

# Consumer perceptions of precision breeding

Area of research interest: [Behaviour and perception](#)

Planned completion: 1 December 2022

Project status: Completed

Authors: Ipsos UK

Conducted by: Ipsos UK, Food Standards Agency, Food Standards Scotland

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## Consumer perceptions of precision breeding: Executive summary

Results available: Results available

Area of research interest: [Behaviour and perception](#)

Research topics: [Novel foods](#)

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[The Board Paper](#) published 9 March 2023 seeks Board input in respect to Consumer information on precision bred food.

The Genetic Technology (Precision Breeding) Bill is currently progressing through parliament. To understand consumer perceptions further, the FSA has commissioned research to build on [Consumer perceptions of genome edited food \(2021\)](#).

## Methodology

This research was conducted in two stages:

### Phase 1: Polling

- A quantitative online survey, with 4,177 respondents across the UK.
- Conducted via the Ipsos Access Panel, allowing national and regional samples that are representative of the population on key demographics.

- Achieved total sample of 4,177 UK adults aged 16-75. Sample for England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).
- Fieldwork ran from 29 July to 1 August 2022.

## **Phase 2: Deliberative workshops**

- Reconvened deliberative workshops, with each cohort attending two 3-hour sessions hosted on Zoom.
- The achieved sample was 97 in total, with 43 in England, 26 in Wales and 28 in Northern Ireland. Scotland was not included in the qualitative research as Food Standards Scotland will be carrying out their own deliberative research with consumers in Scotland.
- Participants had enough time to familiarise themselves and ask questions about precision breeding before having to consider their own opinions.
- Participants received £120 for their time.

## **Awareness and understanding of precision breeding**

There was very low awareness of precision breeding, both in workshops and among polling respondents. Very few had ever heard of precision breeding, and generally they did not know what the term referred to.

Three quarters of polling respondents (75%) have not heard of precision breeding, whilst just one in twelve (8%) have and know what it is, and 16% have heard of it but are unfamiliar.

However, it is important to note that they also had low awareness and understanding of food production methods generally, including conventional breeding methods.

Workshop participants who had heard about precision breeding said they had heard about it from EU-Exit related news about trade and imports, or from New Scientist articles about scientific developments such as CRISPR.

Once participants knew what precision breeding was, they displayed some key initial reactions, which were underpinned by their general attitudes to and understanding of food technology and science. These initial reactions often informed their overall attitudes throughout the workshop discussions.

- There were participants who viewed precision breeding as a natural progression from conventional breeding, and a logical next step that is similar, but more efficient than selective breeding.
- There were also participants who viewed precision breeding as unnatural interference, and just a re-brand of genetic modification. These participants viewed precision breeding as unpredictable and likely to cause unpredictable health impacts in the long-term.

Overall, half of survey respondents (50%) said that precision bred food products should be available for sale in the UK in the future, compared to fewer than three in ten (29%) who said they should not be.

However, both the workshop and survey findings demonstrated that precision breeding is less acceptable in animals than in plants. A majority of the survey respondents (54%) think it would be acceptable to use the precision breeding of plants in food production, whilst just 35% said precision breeding of animals is acceptable.

There were some negative reactions to the terminology, with the word 'breeding' closely associated with livestock rather than crops. This was off-putting to some participants because precision breeding in animals was often not seen as acceptable. Participants suggested that

'grown' or 'cultivated' or even 'engineered' are words that are more closely associated with plants.

When hearing about how precision breeding works, the word 'mutation' was also very off-putting for participants who were less familiar with the scientific concepts. They viewed mutations as a negative or scary occurrence, and therefore not a word they would like to associate with their food.

## Perceptions of risk and benefits

It is important to note that the benefits and risks reported on here are the respondents' perceptions, the ones that matter to them; these may not be based on the existing scientific evidence. As this report represents participants' views, it is important to include all of these, as they demonstrate the concerns, expectations and areas of confusion for consumers.

**Key perceived benefits for consumers include:** Improved health benefits such as increased vitamins in food, or allergen safe foods, potentially cheaper foods if cost savings from higher yields passed onto consumers, improved availability of foods if less reliance on imports due to UK climate friendly precision bred crops.

**Key perceived benefits for the economy and food industry include:** Farmers benefiting from higher yields due to improved resilience and fewer imperfections in crops, more local food production if crops altered to be resilient to UK climate, and more jobs created in research and development to create new precision bred crops.

**Key perceived environmental benefits include:** Combatting impacts of climate change with more resilient crops, lowering carbon emissions by increasing local food production and reducing imports.

**Other perceived benefits include:** Global benefit of creating resilient crops that may address food security in countries impacted by climate impacts such as floods.

**Key perceived risks for consumers include:** Risk of unknown long-term health impacts caused by consuming precision bred foods, emergence of new food intolerance, lack of transparency about decision making meaning that the public interest is not prioritised, lack of information undermining consumer choice, or more expensive foods if the costs of research and development passed on to consumers.

**Key perceived risks for the economy and food industry include:** Monopolisation of precision bred foods by large companies may price out smaller companies and hoard profits generated by the technology, risk to trade negotiations for the UK if deviating from the EU stance on precision breeding.

**Key perceived environmental risks include:** Risks to biodiversity if more resilient precision bred crops are not contained and cross contaminate non-precision bred crops, risk to ecosystems if new crops diseases mutate.

**Other perceived risks include:** Risk that monopolisation of precision breeding may cause increased global inequity if smaller countries who lose key export income due to increase in UK grown precision bred crops, or if they are not able to access the technology to combat food scarcity after human or natural disasters, risk of crossing ethical and moral lines by 'playing god' with the DNA of other organisms.

Participants felt that any benefits achieved by precision breeding will be seen sooner, yet negative impacts may only become obvious in the long-term, too late to be properly addressed.

There was a sense that scientific advancements like precision breeding are necessary to tackle both global and domestic challenges, such as climate change and the cost of living crisis. It was also suggested that precision breeding may provide some security to the UK's food supply, often cited in relation food shortages that participants linked to the pandemic and the UK's exit from the EU.

However, there was still large concern amongst participants, particularly about the unknown. Whether they were supportive of precision breeding or not, participants felt that it is worth it only if very tightly controlled, assessed, and monitored.

## **Understanding and awareness of food regulation in the UK: food you can trust**

There was generally very strong confidence in current UK food regulation, with participants trusting that food available to them is safe.

Among survey respondents, a large majority of over eight in ten (83%) are confident that the food they currently buy in the UK is safe to eat, while just a small minority (12%) said the opposite.

Workshop participants said this trust has been undermined to some extent by previous controversies, with participants sometimes referring to the horse meat scandal and "Mad Cow" disease. Participants responded particularly well to the independent nature of the FSA. They viewed the FSA's work as more trustworthy because it is non-political.

Participants were reassured that the new food risk assessments process can take up to 2 years, feeling that this demonstrated appropriate thoroughness. Some participants were also supportive of the proportionate assessment of foods that are new to the UK market yet widely consumed in other countries (such as Chia seeds) compared to new foods with little or no history of consumption in other countries (such as Quorn).

Workshop participants said that they trust scientists, experts, farmers, and independent regulators. They did not trust politicians or large corporations such as biotech companies, supermarkets or large food producers. The quantitative survey showed similar patterns of trust. Around seven in ten trust scientists (75%), farmers (73%) and scientists advising on food (69%), and three in five say the same about regulators such as the FSA (62%). Just under half trust food manufacturers (49%), and only 14% trust politicians.

Workshop participants were asked what they would want or expect to be in place so that they could trust that precision bred foods were safe. They wanted unbiased, independent governance of precision breeding, and reassurance that decision making is led by scientists and experts, and not private or political bodies.

Participants were very clear in their desire for thorough safety testing of all new precision bred products. They wanted to know that risk assessments would have high standards and require strong evidence and that the FSA's work to regulate precision bred foods would be adequately funded so that consumers can trust that the processes are followed thoroughly.

Due to low trust in politicians and private corporations, participants wanted full transparency about the organisations and individuals who fund precision breeding research, develop new crops, or produce precision bred products. They felt it is important for consumers to know which products are precision bred, and to have been well enough informed that they can understand what this means.

Participants also wanted to ensure that precision breeding technology and precision bred seeds were accessible for small producers and developing countries. They worried that without market

regulation large producers may monopolise precision breeding technology.

Participants were also keen to see separate environmental impact risk assessments conducted on new precision bred crops, as part of the authorisation process.

## **Views on the Genetic Technology (Precision Breeding) Bill and regulatory framework**

The Genetic Technology (Precision Breeding) Bill was introduced to Parliament in May 2022 and will set the legal parameters for the release and marketing of, and risk assessments relating to, precision bred plants and animals and the marketing of food and feed produced from such plants and animals.

Overall, participants across the groups reacted positively to the idea that the Bill would create a new category specifically for precision bred foods. Due to the scientific differences between genetic modification and precision breeding, participants felt it logical that the two were separated. They felt this may improve transparency and consumer choice for those who are happy to eat precision bred but not genetically modified foods.

Some participants opposed the Bill because they fundamentally disagreed with the distinction between genetic modification and precision breeding, arguing that despite the difference in outcomes, it is still altering DNA and should be considered a type of genetic modification.

Workshop participants largely supported the concept of a two-tier risk assessment framework, saying that the approach is logical, by prioritising FSA resources to focus on thorough assessments for products that were more likely to have risks, and avoiding over-assessing lower risk foods in Tier 1 and that we already know to be safe. More details about the difference between Tier 1 and Tier 2 is described in the main body of the report.

Some participants disagreed with the two-tier system, due to their view that that all precision bred products should be subject to more rigorous Tier 2 level screening. They reasoned that there is no way to predict what risks may be discovered in the future, and therefore Tier 1 assessments would not be acceptable while precision breeding is new.

Some participants felt strongly that the two-tier system should only apply to precision bred crops, not livestock. These participants felt that all precision bred livestock should be subject to Tier 2 regulation and assessment, or subject to a separate bill and regulation system entirely due to the common opinion that precision breeding in livestock is far less acceptable and possibly riskier than in crops. Some also felt that precision bred livestock should not be permitted at all.

In both Wales and Northern Ireland, there was concern that their own devolved governments would have no input into safety regulations if the Bill applies only to England. Welsh participants had concerns that the Welsh farming industry may be at a disadvantage to English farmers who are allowed to grow precision bred crops.

## **Communicating information about precision breeding**

Participants felt that the public should be educated on the broad concept of precision breeding, so that they have a basic understanding of how the foods available to them may change. They felt this is important so that consumers are able to choose to learn more if they want to, and where to look for more information.

Public education was also seen as key to maintaining public trust in precision bred foods, and the transparency of the UK food system as a whole. Participants described clear information as a

protection against backlash and misinformation.

Workshop participants felt very strongly that precision bred products should be labelled as precision bred. While existing mandatory labelling would inform consumers of any changes to the characteristics of the product, participants felt that this would not be sufficient on its own. They argued that being able to identify precision bred products via labelling is critical for transparency, and therefore to consumer choice and public trust.

Survey respondents agreed, with nearly four in five (77%) saying it would be important when buying a food item to know if it had been precision bred, and nearly half (45%) saying it would be 'very' important. Only one in six (15%) say knowing this would not be important.

Participants were informed that the FSA are considering a precision breeding register. Participants felt that would be a beneficial way to house all helpful information in one place, as a powerful tool for transparency and public trust. While participants felt that consumers may not be likely to use the register, they said that just knowing the register exists is key to public trust.

Participants felt that the register could be most effective if combined with some level of product labelling as they would need to know if a product is precision bred so that they know when to refer to the register for more information. In addition, they wanted information at the point of purchase so they could make an informed decision.

Participants felt that the register should prioritise accessible, jargon-free language, so that consumers could understand the information.

## **Views of precision breeding across UK nations**

A requirement for the FSA was how views varied across the UK nations. Overall, perceptions of precision breeding were broadly similar across nations, with few notable differences. However, the quantitative findings suggest slightly more positive views in England. For example, there was slightly less support for precision bred foods to be on sale in Wales and Scotland, and consumers in Northern Ireland were less likely to think precision bred food would be safe and less likely to say they would eat precision bred foods.

People across all nations thought the potential impact precision breeding could have on food affordability and the environment was more likely to be positive than negative but were more concerned about animal welfare and even more so about small-scale farmers, particularly in the devolved nations. People in the devolved nations were also less convinced by many of the potential positives such as nutritional benefits, the taste, animal welfare and small-scale farmers compared to those in England, particularly in Scotland and Northern Ireland.

# Consumer perceptions of precision breeding: Introduction

## Research context

The Genetic Technology (Precision Breeding) Bill is currently progressing through parliament and, should the Bill achieve Royal Assent, this will allow the Food Standards Agency (FSA) to advise Ministers on the introduction of a regulatory framework for precision bred organisms (PBOs) for use in food and feed which is separate from the current regulatory framework for genetically modified organisms (GMO) for food and feed uses.

The introduction of precision bred food and feed to the market will impact on consumers and the choice of food products available. Now that the Bill is going through the UK Parliament and the scenario of the introduction of precision bred food into England is less hypothetical, the FSA wishes to commission further research to build on [Consumer perceptions of genome edited food \(2021\)](#).

## Devolved nations context: The FSA's role and the Bill

Devolution in the UK means that there are different policy requirements, accountabilities and priorities across the four nations. The FSA operates in England, Northern Ireland, and Wales and has different policy responsibilities within these countries. Food Standards Scotland (FSS), a separate public body, has responsibility for food policy in Scotland.

**Figure 1: Food policy responsibilities across the UK four nations**

| Food policy area                                       | England                                            | Northern Ireland | Wales            | Scotland |
|--------------------------------------------------------|----------------------------------------------------|------------------|------------------|----------|
| Food and Feed Safety and Hygiene                       | FSA                                                | FSA              | FSA              | FSS      |
| Nutrition related Labelling, Composition and Standards | Department of Health and Social Care               | FSA              | Welsh Government | FSS      |
| Food Compositional Standards and Labelling             | Department for Environment, Food and Rural Affairs | FSA              | FSA              | FSS      |

The Precision Breeding Bill is for England only. Despite being an England-only Bill, there may be implications for consumers in Northern Ireland, Wales and Scotland:

- **Northern Ireland:** Precision bred foods authorised in England will not be permitted to be sold in Northern Ireland. Northern Ireland continues to comply with EU Law under the current terms of the Protocol on Ireland/Northern Ireland. Under EU Food law precision bred food would still have to be authorised as genetically modified food before it could be placed on the market and labelled as such. It would be subject to the EU authorisation process. We have included consumers from Northern Ireland in this research to understand their views on precision bred foods should products be sold in Northern Ireland in future.
- **Wales and Scotland:** Under the market access principle of mutual recognition outlined in the UK Internal Market (UKIM) Act 2020 a product that is authorised to be produced in or imported into England can enter the Scottish or Welsh market for direct sale. The mutual recognition principle only relates to the sale of goods in another part of the UK – local regulations govern any use/processing after sale by food/feed businesses. However, businesses in Wales and Scotland would not be able to produce precision bred foods to sell in Wales or Scotland themselves.

This research does not aim to get consumers' views on the Bill itself, but to understand consumers' priorities and opinions to inform the FSA's regulatory development and communication approaches if the bill is passed.

This research aims to:

- Understand consumer awareness and perceptions of precision breeding,
- Provide evidence on what information might be needed to maintain consumer confidence,
- Provide evidence on future information needs of consumers when precision bred food products come on the market,
- Provide evidence to stakeholders in the Welsh Government and Northern Irish Executive to inform future policy,
- Inform how the FSA should communicate the main themes of the Bill to consumers.

## Research questions

1. What do consumers currently understand about the term “precision breeding”?
2. What are their attitudes to precision breeding, what concerns do they have and why?
3. What do they perceive to be the risks and/or potential benefits?
4. What are the factors that influence the different attitudes towards the acceptability of precision bred organisms entering the food and feed market?
5. What are consumer views on the FSA's proposed regulatory framework for precision bred organisms, and how if at all does it impact on consumer confidence?
6. What information do consumers need to come to an informed position on precision breeding?
7. How can the FSA best communicate with consumers about precision breeding?

## Methodology

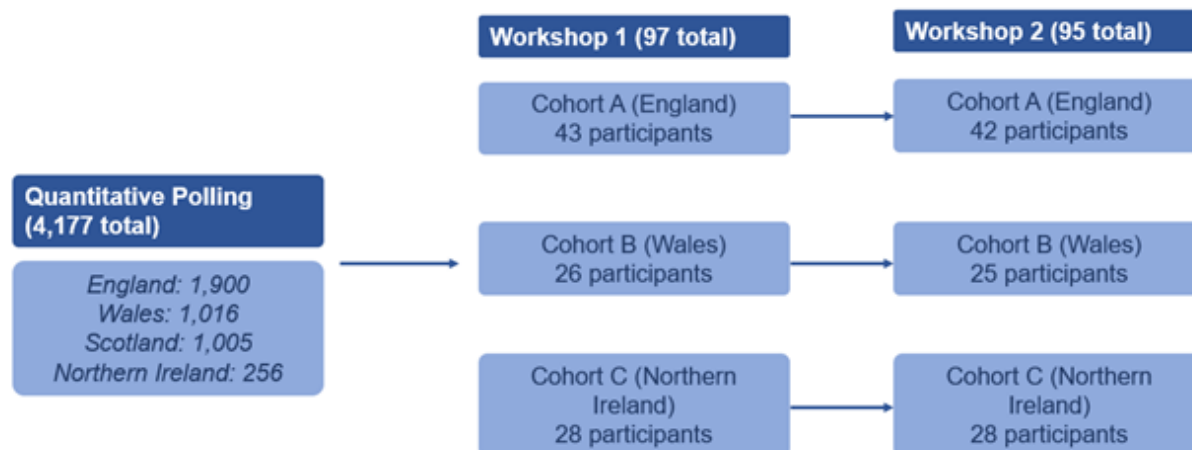
In August 2022, the FSA commissioned Ipsos UK to conduct research exploring consumer views on precision breeding. This research used a mixed-methods approach and is comprised of two phases:

**Phase 1:** Quantitative survey research (England, Scotland, Northern Ireland, Wales)

**Phase 2:** Deliberative workshops (England, Northern Ireland, Wales)

**Figure 2: Flowchart showing the fieldwork process**





## Phase 1: Quantitative online survey

For phase one of the research, an online methodology was used to deliver the quick turnaround required. The Ipsos Access Panel was used as it achieves national and regional samples that are representative of the population on key demographics, as well as allowing for equivalent split samples for the administration of nuanced surveys on specific topics.

From the online survey, the key issues were the level of awareness and knowledge of precision breeding, consumer views of the acceptability of precision breeding, and what are consumer views on precision bred food. The initial findings from this informed the qualitative phase of this research.

### Phase 1: Sampling and recruitment

A key requirement for the FSA was how views varied across the UK nations. The achieved sample of 4,177 UK adults aged 16-75 was composed of online interviews through an Ipsos i:Omnibus survey in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256). Fieldwork ran from 29 July to 1 August 2022.

Quotas for the overall sample were set on age, gender and working status. These samples were weighted to be representative of each nation by age, gender, working status and social grade. When they were combined into an overall UK data set, each nation was then weighted to its relative proportion. The full sample for phase 1 can be found in Appendix 1.1.

The survey included a split sample where respondents were made aware of the FSA's and FSS's regulatory involvement with precision breeding at different stages of the survey. Whilst this had little impact on findings, this report highlights where these differences in question wording occurred.

Only demographic differences that are statistically significant at the 95% confidence level, 2-tailed, have been commented on in this presentation, unless otherwise stated.

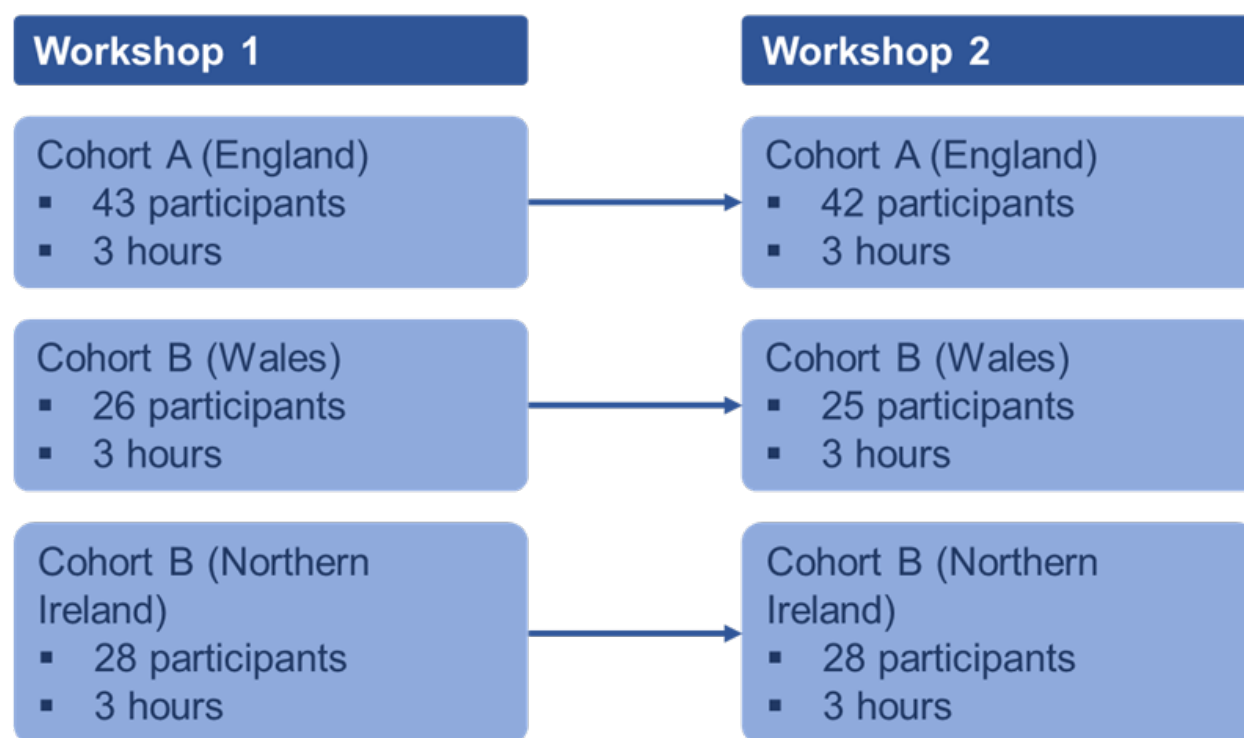
## Phase 2: Deliberative workshops

Phase 2 was the qualitative stage of the research, consisting of reconvened workshops with 97 participants across three national cohorts. Each workshop was 3 hours long, providing participants with 6 hours of deliberating across the two sessions.

The benefits of using reconvened workshops were twofold. It meant that participants had enough time to familiarise themselves and ask questions about precision breeding before having to consider their own opinions. Additionally, it allowed space for reflection between the two

workshops, meaning participants could discuss the topic with their peers and reflect on what they had learnt.

**Figure 3: Flow chart of phase 2 design**



### **Phase 2: Sampling and recruitment**

The target sample was made up of 90 participants in total, split by nation: 40 England participants, 25 Wales participants and 25 Northern Ireland participants. To ensure this target was achieved, there was over-recruitment in each cohort. Due to good participant attendance, the achieved sample was 97, with 43 in England, 26 in Wales and 28 in Northern Ireland.

To ensure that the workshops delivered a diverse range of views and experiences, each workshop sample met minimum quotas on age, gender, ethnicity, and socio-economic group (SEG). Due to the nature of the research, the sample also accounted for additional relevant factors, including household makeup, dietary habits and food hypersensitivities.

For further details, please see the proposed quotas and achieved sample in Appendix 1.2.

A trusted recruitment partner used a screening questionnaire to select participants in each nation, and participants received £120.00 in total for their time (£60.00 per 3-hour workshop).

Workshops were hosted online via Zoom. To enable deep discussions between participants, each workshop was divided into smaller breakout room groups of around six participants. Each breakout room had its own facilitator to foster meaningful but also manageable interactive conversation.

Participants would return to the central plenary when being presented with further information. This ensured consistency in how key information was delivered to participants.

**Workshop 1:** The first set of online workshops took place on 11 (England), 12 (Wales) and 13 (Northern Ireland) October 2022. The key aim of this workshop was to introduce participants to the basic concepts of precision breeding, allowing us to capture baseline awareness of the topic, initial reactions to the concepts, and explore perceived benefits and risks.

**Workshop 2:** The second workshops took place a fortnight later, on 26 (England), 27 (Wales) and 28 (Northern Ireland) October 2022, with the remaining participants from each regional cohort ([footnote 1](#)). Breakout room groups were re-arranged so that participants were interacting with a different mix of people, and therefore exposed to diverging opinions and attitudes towards precision breeding. This session aimed to explore expectations of precision breeding regulation, seek feedback on a proposed regulatory approach, and understand how precision breeding information should be communicated to the public.

These workshops were held following conclusion of debates on the Bill in the House of Commons and prior to 2nd reading of the Bill in the House of Lords. Any details provided to participants was therefore based on the proposed contents of the Bill at this point, which was still to be subjected to debate in the House of Lords (where amendments could be considered).

## Reporting conventions

This report blends both quantitative polling findings with qualitative workshop findings. It is structured around the flow of workshop discussions, with quantitative findings integrated at key points to provide context. Subheadings make clear where quantitative findings are included. Although the results have been blended, only the quantitative findings are relevant to Scotland, as qualitative work relates only to England, Wales and Northern Ireland. FSS will be carrying out separate qualitative research with consumers in Scotland.

There are some key differences in reporting conventions for the qualitative and quantitative findings:

- **Quantitative:** Refers to respondents, rather than participants. This aims to show quantity and proportion of respondents who held particular views. While similar quantitative research was conducted in 2020, it is important to note that the data sets are not directly comparable due to changes in language.
- **Qualitative:** Refers to participants, rather than respondents. Aims to show the range of views held, and the strength of feeling, not how many participants held a particular view.

1. There was some drop-out between workshop 1 and 2 for Cohorts A and B.

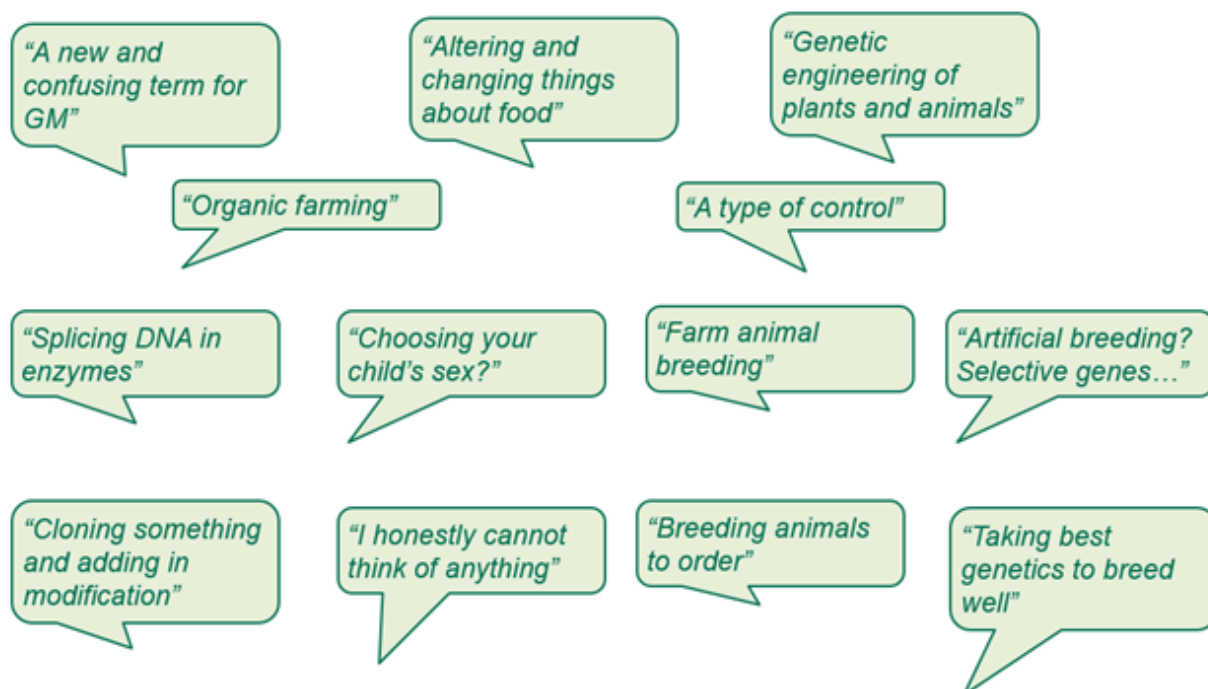


# Consumer perceptions of precision breeding: Awareness and understanding of precision breeding

## Baseline public awareness

Workshop 1 began with an introduction to precision breeding, outlining the key scientific concepts, and how the method compares to conventional methods, and genetic modification.

**Figure 4: Uninformed views of what 'precision breeding' means, from workshop chat function**

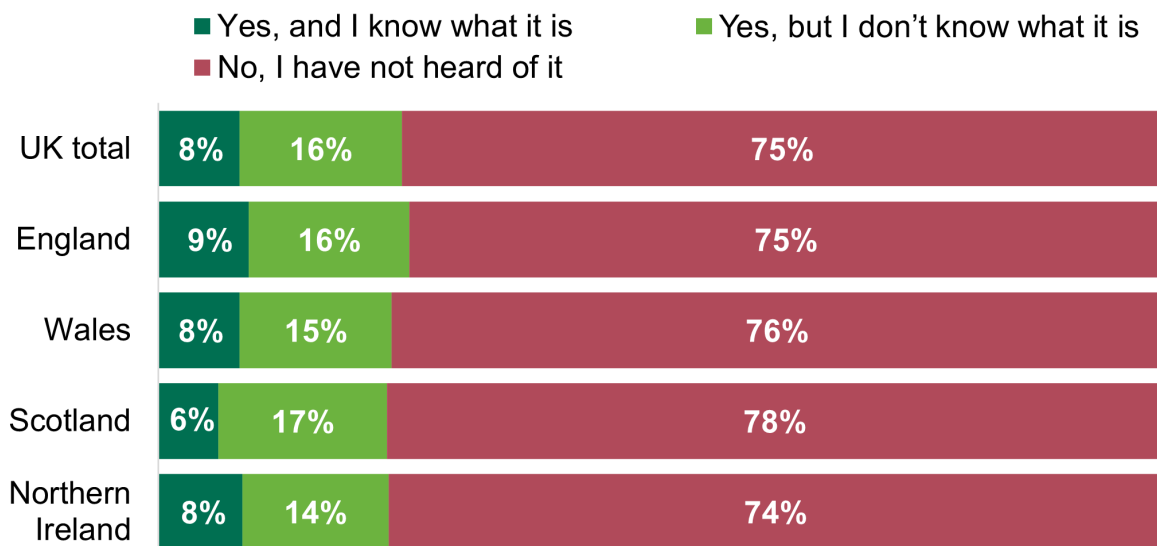


Before this information was shared with participants, they were asked if they had heard of precision breeding or knew what it is. Very few participants had ever heard of precision breeding, and generally they did not know what the term referred to. They did however make some guesses before information was presented to them, often suggesting: a new term for genetic modification, artificial selection, or breeding animals (rather than plants).

This aligns with the quantitative findings, where respondents' claimed awareness of precision breeding was low. Three quarters (75%) have not heard of precision breeding, whilst just one in twelve (8%) have and know what it is, and 16% have heard of it but are unfamiliar.

Awareness is slightly higher among men (12% saying they know what it is) and those living with children (15%). People in England (9%) are more likely to say they know what it is compared to people in Scotland (6%).

**Figure 5: Have you heard of precision breeding before?**



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

During workshops, the introduction to precision breeding shared with participants explained that:

Precision breeding is a term used to describe a range of modern scientific methods for editing an organism's DNA.?

Precision breeding makes changes to a plant or animal that could have happened naturally? through traditional?breeding methods but can now be made to happen more quickly and more predictably.

This might be done to make things more resistant to disease, need less water to grow, or to increase the nutritional content.

Participants were also shown definitions of other methods including artificial selection, induced mutation, and genetic modification. They were shown two informational videos about precision breeding, and the CRISPR tool. The full Workshop 1 materials can be found in Appendix 3.

After they had been presented with this information, participants discussed their familiarity with this information and shared their assumptions.

It was clear that participants had very low awareness about precision breeding. However, it is important to note that they also had low awareness and understanding of food production methods generally, including conventional breeding methods. This made it challenging for some participants to grasp the differences between methods, as they learned about them all at once.

Participants were also surprised and sometimes felt uncomfortable about conventional breeding methods, having previously assumed that there was less human intervention in breeding for food production. Induced mutation in particular was worrying for participants, due to the use of chemicals or radiation. They noted that they were unaware of these methods previously and had questions about them.

**"The radiation shocked us all, that they are doing that with food. It's a worry with our health."**  
**(Workshop 1, England)**

**"I associate radiation with something harmful, and hazardous. So, if they're doing that to foods, what is that transferring to people who eat it?"** **(Workshop 1, Northern Ireland)**

This context is key when analysing participant reactions to precision breeding, as awareness of other breeding methods often shaped participants reactions to information about precision breeding.

- Those who were more familiar with conventional breeding methods and the concept of mutations were often more open to the idea of precision breeding, seeing this as similar to selective breeding.
- Those who were unfamiliar with conventional methods were often surprised by the level of human intervention overall, and sometimes responded by feeling that humans should intervene less and focus on 'natural' methods.
- Those who were aware of genetic modification quickly recalled controversy and public distrust in these approaches. These participants often voiced initial wariness of precision breeding, viewing it as closer to genetic modification than conventional methods, or even viewing it as a re-brand of genetic modification.

Although awareness was very low in workshops, there were participants who had heard of precision breeding, and a few who knew about CRISPR specifically. These participants said they had heard about it from EU-Exit related news about trade and imports, or from New Scientist articles about scientific developments.

## **Understanding of and reactions to precision breeding information**

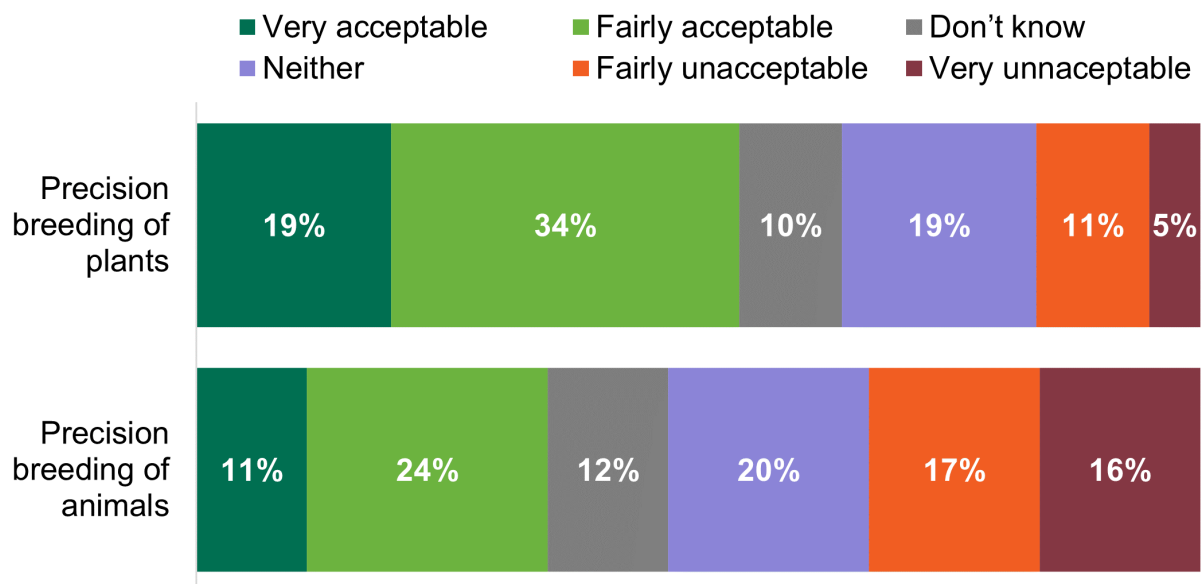
Participants' comprehension and reactions to the definitions were varied. This chapter discusses how participants interpreted this information, what the common areas of confusion were, and gives insight into how precision breeding can best be explained.

There were several key initial reactions to precision breeding, which underpinned participants' overall attitudes:

- There were participants who viewed precision breeding as a natural progression from conventional breeding, and the logical next step in farming technology. These participants often described precision breeding as a faster more precise method for selective breeding, and therefore not too different from conventional methods. This view led participants to consider ways in which the technology could create solutions to current global challenges such as food scarcity and climate change.
- There were also many participants who viewed precision breeding as unnatural interference, and just a re-brand of genetic modification. These participants often described precision breeding as an unpredictable technology, with no way to truly know the health or environmental impacts. This view led participants to raise ethical questions about the morality and risks of 'messing with nature' or 'playing God' by altering the DNA of other organisms.

Both the workshop and survey findings demonstrated that precision breeding is less acceptable for consumers in animals than in crops. A majority of survey respondents (54%) think it would be acceptable to use the precision breeding of plants in food production, whilst 16% say it would be unacceptable. However, respondents are more divided over whether precision breeding of animals is acceptable (35% acceptable, 33% unacceptable).

**Figure 6: How acceptable or unacceptable, do you think it is to use the following in food production?**



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

Overall, half (50%) think that precision bred food products are safe to eat, and 22% think they are unsafe. Again, attitudes are soft with just 13% thinking these products are “very safe”. People in Northern Ireland are less likely to think they are safe (42% compared to 28% who say unsafe).

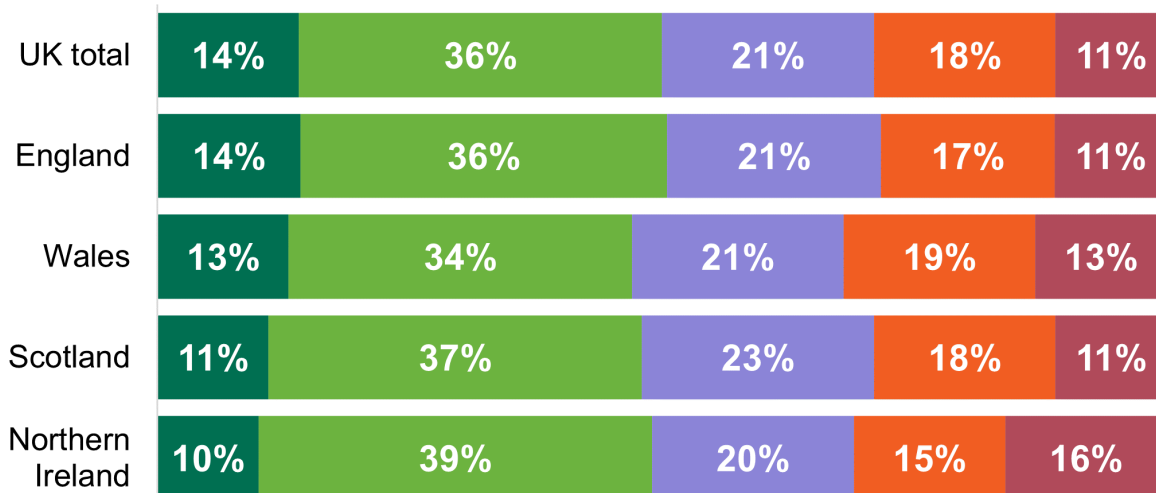
Those most likely to think they are safe include Londoners (63%), men (58%), 16–34-year-olds (56%), households with children (56%), higher socio-economic groups AB (55%), graduates (54%), and people who like unfamiliar foods (60%).

Half of survey respondents (50%) say that precision bred food products should be available for sale in the UK in the future, compared to fewer than three in ten (29%) who said they should not be. However, this support is not particularly strong, with one in seven (14%) saying they definitely should be available, compared to just over a third thinking they probably should be available (36%). People in Wales are slightly less likely to think these products should be available for sale (47%).

**Figure 7: Do you think that precision bred food products should, or should not, be available for sale in the UK in the future?**



- Yes –they definitely should be available for sale in the UK in the future
- Yes –they probably should be available for sale in the UK in the future
- Don't know
- No – they probably should not be available for sale in the UK in the future
- No – they definitely should not be available for sale in the UK in the future



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

Workshop participants also had initial reactions to the terminology used, either the term 'precision breeding', or in the words used to describe the process. The word 'breeding' itself was very closely associated with livestock rather than crops, which was off-putting to some participants because precision breeding in animals was often not seen as acceptable. Participants suggested that 'grown' or 'cultivated' or even 'engineered' are words that are more closely associated with plants.

"It doesn't strike me that cauliflowers, for example, get 'bred'. I'm sure it's an industry term but it's a bit freaky. It's a mental image. You don't need that." **(Workshop 2, Northern Ireland)**

"I don't like what it's called, precision breeding, it doesn't go with the ingredients, plants. Breeding to me is what you do with animals.?" **(Workshop 2, England)**

The word 'mutation', while scientifically appropriate, was also very off-putting for those participants who were less familiar with the scientific concepts. They viewed mutations as a negative or scary occurrence, and therefore not a word they would like to associate with their food.

"It's the mutation, it sounds all disfigured to me." **(Workshop 1, England)**

There were also some common areas of confusion where participants misunderstood core concepts or made assumptions about the process.

- Distinction between methods: Some participants struggled to understand the difference between precision breeding and genetic modification, and often asked for clarification and mixed up the two throughout the length of the fieldwork. Some participants also got confused between induced mutation and precision breeding and referred to the use of chemicals or radiation in precision breeding. This seemed to be because they had learned about both at the same time.
- Methods for growing precision bred crops: There was also a common assumption that precision bred crops would be fully produced in laboratories, rather than developed and



tested before being planted and grown. This assumption led some participants to view precision bred crops as less natural, as they did not consider them to be 'grown' or from the ground.

"I don't know if I'd feel comfortable eating something that was made in a lab when it should have been grown. And does it have the same nutrition as a vegetable grown in the ground? "

**(Workshop 1, England)**

- Availability of genetically modified foods in the UK now: There was an assumption that many UK foods are already genetically modified, but that consumers were not informed about it. This was linked to distrust in food producers and transparency with the public, with a sense that food production practices are routinely hidden from consumers.

"Chicken in supermarkets, you know that's genetically modified. It doesn't surprise me they're trying to do this with fruits or the potatoes...A lot of food and stuff that isn't organic is already modified." **(Workshop 1, Wales)**

There were many questions that participants asked in response to the precision breeding information they were shown. These questions highlight areas of interest, concern, and where further explanation may be beneficial in communications to the public.

#### **Common questions asked:**

- Questions about PB decisions and funding:
  - Who is going to make final decisions about precision breeding?
  - Who funds scientific trials?
  - Who will benefit financially?
  - What about precision breeding in other countries?
  - Will we import precision bred foods?
- Questions about the scientific process:
  - What methods are used to change the DNA
  - In what way is the DNA changed?
  - How is crop DNA stored?
- Questions about potential impact of precision breeding:
  - Will precision bred food be more expensive?
  - Will this negatively impact farmers?
  - Could there be adverse health impacts for people or animals?
  - Could this potentially create new allergies?
  - What does this mean for organic produce?



## **Consumer perceptions of precision breeding: Perception of risks and benefits**

Participants discussed perceived risks and benefits across the workshops. While some confirmed their positive or negative views during this discussion, others went back and forth in how comfortable they felt about precision breeding, with some starting to feel differently than they had initially.

It is important to note that these are perceived risks and benefits that matter to participants but may not reflect the most important or most likely based on the existing scientific evidence. As this report represents participants' views, it is important to include all of these, as they demonstrate the concerns, expectations and areas of confusion for consumers.

## **Perceived benefits**

### **Consumer benefits**

A key benefit for participants was the possibility of precision bred foods having health benefits. Participants were enthusiastic about precision breeding leading to foods with higher nutritional value or having increased sources of vitamins. For example, many groups discussed the potential for precision bred foods with an increase in vitamin D as being particularly helpful for the UK, where many consumers are deficient. Participants also saw precision breeding as potentially having benefits for the overall public health of the UK, not just themselves as an individual consumer. For example, some suggested that precision bred foods could help tackle obesity in the UK by offering consumers better quality food in terms of nutritional value.

The potential for precision bred foods to be cheaper for consumers was an important potential benefit for many. These participants reflected on how this could help the impact of the current cost of living crisis. Participants were optimistic that precision bred foods being available at a lower cost could help tackle food poverty in the UK, alongside making food cheaper for all consumers.

"They'd be a cost benefit, if there's less wastage as everything comes out perfect, the cost should be less." **(Workshop 1, England)**

Participants also highlighted how precision breeding could increase the availability of certain foods in the UK. Many said that it would be useful for the UK not to have to rely on imports from other countries for foods that we eat a lot of, for example chocolate and avocados.

"Having the ability to grow avocados without heat and humidity, for example, we could grow it in the UK without relying on other countries." **(Workshop 1, Wales)**

Similarly, participants were enthusiastic at the prospect that precision breeding could help remove the components in food that cause intolerances and allergies. For participants, this was important because it may allow those with dietary requirements more choice as consumers, and they may not have to worry as much about the consequences from eating different foods.

"To make the crops healthier. More nutrients. Especially for people with coeliac disease, my girlfriend suffers from that and it's awful. That would be brilliant." **(Workshop 1, Wales)**

### **Benefits for the economy and food industry**

There was optimism in groups about ways in which precision breeding could benefit individual farmers and producers. Participants thought that if crops could be bred to be more resilient, (against drought, flooding, or hot weather), and have fewer imperfections, then farmers would gain consistently higher yields and see less crop waste. There were expectations amongst some that precision bred foods could be "faultless", although other participants did not expect this but

thought these products should be consistently of a higher quality than non-precision bred crops.

"There will be less waste because they took out the DNA that spreads the disease, so less spray is needed on there, which effects the environment." **(Workshop 1, England)**

Participants also raised that, if made to be more resilient, precision bred crops may be more locally sourced, creating more local food production and benefitting the UK farming industry. The groups were particularly interested in how this could help make the UK more self-sufficient when it comes to food production, allowing us to rely less on imports and maintain consumer access to foods that may be suffering shortages elsewhere in the world. This was a pertinent issue for participants, who often discussed this in reference to trade impacts from the war in Ukraine and the UK's departure from the EU.

"The way the world's shaping up, like with us leaving the EU, we could be held hostage as a lot of our food comes from the EU, if you can precision breed crops within our climate, it ensures food security." **(Workshop 1, Wales)**

It was also thought that if the UK introduced precision bred food, it could provide jobs to a range of sectors. Participants acknowledged that it could lead to more jobs in farming because of the increase in yields, however they also discussed that it could boost the UK's scientific research industry.

## **Environmental benefits**

A leading benefit for participants was how precision breeding could help combat climate change by creating more sustainable crops. Participants thought the benefits were potentially two-fold; firstly, as discussed above, if crops could be precision bred to be more resistant to extreme weather conditions, there would be less waste. Secondly, participants discussed that if crops could be grown more locally, this would lower our carbon footprint by reducing pollution caused by haulage and airmiles.

"That it could help make crops more resilient and help with droughts and stuff. Amazing. I think that's a really, really good thing." **(Workshop 1, Wales)**

This point was caveated by some who felt that precision breeding could be portrayed as fulfilling the UK's obligations around tackling global warming, meaning government may not prioritise taking further action. These participants stressed that precision breeding is a "little fix", and not a complete solution, meaning we still need to address root causes of global warming.

## **Other benefits**

Participants thought that precision breeding could have a global benefit, particularly for countries who suffer from food shortages due to famine and or natural disasters. Some referenced the recent floods in Pakistan and discussed how difficult it will now be to grow traditional crops on that land. This was a stand-out benefit for participants, and they were enthusiastic thinking about how precision breeding could potentially help combat world hunger.

"It could help a lot of economically struggling countries, if there's a drought, or something, and you can make crops more robust, it could save a lot of lives." **(Northern Ireland)**

"The food scarcity for those with no food, it could make a big difference to their life...We have food, so it doesn't affect us that much. We may not get the nicest strawberries in the supermarket at the moment but that's it. For people with no food, this would be life changing." **(Workshop 1, England)**

The quantitative findings indicated that the public would expect similar benefits. Respondents expect that if precision bred products became available for sale in the UK, then they would be more likely to have a positive than negative impact on the affordability of food (38% vs. 19% respectively), on the environment (36% vs. 18%), how nutritious precision bred food products are (34% vs. 18%).

## Perceived risks

### Consumer risks

A leading concern for participants, reflected throughout both workshops, was a fear of the unknown in relation to precision breeding. Participants often highlighted that there may be long-term side effects from eating precision bred food that won't be realised for years to come, or perhaps will only be recognised when it is too late. They often compared this to the Covid-19 vaccine, explaining that they feel some uncertainty about what could be found out in the future.

"Yes... the long-term risks to our bodies, perhaps, that we might not know for 20 years or so. That's definitely a concern." **(Workshop 1, England)**

"If we can do this this quickly now, do we know everything or do we have to wait to find out eight to fifteen years down the line?" **(Workshop 1, Northern Ireland)**

Some participants were particularly concerned that precision breeding could create new food intolerances, or that the given examples of foods that can reduce blood pressure may have serious consequences for consumers who struggle with that issue anyway.

Linked to this, participants were concerned that there would be a lack of transparency surrounding precision breeding. All groups had very strong feelings that the public would need to be informed about precision breeding, and which products contain precision bred ingredients. Participants thought it was essential that consumers have this information so that they can make informed choices about what they eat.

Participants are also particularly concerned over a lack of transparency around funding for precision breeding, and political interest. These participants wanted to learn more about who would be funding the technology, and who would be set to benefit from it financially or politically. Some groups were worried that politicians and manufacturers would attempt to keep their self-interests hidden, meaning that public benefit would not be prioritised for decisions around precision breeding. Across the workshops, participants raised that transparency over this information would be key to their perception or acceptance of precision breeding.

"If somehow the elimination of the profit motive could be achieved for the betterment of all, I think people would be much more agreeable to get behind it. The fact there is a profit motive in this, which I'd be quite certain there is, quite a major one, makes me suspicious of the players involved, including the FSA and its process." **(Workshop 2, Northern Ireland)**

Participants were also concerned that precision bred foods may be of poorer quality than "traditional" foods, particularly in terms of taste.

"We were taught that mutations are random. It puts you off, you wonder if it will change the taste. You'd rather have something natural tasting, not artificial." **(Workshop 1, England)**

Despite being told that precision bred foods may be more affordable, participants were concerned that they would actually be more expensive for consumers. Many thought that if precision bred foods require more research and investment, then this would increase consumer costs. Reflecting on the current cost of living crisis, participants worried that increased costs due to precision

breeding could increase food inequality and disparities between the wealthy and poor. Participants also discussed how, even if product prices do not increase, consumers may still end up paying for precision breeding indirectly via taxes.

"I was thinking of the risk and that it can lead to some food inequality or a hierarchy where if we did not produce it cheaper, then only the rich can afford [precision bred foods]." **(Workshop 1, Northern Ireland)**

## **Risks for the economy and food industry**

Workshop participants raised concerns that the profits and benefits of precision breeding may be monopolised. Participants thought that large producers or businesses would receive an unequally large share of the profits, or precision breeding technology and crops might become patented and so small businesses or farmers would be priced out if they could not afford access. They were worried that small farmers would lose their livelihoods if precision breeding was introduced.

"Can I mention the elephant in the room? Biotech companies, because they're all going to patent all this stuff and make a fortune. They will benefit from it." **(Workshop 1, England)**

Some participants were also concerned that 'traditional' farms themselves may become neglected or even derelict. However, this seemed to come from the common misunderstanding that precision bred crops for sale would be grown in labs.

There were participants who queried whether now is the right time for the UK to be introducing something new into the economy. These participants referenced the cost-of-living crisis but were also concerned about the UK taking a diversion from the EU stance on precision breeding, and whether this could have any trade implications.

"The European Union is thinking about introducing this, which makes me think, 'so it's banned at the minute?' So it makes me think there must be a reason it's banned." **(Workshop 1, Northern Ireland)**

## **Environmental risks**

Many participants had concerns about precision breeding's impact on the ecosystem. They worried that crops precision bred to be disease resistant may eventually lead to disease mutation, causing widespread problems for the environment. Considering biodiversity, the groups again reflected on the dangers of unknown risks and questioned how precision breeding could impact the food chain and natural habitats. Participants were particularly worried whether insects and other pollinators would be able to live off crops the same as they do now.

"If the precision-bred crops are untraceable or they can replace other crops if they are more resilient...You just don't know. Some things can become resilient and maybe start attacking other plants. Then you can have a non-foreseeable circumstance." (Workshop 1, England)

Similarly, groups worried that precision bred crops would be difficult for farmers to control, or that producers would get 'carried away' with precision breeding, and that it would be hard to prevent cross-contamination with other, non-precision bred crops. Participants were concerned that this might result in losing existing crop varieties and our natural resources.

Participants seemed very alarmed at the potential damage that these environmental risks could cause, and many discussed how they thought that introducing precision breeding may only consider human benefit, not how this could impact our wildlife or environment.

## **Other risks**

Some were concerned about the morality of precision breeding. These participants perceive precision breeding to be inherently unnatural, and so question whether it is morally correct, as it could be seen as 'playing God', or 'messing with nature'.

"Well, is it morally correct? Some people might say you're playing God essentially. **(Workshop 1, Wales)**

"With the DNA I just don't agree with messing with nature." **(Workshop 1, England)**

Participants were also worried if the UK were to introduce this technology it could increase global inequality. Some were concerned that if the UK was able to grow crops that it previously could not, reduction in imports could be taking away a vital part of another country's economy. Similarly, based on the discussed benefits of making crops resistant to extreme weathers, participants were concerned that the countries that could benefit from these technologies most may not have access to it.

"Will it only be us and first world countries getting the benefits of these crops? Will places that are struggling have to support themselves with the crops they have?" (Northern Ireland)

Another key concern for participants was that introducing precision bred crops may accelerate or encourage less acceptable uses of precision breeding. Some participants saw the discussion of precision bred crops as a "trojan horse" attempt to introduce precision bred livestock into the UK food market, which was something they often opposed. Consistently across workshops precision breeding for animals was something many participants felt very strongly about. Even participants who were enthusiastic about the benefits of precision bred crops often felt that precision breeding for livestock was less acceptable, if at all.

"I think there does need to be more assurance around sentient beings over things that have no sense or sensitivities. There should be more detail for the animals." **(Workshop 2, Northern Ireland).**

The quantitative survey respondents were most concerned about small scale farmers who cannot access precision breeding technology. Half (50%) said this could have a negative impact, compared to only 18% who think it will impact positively. Those most likely to say it could have negative impact include people living in rural areas (61%), those aged 55-75-years-old (58%) and women (55%). Approximately one in six (18%) said it will have neither a positive nor a negative impact, and 14% said they don't know.

## **Balance of benefits and risks**

At the halfway point in the qualitative research, there was a mix of comfort levels with precision breeding. Many participants felt unsure whether they supported it or not, while others had started to solidify their view one way or another.

Overall, participants felt that any benefits achieved by precision breeding will be seen sooner, yet negative impacts may only become obvious in the long-term, after precision bred foods have been consumed for a long time. Those who said this were worried that the negative impacts may be realised too late to be properly addressed.

"In terms of benefits, they seem good on paper but in terms of the underlying risk, we just don't know what the impacts are. Generations are going to change downstream, it's all going to change so we don't know the change until it hits us." **(Workshop 1, England)**

There was broad enthusiasm for the possible benefits of precision breeding, and a sense that such technological and scientific advancements are necessary to tackle both global challenges, such as climate change, but also domestic challenges such as the cost of living crisis and security

to the UK's food chain.

"Even though I'm not too hot on the idea of precision breeding, you can't deny the potential benefits that have come up. So I feel a bag of mixed emotions." **(Workshop 1, Wales)**

"I'm quite in favour of precision breeding. I'm quite anti genetically modified food. The key thing is that it can happen naturally in nature but it's sped along and done more precisely. This is the beginning of the research, really. In terms of crop yields and increased nutritional value, all the possibilities, I'm just hugely in favour of it." **(Workshop 2, Wales)**

However, there was still large concern amongst participants, particularly about the unknown. Whether they were supportive of precision breeding or not, participants felt that it is worth it only if very tightly controlled, assessed, and monitored.

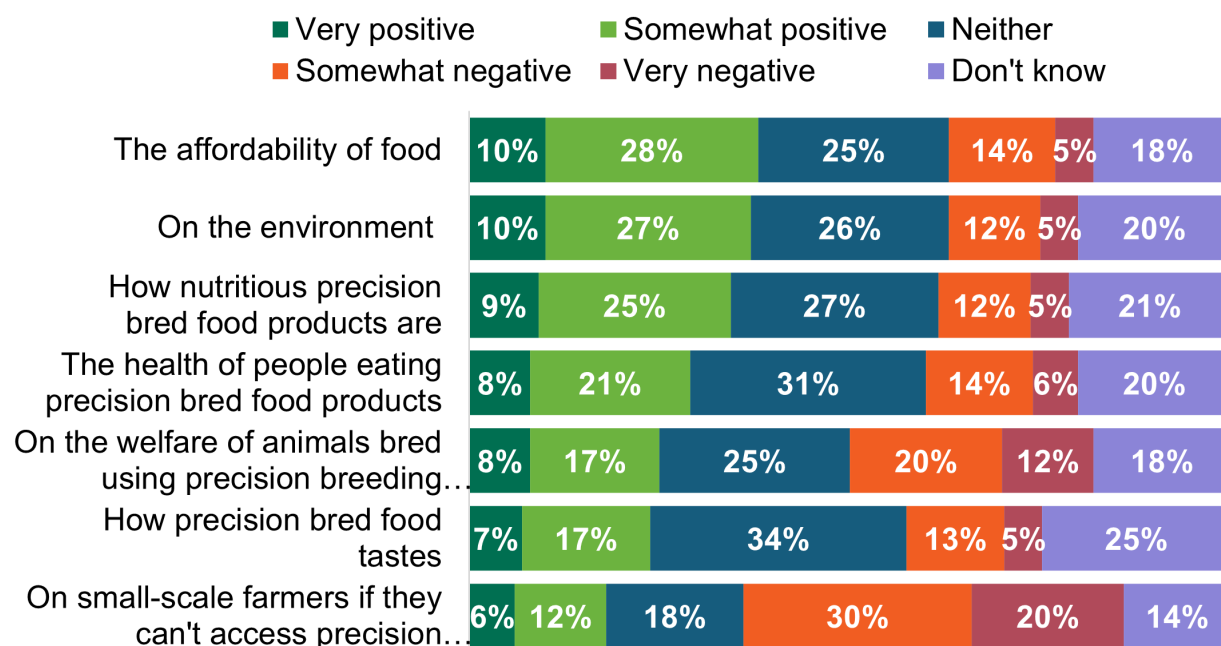
When considering whether they would choose to eat precision bred foods, some participants were quick to stress that they would not eat precision bred meat and that they would worry about eating something "unnatural". However, there were participants who said that given reassurance about safety and long-term risks, they would be willing to eat precision bred foods if they came with health benefits or if they were cheaper.

"If it was cheaper, you would probably try it and see if it's for you. For a lot of consumers it goes down to price." **(Workshop 2, Northern Ireland)**

"I've changed my opinion... It could be a really good thing and it could help a lot of people. But not with meat, only with vegetables." **(Workshop 1, Wales)**

In general, people in the devolved nations are less convinced by the potential positives of precision breeding across a range of areas compared to those in England. Full details of these quantitative findings are included in the devolved nations summaries later in this report (page 58).

**Figure 8: If precision bred food products became available for sale in the UK, what do you think the impact might be on the following...?**



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

If they became available for sale in the UK, then around three in five respondents said they would be willing to eat precision bred cereals, grains or flour (59%), precision bred fruit or vegetables (59%) and processed foods that have been precision bred (56%). In each case only around one in four (26%-28%) said they would not be willing. There is slightly less willingness to eat precision bred dairy products but still a majority say they would (52%), against three in ten (31%) who would not. People are more divided on whether they would eat precision bred meat (44% would, 39% would not).

Around three in five consistently said they would eat a precision bred product if it had health benefits (65%), was better for the environment (64%), improved animal welfare (64%), was safer for people with allergies (64%), tasted better (62%), was cheaper (61%) or more resilient to changing climates (60%). People in Wales and Scotland are particularly open to these benefits.



## Consumer perceptions of precision breeding: Understanding and awareness of food regulation in the UK: food you can trust

### General confidence in UK food regulation

There was generally very strong confidence in current UK food regulation, with participants trusting that food available to them is safe. Participants spoke about being able to automatically trust that food that is available on UK shelves is safe, sometimes contrasting this standard to other countries.

"There is a trust that once it reaches the shelf, it's kind of safe otherwise it wouldn't have made its way to the consumer." **(Workshop 2, Northern Ireland)**

"The food you get here is really good. You don't get any problems, really. What you see in some places abroad, it's a totally different ballgame." **(Workshop 2, Wales)**

This trust has been undermined to some extent by previous controversies, with participants sometimes referring to the horse meat scandal, Mad Cow disease, and incidents where livestock farms have been revealed to be unsanitary or inhumane despite being subject to regulations.

Participants were familiar with some of the FSA's activities, particularly the Food Hygiene Rating Scheme, as this is very visible to the public. There were also participants who were familiar with these initiatives but were not aware that the FSA were responsible for these.

They were much less familiar with risk assessments and abattoir inspections but were reassured to learn about this work happening behind the scenes. Participants were often surprised that the FSA gives independent advice to the Government and asked about the Government's obligation



to abide by this advice.

"In terms of chlorinated chicken, for instance, [The FSA] might say it's not a good thing to do. Because the government wants a trade deal with the States, they might ignore that." **(Workshop 2, Wales)**

"There is a lot going on behind the scenes and obviously all with the intent of making us safer in what we're eating. I'd no idea really about the FSA before this." **(Workshop 2, England)**

When learning more about the FSA's role, participants responded particularly well to the independent nature of the FSA. They viewed the FSA's work as more trustworthy because it is non-political and does not have a Minister, linking to an underpinning theme of distrust in politicians.

"It was reassuring to hear it's apolitical and not led by Tories, Labour, whoever...there are a lot of people who have connections from industry with political people. I'm sure one or two of them have asked certain questions or pushed things through parliament. If it's not political I would have more trust in that." **(Workshop 2, Wales)**

Some groups discussed how realistic it is for the FSA to get it right every time. Participants noted that while there have been some food scandals in the past, they are infrequent and there will always be some things that go wrong. However, in the context of precision breeding, this was sometimes given as a reason to be very cautious. Despite trust in the FSA's intentions, these participants felt the consequences of mistakes could be too high.

Participants were also introduced to some example assessment process that new foods may be subject to before being authorised for sale in England (See Workshop 2 materials in Appendix 3).

Participants said they were surprised but reassured that the new food risk assessments process can take up to 2 years. On reflection, they felt that this demonstrated appropriate thoroughness and were reassured that the decision to approve unfamiliar foods for the UK market is a long process. Some participants were also supportive of the proportionate assessment of familiar new foods (such as Chia seeds) compared to unfamiliar new foods (such as Quorn).

"I think it's reassuring that the food on our plate has a journey to get to and that a new product can't be released until it's shown to be safe or if the claims around it, like having more vitamin D etc. have been substantiated, that's reassuring." **(Workshop 2, Northern Ireland)**

Among survey respondents, a large majority of over eight in ten (83%) are confident that the food they currently buy in the UK is safe to eat, while just a small minority (12%) said the opposite. People in Northern Ireland are slightly less confident about current food safety (77% say confident, 17% say not confident).

## Who do consumers trust?

A key theme across all workshop discussions was who participants considered trustworthy, and who do they not trust, in the context of precision breeding information and decision-making.

Participants put most of their trust in scientists and experts, as they are perceived as unbiased and qualified for making decisions on a scientifically technical topic.

They also trusted individual farmers, and farmers unions. They felt that these groups would be able to speak to the benefits to small farms and give insight as to whether or not precision bred crops would have a real impact for the UK's agriculture.

Participants also had some trust in regulators more generally, not just the FSA. However, they did interrogate regulator characteristics, valuing independence, transparency, and a good track record for holding corporations or governments to account.

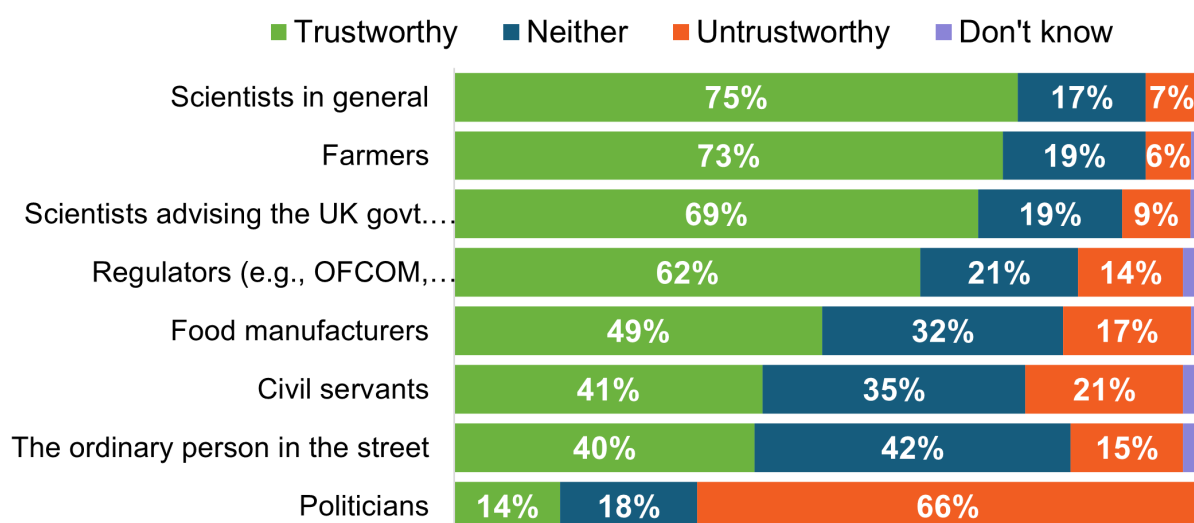
Participants had significant distrust in politicians, and in turn sometimes distrust in government generally. They described a lack of transparency which results in decision making for profit or political gain rather than the public benefit. This distrust was referred to throughout discussions, demonstrating how this shapes views for many people.

Participants did not trust large corporations who may have an investment or profit incentive in precision breeding, they referred to biotech companies, supermarkets and large food producers. These organisations were sometimes referred to as 'industry' and seen to have financial influence over politicians and decision making.

"While we need to rely on a body such as the FSA to look out on our behalf, I think it's hard for us, especially for those of us in Northern Ireland, to believe it's not political, or impervious to lobbying efforts on the part of big pharma or the agri[cultural] industry, or things like that." **(Workshop 2, Northern Ireland)**

The survey results showed similar patterns of trust. Around seven in ten trust scientists (75%), farmers (73%) and scientists advising on food (69%), and three in five say the same about regulators such as the FSA (62%). Just under half trust food manufacturers (49%). Trust in groups is similar across nations, although people in Northern Ireland tend to be slightly less trusting of scientists (70% vs 75% among overall sample), farmers (67% vs 73%) and food manufacturers (42% vs 49%).

**Figure 9: In general, how trustworthy or untrustworthy would you say these groups are?**



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

## What is needed to maintain public trust

Before being introduced to the FSA's proposed regulatory framework, participants were asked what they would want or expect to be in place so that they could trust that precision bred foods were safe.

### Governance and regulation

Participants were clear that they wanted unbiased, independent governance of precision breeding. They wanted reassurance that decision making is led by scientists and experts, and not private or political bodies who participants worried may not prioritise public benefit.

Participants also wanted severe consequences for any precision bred food producers who do not comply with regulations. They explained that fines or legal consequences must be severe enough so that they outweigh potential profit incentives for large producers to cut corners with safety regulations.

"We need government inspectors that can issue fines or take away the license if the laws aren't adhered to." **(Workshop 1, England)**

"If necessary, close businesses down who are not complying." **(Workshop 1, England)**

## **Adequate funding for regulation**

Participants wanted to know that the FSA's work to regulate precision bred foods would be adequately funded so that consumers can trust that the processes are followed thoroughly. They worried that government cuts could undermine the FSA's ability to manage the introduction of precision bred foods, or resource appropriate ongoing monitoring of impacts.

"I think the Food Standards Agency do a very good job. It just seems like such a huge thing that it might be too much for a probably underfunded body. That was my concern, that it could be something that quickly accelerates to the point that it's not being controlled effectively" **(Workshop 2, Northern Ireland)**

## **Rigorous safety assessments**

Participants were very clear in their desire for thorough testing of all new precision bred products. They wanted to know that risk assessments would have high standards and require strong evidence, but also that there would be ongoing monitoring of precision bred products to identify any long-term impacts to consumers. There was a concern that the government may be keen to rush the introduction of precision bred foods and wanted there to instead be a slow introduction allowing for due diligence on all decisions.

"A lot of trials need to be done before we jump to conclusions...It shouldn't be rushed." **(Workshop 2, England)**

## **Transparency**

Due to low trust in politicians and private corporations, participants were concerned about how these parties may influence decision making or development of precision breeding for financial or political gain. To mitigate this, participants wanted full transparency about the organisations and individuals who fund precision breeding research, develop new crops, or produce precision bred products.

"You want to know who's behind this thing. It's always good to know. Once you see who's behind it you can see their agenda." **(Workshop 1, Wales)**

Participants also wanted transparency about precision bred products themselves. They felt it is important for consumers to know which products are precision bred, and to have been well enough informed that they can understand what this means.

## **Equal access and affordability**

Participants wanted any cost saving from precision breeding to be shared across the food chain, so that farm workers, organisations and consumers all benefit from cheaper products or better pay or profit. This was rooted in a concern that large producers will leverage their power to keep any cost savings as additional profit, shutting out smaller organisations and consumers from financial benefits.

"Make sure for every sell there's a good proportion going to small companies. Have those laws in place." **(Workshop 1, Wales)**

Participants also wanted to ensure that precision breeding technology and precision bred seeds were accessible for small producers and developing countries. They worried that without market regulation large producers may monopolise precision breeding technology. They thought this may happen if larger companies can patent new seeds, or if access to precision breeding technology or seeds is too expensive for smaller producers to afford. Participants anticipated that without this regulation, smaller producers may not be able to compete with large precision breeders, who have more resilient crops and therefore lower production costs.

## **Environmental considerations**

Potential impacts on ecosystems and biodiversity were a big concern to participants. However, they struggled to identify actions or regulations that would give them confidence that this risk has been mitigated.

They discussed the possibility of separating precision bred crops from other crops, to avoid cross-pollination. Participants acknowledged that this could be very expensive and difficult to do effectively, as cross-pollination could happen through wind, water, insects or birds. Despite this cost and challenge, there were participants who felt that it was the only acceptable way forward, and a cost associated with developing something new and unknown. They suggested large greenhouses to avoid cross-pollination, at least until more is known about environmental risks.

Participants were also keen to see separate environmental impact risk assessments conducted on new precision bred crops, as part of the authorisation process.

# Consumer perceptions of precision breeding: Views on the Bill and regulatory framework

## Reactions to the Genetic Technologies (precision breeding) Bill

To ensure informed discussion, participants were presented with some high-level information about the Genetic Technology (Precision Breeding) Bill, and the role of the FSA if the bill is passed.

It was explained that if the Bill does become law in England, precision bred foods would become a new category, separate from genetically modified organisms and from conventional methods of production.

It was also explained that, if this happens, the FSA will need to advise Ministers on making new regulations for the purpose of assessing precision bred food and feed before they are authorised for sale in England.

To see the full explanation of the Bill and the FSA's role, please refer to Workshop 2 materials in Appendix 3.

### Positive views on the Bill:

Overall, participants across the groups reacted positively to the idea that the Bill would create a new category specifically for precision bred foods.

Due to the scientific differences between genetic modification and precision breeding, participants felt it logical that the two were separated. This scientific difference – that precision breeding achieves mutations that could occur naturally or through conventional methods – was something that participants reflected on frequently throughout the second workshop and seemed to be an important driver in accepting precision breeding in general.

Participants also felt that this separate category would improve transparency around precision breeding, by demonstrating the scientific difference to consumers and reducing confusion between the two. Participants acknowledged that by creating a new category, precision breeding regulation processes may be a lot quicker than those for genetically modified foods, and so precision bred products could become available much quicker. They felt this may improve consumer choice for those who are happy to eat precision bred but not genetically modified foods.

However, these supportive comments were often subject to the caveat that precision breeding still be subject to thorough testing and regulation, even if it is to be removed from the scope of GMO regulation.

### Negative views on the Bill:

Some participants fundamentally disagreed with the distinction between genetic modification and precision breeding. It is important to note that this view was separate from participants who did not understand the distinction. Those who disagreed with making the distinction between the

methods argued that even though precision breeding makes changes that could be achieved naturally or through conventional methods, it is still altering DNA and should be considered a type of genetic modification.

Those who disagree with the distinction often argued that Bill allows for a re-brand of genetic modification, giving producers an opportunity to overcome the public's negative perceptions of genetic modification. This would enable them to use the term "precision breeding" to bypass laws and regulations about genetic modification without the public scrutiny that usually comes with it.

"When you speak to people about genetically modified foods there's a deep concern immediately. Are they just looking to change it from genetic modification to precision bred to win people over?" **(Workshop 2, Wales)**

Some participants were sceptical about the intention behind the Bill, often linked to the way precision breeding was defined. These participants explained that precision breeding being defined by changes that 'could' occur naturally or by conventional breeding methods, is different to changes that 'would' occur naturally. This wording led some to think that the bill could allow precision bred outcomes that technically 'could' have happened without this intervention but would have been unlikely enough that they could be considered artificial or unnatural.

There was also concern about how the public would understand these distinctions. Participants seemed worried that the public may not understand the differences between precision breeding and other techniques for developing new types of food, leading to confusion. These participants questioned the relevance of a new food category if a large section of the population does not understand the reasoning behind it.

## **Areas of confusion and questions about the Bill**

A key area of confusion was the title of the bill and the terminology used. For participants, having the words 'genetic technology' included makes it seem as though precision breeding is a type of genetic modification. This was particularly confusing for participants as they understood that the bill endeavoured to separate these two forms of food production.

"The bill's the 'Genetic Technology Bill: Precision breeding'. That doesn't help the clarification in people's minds about the confusion around your definitions" **(Northern Ireland, Workshop 2)**

Despite some confusion, participants in general were curious to learn more about many areas of the bill, particularly about the role of ministers being able to approve a new precision bred crop. Participants wanted to know more about what it meant for ministers to have this responsibility, as they worried that it would allow precision breeding to become more about business than benefitting consumers.

Participants also wanted to know about what decisions would be made further down the line in relation to importing precision bred foods from other countries and introducing precision breeding to livestock. In both instances, these questions demonstrated concern about possibilities, especially precision breeding in livestock.

## **Understanding of the FSA's role in precision breeding regulation**

The role of the FSA was generally clear to participants. It was understood that DEFRA would make decisions that precede the FSA's own assessments, and it would be the FSA's responsibility to manage the regulatory approval process for precision bred food as it was introduced.

Participants were positive that the FSA would be working alongside DEFRA on introducing precision breeding, as it was suggested that the two authorities could hold each other to account.

This was linked to wider questions about the independent nature of the FSA and how its work aligns with the role of parliament and wider government. Those who questioned the FSA's independence voiced general distrust that any organisation can completely avoid political or financial influence – and doing so was something participants generally thought was important.

Considering this, participants were curious as to how FSA resources would be directed towards precision breeding, should the Bill pass. They wanted to know how much of the FSA's time and staff would be spent on regulating and assessing precision breeding to affirm safety.

## Reactions to the two-tier framework

Participants were introduced to the potential two-tier framework for risk assessing precision-bred food products at a very high-level (see Figure 8 below, and the full workshop materials in Appendix 3). It was explained that the purpose of the framework is to separate lower-risk, or more understood, changes from more significant, or less understood ones, so they can have suitable and proportionate levels of risk assessment and scrutiny. The aim for the framework to be 'future proofed' (for the tiers to remain proportionate and applicable in the future when precision breeding technology has advanced) was also explained to participants.

It was stressed that the framework is very much in a developmental stage. There were participants who struggled to grasp the tier system without clear examples of precision bred products and how they would be processed through this framework.

**Figure 10: Slide shown to participants on the two-tier framework**

**What are the FSA considering for their framework?**

The FSA are exploring a two-tiered approach to authorising precision bred foods, which is proportionate, transparent, and based rigorously on the science.

This would distinguish between minor changes that might typically result from traditional breeding, and major changes that while theoretically possible to achieve through traditional breeding, may or may not significantly alter the safety of the consumed product.

|                                                                                                                                                                                       |                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tier 1:</b><br>All applications for new products are screened for <b>similarity to traditionally bred varieties</b> where the risk is understood and not of concern for consumers. | <b>Tier 2:</b><br>Applications for new products <b>where the Tier 1 screening does not allow the risk to be understood</b> , are subject to an additional step. These applications require a risk assessment to determine the level of risk for consumers. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- The FSA feels this would give flexibility across a broad range of products and future proof the process as technology develops.
- Scientists will use known evidence to decide how new products are classed as Tier 1 or Tier 2. This will be independent from the government or manufacturers.

### Positive views on the two-tier framework:

There was a widely held view that in principle the proposed two-tier framework is a rigorous system that would give consumers confidence that precision breeding would be regulated thoroughly. Participants thought it would be appropriate to divide precision bred food into tiers according to levels of risk as suggested. Participants particularly liked that the FSA were looking to distinguish between risks that could realistically happen, and those that are very unlikely, and they saw this as a logical approach to regulation.

"It's quite reassuring, the different stages and amount of legislation that everything has to go through. It makes me feel a bit better about it than I did last week." **(Workshop 2, England)**

Participants saw the framework as an efficient use of FSA resources, suggesting that time and money would not be wasted in over-assessing foods and products are in Tier 1 and that we already know to be safe, allowing more time to be devoted to unknown products that require a more rigorous assessment via Tier 2. This was caveated for some by fear that insufficient FSA funding could undermine quality of risk assessments.

Some participants saw the framework as an opportunity to educate the public on precision breeding, as an introduction into the landscape of food regulation, even if they do not fully understand the topic. These participants thought the framework could be a steppingstone for the public, allowing them to do further independent research if they were interested in the topic.

## **Negative views on the two-tier framework**

Participants were not unanimous in their support for the two-tier framework. Some felt as though a shorter route for assessment (Tier 1) would never be appropriate, due to their concerns that there is no way to predict what risks may be discovered in the future. With this reasoning in mind, these participants felt strongly that all precision bred products should be subject to Tier 2 level screening.

To illustrate this point, one participant explained that Tier 1 foods are still fundamentally different from their "traditional" alternatives, arguing that if they were genuinely similar there would be no need to modify them using precision breeding in the first place.

"What is the margin to traditionally bred varieties? If Tier 1 is so similar, what was the point [of precision breeding] in first place? **(Workshop 2, Wales)**

Concerned participants argued that Tier 1 may be an opportunity to short-cut past rigorous assessment processes, getting precision bred foods on the market and avoiding what they perceived as adequate safety checks. These participants were concerned that foods subjected to Tier 1 level assessments may receive less thorough screening which may potentially fail to pick up on harmful side effects.

"That's just a government way of cutting corners. Everything should be treated exactly the same. There's no reason for a Tier 1 and a Tier 2. It's all precision breeding, so it can all have an impact and should be treated the same." **(Northern Ireland, Workshop 2)**

"I'm concerned about the small ones where there's less screening. They could slip through the net. If it's a minor issue, but for some people it could be big." **(Wales, Workshop 2)**

## **Participant suggestions for the two-tier framework**

Some participants felt strongly that the two-tier system should only apply to precision bred crops, not livestock. These participants said that the framework did not give them the same level of confidence for precision breeding in livestock as it does with crops. This was rooted in the view that precision breeding livestock is far less acceptable and possibly riskier than for crops. In these discussions there were often references to the Foot and Mouth and Mad Cow disease outbreaks.

As a result, participants expect precision bred livestock to have its own approach, suggesting that a three-tier system may be more suitable to capture the full scope of precision breeding and its risks. Some also felt that precision bred livestock should not be permitted and should be subject to a separate Bill and regulation system entirely.



Participants wanted the regulatory framework to ensure equal and fair access to precision breeding technology. They explained their concern that complex regulation processes may make it disproportionately harder for smaller producers to navigate, putting them at a disadvantage when competing with larger, more resourced producers in this new landscape.

### **Communicating the framework:**

When considering how the framework should be communicated to consumers, there were a range of expectations. Some participants felt it very important that the tier framework is communicated to the public to gain public trust. For some this meant that the public should be informed what the tier criteria are, whilst others expect a product's tier level to be shown on packaging. This was mainly due to the difference in risk between the tiers, and so participants said that while they may be comfortable eating Tier 1 foods, they would not feel the same about Tier 2.

Comparatively, others felt that any potential risks of a product should be communicated, but not necessarily the tier it has been categorised as. These participants pointed out that we do not inquire about the safety processes behind other types of food, and that the public should put their trust in scientists to communicate any specific risks.

“With natural food, we don't get to know all the testing that happens, we just get the traffic light system, the fat and sugar content and such. We don't know the tests. I don't think we need to know all the risk assessments, just that its precision bred.” (Workshop 2, England)

Not all participants thought the tier system should be actively communicated to consumers. There was also concern about giving the public overwhelming amounts of information on regulation. Participants noted that it would be difficult to communicate the level of knowledge given in the workshops to the public without it being confusing. In one instance, having tier information on packaging was compared to reading a patient information leaflet for medication.

“I just think it could get confusing. I was listening to it, and I struggled to tell the difference between Tier 1 and Tier 2. GM has been around forever, and I still don't fully understand it. If you had Tier 1 PB, Tier 2 PB, and GM, no one's going to understand it.” **(Northern Ireland, Workshop 2)**

Some participants acknowledged that they personally may not be interested in knowing about the tier level of foods, but still thought that it was important this information should be available for those that do want to know.

## **Nation specific attitudes to regulation**

In the workshops held with the devolved nations, there was a clear concern about how an England-only bill could impact Wales and Northern Ireland due to inconsistent standards between nations.

In both Wales and Northern Ireland, there was concern that their own devolved governments would have no input into safety regulations if the Bill is England only. There was also some frustration that this is an example of other UK nations being impacted by decisions made by England's government with no say on whether this is what they want.

“The Welsh or Scots have got no input into the safety of the product, we've got to rely on what English people are telling us?” **(Wales, Workshop 2)**

Welsh participants added further concerns about the impact on the Welsh farming industry, worrying that they may be at a disadvantage to English farmers who are allowed to grow

precision bred crops. Welsh participants said that if this was the case, they may avoid buying precision bred products to support Welsh farming.

Participants in Wales suggested that Wales should be 'all the way in or all the way out' when it comes to precision breeding. They wanted to know why this was not being proposed as a UK bill in law, as it would affect consumers across all nations. Participants also suggested that an England-only approach may result in unnecessary work for Welsh government if they are likely to introduce a similar Wales-only Bill at a later date. They argued that it could save Wales money and time to collaborate and adopt this Bill alongside England.

"Welsh people are very patriotic, especially in small rural areas... People wouldn't want to buy those products anyway because they would feel they are putting people in Wales out of business. That's inevitably what would happen unless we jump on board. **(Workshop 2, Wales)**

"I am concerned about it not applying in Wales, would farmers not be able to use it, and will they be overtaken by English farmers that can?" **(Workshop 2, Wales)**

For Northern Ireland participants there were specific concerns about England-approved precision bred organisms in relation to the issue of the Protocol on Ireland/Northern Ireland. They worried that inconsistent precision breeding rules could complicate matters at the border but were also keen to see existing standards in Northern Ireland maintained.

"In Northern Ireland, we're in this big checkpoint with Brexit. There may be a border in the Irish Sea, we don't know. But making sure standards are maintained." **(Workshop 2, Northern Ireland)**

"Who knows what's going to happen with this protocol thing. Right now Northern Ireland is in line with the EU... If the UK standards were lower than the EU standards then they potentially wouldn't be allowed in Northern Ireland" **(Workshop 2, Northern Ireland)**

Participants also noted that crops cannot easily be confined by land-borders, which may cause challenges with any contrast in precision breeding policy between Ireland and Northern Ireland.

"A precision bred potato has no idea which side of the border it's being planted and grown. Surely, won't it be very important that future proofing includes the alliance of Irish and Northern Irish regulations and attention on this issue?" **(Workshop 2, Northern Ireland)**



## Consumer perceptions of precision breeding: Communicating information about precision breeding

Throughout the workshops, participants spoke about the information that consumers should receive about precision breeding without much prompting. These discussions centred around views about broad communication (i.e., public education), as well as product specific information (i.e., product labelling).

This research aimed to explore how regulation and risks of precision bred foods should be communicated to consumers. It should be noted that while participants had low awareness of precision breeding, they also had low awareness of food production methods generally. Communication around precision bred foods may be confusing if it does not consider this general lack of awareness, and work to put precision breeding information in context of wider food production methods.

This chapter discusses participants views on public education about precision breeding, labelling of precision bred products, and an online register of all precision bred organisms authorised for use in food and feed. All three of these topics shared common themes and overlapped significantly, particularly on their shared role for transparency to build public trust and ensure consumer choice.

## Public education

Participants felt that the information should be made available to the public about the broad concept of precision breeding, so that they have a basic understanding of how the foods available to them may change. They felt this is important so that consumers are able to choose to learn more if they want to, know the terms to use and where to look for more information.

Public education was also seen as key to maintaining public trust in precision bred foods, and the transparency of the UK food system as a whole. Participants described clear information as a protection against backlash and misinformation. They explained that if there are negative responses to precision bred food, if the public feel misled into consuming products then the reaction and resulting distrust in UK food will be much worse than if they felt that they decided to consume precision bred foods on their own terms.

“The public have to know from a purely marketing perspective, so people are on board... Make sure the knowledge is there, so people don't feel duped.” **(Workshop 2, Northern Ireland)**

Participants also saw public education as key to consumers ability to make informed choices. They said that without knowing that there is a new type of food on shelves alongside conventionally bred foods, consumers have no opportunity to compare and decide whether or not to buy and eat these products. This was said to be particularly relevant to those who have medical conditions for food hypersensitivities, who carefully check foods for nutritional content, allergies and ingredients, but may not expect changes to basic ingredients such as vegetables.

In order for public education to build trust, participants said that communication about precision breeding should be done before products are on shelves, so that consumers have time to understand and research the change beforehand.

The key focuses of public education about precision breeding suggested by participants were:

- **How precision breeding differs from genetic modification and conventional methods.** Participants said that the key difference that made them grasp and feel comfortable with precision breeding was that the changes made could have happened naturally or through selective breeding. They felt this was key to centre in public communications so that consumers could separate precision breeding from genetic modification and judge it on its own merit.

“I think for me the clinching factor is that it could actually happen in nature. That nails it for me.” **(Workshop 2, Wales)**

- **Where and why precision breeding may be more helpful than conventional methods.** Participants thought consumers would understand more about this change if they were informed about the limitations of conventional methods. They suggested informing the

public about how precision breeding could address global challenges such as crop vulnerability, food scarcity, and climate change resilience.

- **The science and methods; how precision breeding is done:** Understanding the process, from development of a new seed, to growing the final crop, may help consumers to understand the purpose, benefits and risks in their own terms. Participants suggested that communication materials on this use simple language, clear diagrams or videos, and be easily available to those who are seeking out more information.
- **That this technology is regulated and tested to be safe:** Participants felt that the public need to know that precision bred foods available to buy in the UK have been tested and authorised as safe by the FSA. There were participants who felt that more detailed information should be available wish to, including: how each product was tested, what evidence was used for the assessment, and how long the process took.
- **More about the FSA:** Participants sometimes commented that they felt more comfortable and informed about precision breeding because they had learned, through their participation in this research, how involved the FSA are in regulating the safety of our food. For this reason, participants suggested that FSA conduct an awareness campaign about its own role, that it is independent, scientific, and non-political, and its processes and safety measures. They felt this should be done ahead of the introduction of precision breeding to lay the groundwork for consumers to be able to trust the FSA's communications about precision breeding when the time comes.

“Put money into raising people's trust in the FSA. What the FSA does, why we should trust them.”  
(Workshop 2, Wales)

- **How food characteristics of products might change:** Participants thought that consumers should know whether to look out for certain changes, particularly ones that may affect consumers with food hypersensitivities, pregnancy, or medical conditions. They also wanted to be informed about changes in specific nutritional characteristics and other issues such as shelf-life.
- **Organisations involved:** As discussed throughout this report, there was a strong concern about biased decision making, with concerns that politicians and corporations may influence precision breeding decisions in their own financial or political favour, rather than the public's interest. For this reason, participants thought the public should be actively informed about which organisations or individuals are researching, funding, campaigning for, or may profit from, precision breeding advancement. This type of public information was seen as a way to build public trust through transparency, and also combat misinformation.

Similarly, around eight in ten survey respondents say it would be important to have a range of information about precision breed food (on everything tested), particularly about allergies, pregnancy and other health conditions (which 84% say would be important). Vegetarians and people who are concerned about the impact the food they eat has on the environment or concerned about animal welfare are consistently more likely to say each of the different types of information tested would be important.

During workshop discussions, despite a broad desire for clear and transparent public education about precision breeding, there were a range of views on the level of detail, or the extent to which this information should be pushed to consumers.

One view was that there should be a major multi-media awareness campaign, actively circulating information to ensure that as many consumers as possible are properly educated about precision breeding.

“You need a media campaign to inform the public what it is, then benefits of it and any negatives if there are any at that stage. Putting a sign on a shop or a small label is not adequate to inform people.” (Workshop 2, Northern Ireland)

These participants reasoned that consumers should already be informed before precision bred foods are on the shelves. They suggested that if consumers understand the benefits and risks before the products are available, they have time to form some expectations and trust in the process, rather than be alarmed and pushed towards misinformation.

“Hopefully by the time the products reach shelves there will already be a campaign of awareness around what to expect and people are already informed” (Workshop 2, Northern Ireland)

“There has been an increase in conspiracy theories... you will never get rid of that no matter how much information you provide. I do think it's important, that the information is given rather than have the fear of too much information... I think it is important that scientific evidence is provided.”  
**(Workshop 2, England)**

However, others disagreed with this suggestion. They argued that a campaign pushing a high level of detailed information about precision breeding could overwhelm many consumers with more information than they want, need or are able to process.

Another stance was that there could be a lighter touch awareness campaign, informing consumers that a new type of food process called precision breeding may be used on some foods, and directing consumers to sources of further information. Participants suggested that this approach considers the different information needs consumers may have, accommodating for those who are anxious or keen to know more can do so, without unsettling or overwhelming consumers who are not too interested.

Participants voiced significant distrust in UK mass media, and most news sources. They felt that the news and media do not prioritise accuracy or public benefit and are instead seeking strong public reaction. They therefore thought that communications about precision breeding must carefully consider the impact of the media, making frequent references to the backlash to genetically modified foods, and how the same response could be prompted now by loud headlines.

“You'd have to be very careful about how you communicate this because it could cause another scare on the scale of GM food when it first came out. It was all over the newspapers, about how this was going to corrupt the world's crops and all that... If you're saying it's definitely not genetically modified, then that's something that needs to be communicated effectively or the public won't trust it. ” **(Workshop 2, Northern Ireland)**

There were frequent suggestions of an informative unbiased documentary, featuring scientists and possibly a trusted celebrity. Participants felt that this would be a good way to introduce the scientific information to consumers in a digestible way and start conversation about precision breeding. Participants also suggested educating children in schools about precision breeding, so that they would pass the information to their parents.

Participants thought the FSA should directly share information on TV adverts and on posters at supermarkets. These methods may take a high-level approach, avoiding information overload, but directing audiences to sources for more information if they wish to seek it out.

## **Labelling precision bred products**

Throughout workshops, participants frequently referred to labelling, with an assumption that consumers would be able to identify precision bred foods from conventionally bred foods. During Workshop 2, moderators explained to participants some key context to frame their discussion around labelling:

1. **There is a possibility that precision bred foods are not labelled as precision bred,** and that this decision will be made by a range of different agencies and will need to

consider challenges around traceability ([footnote 1](#)).

2. **That any change to nutrition, allergens, ingredients, or safety will be indicated on the label**, even if that label does not state that the change is due to precision breeding.

This clarification allowed for an informed discussion, with participants able to explain their views on the important aspects of labelling with the full knowledge that precision breeding labelling may not be enforced.

With this information in mind, participants felt very strongly that precision bred products should be labelled as precision bred.

While existing mandatory labelling would inform consumers of any changes to the characteristics of the product, participants felt that this isn't sufficient on its own. They argued that being able to identify precision bred products via labelling is critical for transparency, and therefore to consumer choice and public trust.

"If you don't have the labelling on the food, you take away people's right to choose, if someone doesn't want to eat that type of food, you take away that informed choice if the label isn't there."  
**(Workshop 2, Wales)**

"If people who are frightened about it and they don't have to put it on their list of ingredients then you're hiding it aren't you?" **(Workshop 2, England)**

Participants also suggested that an explicit statement on labelling would protect precision bred foods and the regulation system from public backlash and misinformation. They explained that without this full transparency, it would be easier for incorrect information or concerns to grab consumers attention, especially if consumers felt they had been fed precision bred foods against their will due to a lack of informed choice.

"There is a lot of misinformation, and it would take a small number of people to say there is something bad and if it's not labelled that could snowball. So better for it to be labelled then no one can come back and say anything about not knowing what type of food they're putting into their bodies." **(Workshop 2, Northern Ireland)**

"If I didn't know, I'd feel like I'd been lied to... If you're putting it into your body you want to know."  
**(Workshop 1, England)**

Participants also noted the difference between raw ingredients and processed food, sometimes suggesting that it is more important for raw ingredients to be labelled as precision bred than processed foods. They explained this by saying that consumers have different expectations and priorities when choosing these different types of food. For example, consumers would be very unlikely to expect any change to the characteristics of raw ingredients such as loose fruit or vegetables, but they do expect more complex ingredients on processed foods and may be more likely to double check nutritional content or changes to allergens.

Even though participants felt strongly that precision bred products should be labelled as such, they did acknowledge some of the challenges associated with labelling, particularly in relation to traceability. When considering labelling, participants discussed the risks outlined in Workshop 1 around the traceability of precision bred crops, and how, if there are no reliable detection methods, or if products labelled as precision bred could not be verified, this might undermine the worth and validity of labelling. This was compared to how some food labels must say "may contain traces of nuts" because producers cannot guarantee that the product has been made in a factory where there are products containing nuts.

Amongst those who strongly supported transparent precision breeding labelling, there was acknowledgement that food labelling is already very crowded and could become overwhelming or confusing. Participants considered that it would not be feasible to include all information on food

labels, and so a line must be drawn somewhere.

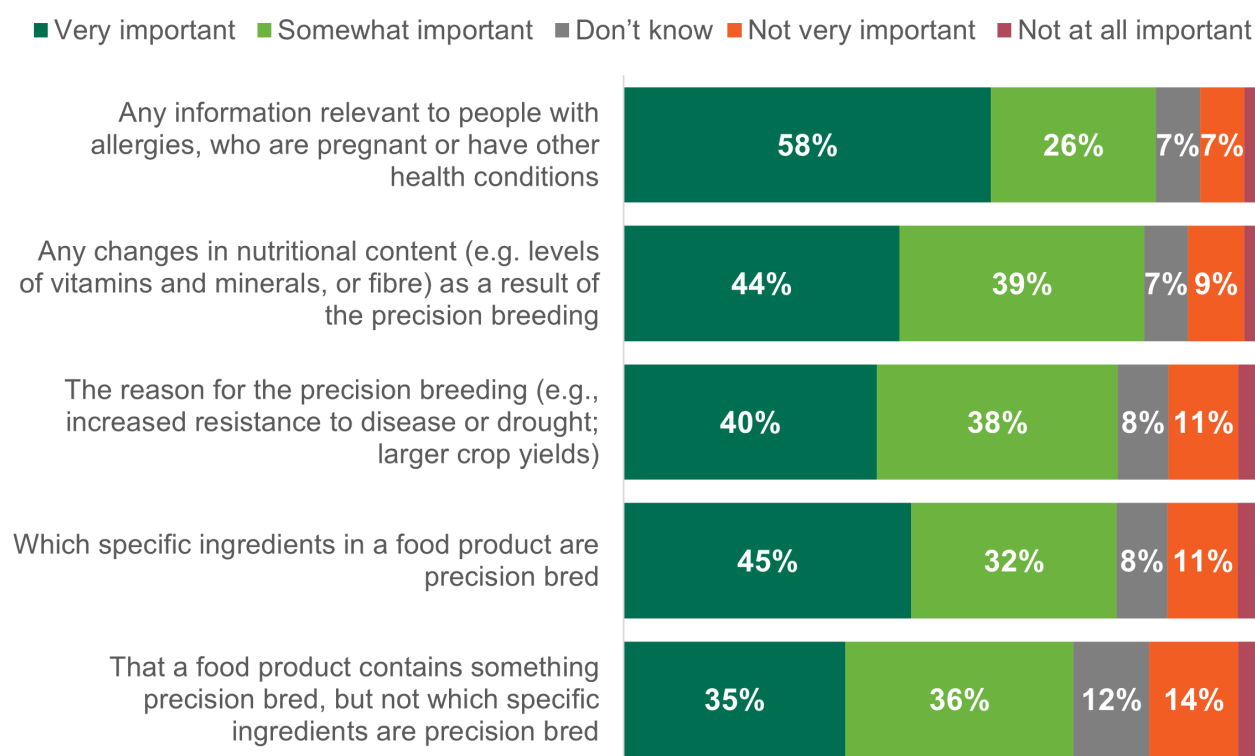
“How far down the vault do you go with the labelling and telling people this and that? You've got to have somewhere where you stop and it's down to the individual to do more research if they feel the need to.” **(Workshop 2, Wales)**

With these discussions in mind, participants shared a few ways in which they thought precision breeding labelling should be presented:

- An overall statement for the product that ‘This contains/may contain precision bred ingredients’. This would allow consumers to avoid if they wish, or to look for more information.
- In the ingredient lists, have (PB) after each precision bred ingredient. This would take up minimal space but allow consumers to know exactly which ingredients were precision bred.
- An eye catching ‘PB’ logo, with a link or QR code directing to more information.

Survey respondents agreed, with nearly four in five (77%) saying it would be important when buying a food item to know if it had been precision bred, and nearly half (45%) saying it would be ‘very’ important. Only one in six (15%) say knowing this would not be important. People in Scotland are slightly less likely to say it would be important (75%).

**Figure 11: When shopping for food, how important would it be to you, to have the following information about precision bred foods?**



Base: All UK respondents (4,177), and in England (1,900), Wales (1,016), Scotland (1,005) and Northern Ireland (256).

Respondent groups which are slightly more likely than average to say it is important for them to know if a food has been precision bred are female (79%), higher socio-economic groups AB (79%), graduates (80%), people who avoid certain food groups for any reasons (84%) or avoid certain production methods (85%), and people who like unfamiliar foods (82%).

According to the survey findings, the public think a range of information about precision bred food would be important when shopping. Around four in five say it would be important to have any information relevant to people with allergies, who are pregnant or have other health conditions (84%), any changes in nutritional content (82%), the reasons why the food was precision bred (78%) and which specific ingredients in the food are precision bred (77%).

## Register of precision bred authorisations

Participants were informed that the FSA are considering a precision breeding register, where all precision bred organisms authorised for use in food and feed are listed on a website that is accessible to the public.

Participants were positive about some aspects of this approach but were clear about the limitations of a register as the sole methods of publicising precision bred products.

The key benefit of a register for participants was the ability to house all helpful information in one place. They felt this would be a powerful tool for transparency and public trust, and the layout of the register could accommodate far more detailed information than a product label could.

There was a common view that consumers may not be likely to use the register, but that this does not negate its important role for transparency and reassurance. Participants felt that just knowing the register exists is key to public trust, even if it is not widely used by the public.

"It would reassure people that the product and the technology was safe. It's an extra level of transparency. People might not even go and check, but if they know they can it will reassure them." **(Workshop 2, Wales)**

Participants also felt that the register could be a helpful research tool, cataloguing and tracking precision breeding as it develops over time.

"It should exist and be recorded for research purposes...[The register] is a growing, living thing, because things change and the information will grow and change with time as things progress." **(Workshop 2, England)**

Workshop discussions focused on some key limitations of the register, with the main limitation being its unsuitability as an everyday tool for consumers.

One reason given for this is that consumers would want to check individual products when deciding whether or not to purchase them, and so would want the information held on the register at the point of purchase. However, using a register while shopping was not deemed to be practical.

They would not want to check every product against the register to confirm if it is precision bred or not, nor would they be able to keep track of all precision bred items on the register and actively avoid them. Therefore, for the register to be practical, they would need to already know a product is precision bred so that they know when to refer to the register for more information.

For these reasons, participants felt that the register could be most effective if combined with some level of product labelling. They explained that this combination would enhance the benefits of the register, while also addressing its limitations:

- It would reduce the burden on labelling, by allowing labelling to simply direct consumers to the register for more detail on the product, minimising the amount of information needed on the label itself.
- It would make the register more practical for everyday use, as product labels would tell consumers when a product contains precision bred ingredients, directing them to the



- register when it matters.
- It would ensure that digitally excluded consumers still have a means of identifying precision bred products.

### **Information to be included on the register:**

Participants wanted the register to be a source for all of the key information that may build public trust, and inform consumer choices:

- The outcome or benefit sought by the change: why was this ingredient precision bred.
- Who is involved: the manufacturer, the scientists who authorised it, who funded the development of this crop.
- The level of risk assessment, what tier the product was classed as, what evidence was the authorisation based on, how long the assessment took.
- The history of the crop: what original crop was altered using precision breeding, had the original crop already been precision bred, resulting in cumulative alterations?

Participants felt that the register should prioritise accessible, jargon-free language, so that consumers could understand the information.

1. Labelling is a DEFRA competency in England and the bill does not include labelling. See table 11 for outline of responsibilities of different departments/agencies.



## **Consumer perceptions of precision breeding: Devolved nation summaries**

### **Wales**

#### **Context of the Bill in Wales**

Under the UK Internal Market Act (2020) market access principle of mutual recognition precision bred products authorised in England may be sold directly to consumers in Wales. Therefore, we have included Welsh consumers in this research. However, businesses in Wales would not be permitted to produce precision bred goods to sell in Wales themselves.

#### **Difference in quantitative findings for Wales**

Slightly fewer respondents in Wales think precision bred foods should be available for sale in the UK (47% vs 50% of the UK total) and more think it should not be (32% vs 29% of the UK total). However, as with the UK total, Welsh views are not generally strong, with 13% saying these products should 'definitely' be available and 34% thinking they 'probably' should.

There were no major differences on acceptability of plants between Welsh respondents and the UK total. When it came to precision breeding in animals, the same proportion of Welsh

respondents thought it acceptable (35%), but a higher proportion thought it unacceptable to precision breed animals (37% vs 33% of the UK total).

Welsh respondents were more likely than the UK total to expect negative impacts on welfare of animals (36% vs 32% UK total), and on small scale farmers if they cannot access precision breeding (54% vs 50% of UK total).

People in Wales are particularly open to eating precision bred food if the food meant certain potential benefits compared to UK total: two in three say they would eat a precision bred product if it had health benefits (69% vs 65% UK total), was better for the environment (67% vs 64% UK total), improved animal welfare (70% vs 64% UK total), was safer for people with allergies (67% vs 64% UK total), was cheaper (64% vs 61% UK total) or more resilient to changing climates (65% vs 60% UK total).

## **Qualitative findings particularly notable in Wales**

In workshops, Welsh groups spoke frequently about 'unnaturalness' of precision breeding or seemed uncomfortable with too much change from traditional crops. Welsh workshop groups often referred to recent food scandals, such as horse meat and BSE (Mad Cow disease). They also spoke often about potential positive and negative impacts for small farmers.

Welsh groups seemed particularly on the fence about precision breeding in Workshop 1, expressing uncertainty about the balance of risks and benefits. By Workshop 2 several Welsh groups were leaning towards more positive but were still very cautious.

As discussed in Chapter 'Views on the bill and regulatory framework', Welsh participants had concerns about the Bill and regulations being too England focused. They worried that Wales would not have as much input into safety regulations if the Bill is England only, and shared frustration at being impacted by decisions made by England's government with little say as a devolved Nation.

"The Welsh or Scots have got no input into the safety of the product, we've got to rely on what English people are telling us?" **(Wales, Workshop 2)**

There were particular concerns about the impact on the Welsh farming industry, which they expected may be at a disadvantage to English farmers who are allowed to grow precision bred crops. Participants expressed that this may well lead them to avoid buying precision bred foods in order to support Welsh farms.

Some Welsh participants argued that it could save Wales money and time to collaborate and adopt this Bill alongside England, especially if it is likely that the Welsh government will repeat the process later and align with English Bill and regulations anyway.

## **Northern Ireland**

### **Context in Northern Ireland:**

Precision bred organisms authorised in England will not be permitted to be sold in Northern Ireland. Northern Ireland continues to comply with EU Law under the current terms of the Protocol on Ireland/Northern Ireland, and any precision bred organism would need to be authorised under the current EU framework for GMOs in order to be legally marketed in Northern Ireland. We have included consumers from Northern Ireland in this research to understand their views on precision bred foods should products be sold in Northern Ireland in future.

### **Difference in quantitative findings for Northern Ireland:**

Note: As fewer interviews were conducted in Northern Ireland (256), this means we are unable to comment on significant differences by demographics.

Respondents in Northern Ireland were more likely to say they have never heard of precision breeding (78% vs 75% UK total). They were also less positive about safety of precision bred foods: around two in five (42%) people in Northern Ireland think precision bred food products are safe to eat (vs 50% of UK total), whilst around three in ten (28%) say they are unsafe (vs 22% of UK total).

The strength of these attitudes also varies compared to the UK total. Confidence in safety is weaker in Northern Ireland with just 9% presuming it would be “very safe” (vs 13% of UK total), and concern stronger with 11% saying ‘very unsafe’ (vs 16% of UK total).

People in Northern Ireland are slightly less confident about current food safety, with 77% saying they are confident (vs 83% of UK total). Northern Ireland respondents are also less confident that if precision bred food became available to buy in the UK that it would be safe (51% vs 56% of UK total), but still a majority.

People in Northern Ireland are slightly less likely to think it would be acceptable to use the precision breeding of plants in food production (46% vs 54% of UK total), and more likely to say it would be unacceptable (20% vs 16% of UK total).

As with UK total, NI respondents are divided over whether the precision breeding of animals is acceptable. People in Northern Ireland are more likely than average to say that it is unacceptable (37% vs 33% UK total) and less likely to say it is acceptable (30% vs 35% UK total). However, due to the base size in Northern Ireland, this difference cannot be claimed to be statistically significant.

Northern Ireland respondents are less positive than UK total about the likelihood of positive impact from precision breeding on:

- Affordability of food: 34% positive (vs 38% UK total)
- The environment: 34% positive (vs 36% UK total)
- How nutritious precision bred food products are: 25% positive (vs 34% UK total)
- The health of people eating precision bred food products: 19% positive (vs 29% UK total)
- How precision bred food tastes: 18% positive (vs 23% UK total)

Those in Northern Ireland had stronger negative views about the potential impact on the welfare of animals bred using precision breeding techniques: 37% said this would have a negative impact (vs. 32% of UK total), and 19% said it would have a positive impact (vs 25% of UK total). Northern Ireland respondents were also more likely than the UK total to say it will have a negative impact on small scale farmers if they cannot access precision breeding (55% vs 50% of UK total).

Three quarters of Northern Ireland respondents (74%) said it is important to know if a food item they were buying had been precision bred. This is slightly less than the UK total (77%).

On willingness to eat precision bred foods, Northern Ireland respondents were slightly less willing to eat some sub-categories:

- Precision bred cereals, grains or flour (54% vs 59% UK total)
- Fruit or vegetables (52% vs 59% UK total)
- Processed foods (53% vs 56% UK total)
- Dairy products (49% vs 52% UK total).
- Precision bred meat (41% vs 44% UK total)

Northern Ireland respondents willingness to eat precision bred food due to specific benefits was generally in line with UK total, but with slightly softer trends: they would still be likely to eat a precision bred product if it was better for the environment, but less so than the total UK (61% vs 64% UK total), also if tasted better (58% vs 62% UK total), was cheaper (57% vs 61% UK total) or more resilient to changing climates (56% vs 60% UK total).

### **Qualitative findings particularly notable in Northern Ireland:**

In workshops, Northern Ireland groups often spoke about distrust in large food corporations, agricultural industry, and politicians. They shared their concerns about how these bodies may prevent cost benefits being passed onto the consumer, or may interfere with decision making and regulation to further their profit or political goals.

As with Wales, Northern Ireland groups often referred to recent food scandals, particularly horse meat and BSE (Mad Cow disease).

As discussed in Chapter 'Views on the bill and regulatory framework', groups discussed concerns about how an England-only bill could impact Northern Ireland due to inconsistent standards between nations. They worried that inconsistent precision breeding rules could complicate matters at the border but were also keen to see existing standards in Northern Ireland maintained. There seemed to be trust in EU standards and decisions regarding food, and precision breeding.

"Who know what's going to happen with this protocol thing. Right now, Northern Ireland is in line with the EU... If the UK standards were lower than the EU standards then they potentially wouldn't be allowed in Northern Ireland" (**Workshop 2, Northern Ireland**)

## **Scotland (survey only)**

### **Context of the Bill in Scotland**

Under the UK Internal Market Act (2020) the market access principle of mutual recognition allows for precision bred products authorised in England to be sold directly to consumers in Scotland. Therefore, we have included Scottish consumers in this research. However, businesses in Scotland would not be permitted to produce precision bred goods to sell in Scotland themselves. Scotland was included in the quantitative research only as FSS plan to run their own qualitative research.

### **Difference in quantitative findings for Scotland**

Scottish respondents were more likely than the UK total to say precision breeding will have a negative impact on small scale farmers if they cannot access precision breeding (55% vs 50% UK total). There were no other Scotland specific trends on the benefits and negatives of precision breeding.

People in Scotland are slightly less likely to say it would be important to know if a food product they were buying had been precision bred (75% vs 77% of UK total), however still a clear majority.

Scottish respondents were particularly open to certain potential benefits compared to UK total: they would eat a precision bred product if it had health benefits (68% vs 65% UK total), improved animal welfare (67% vs 64% UK total) or was more resilient to changing climates (63% vs 60% UK total).

# Consumer perceptions of precision breeding: Conclusions

## Research question 1: What do consumers currently understand about the term 'precision breeding'?

Workshop participants and survey respondents both showed very little awareness of the term 'precision breeding'. Most had never heard of the term before, and even fewer knew what it refers to.

As well as low awareness, there was a mix in spontaneous expectations of what the term 'precision breeding' may refer to during the qualitative research. Workshop participants sometimes associated the term with genetic modification, with selective breeding, or with animal breeding rather than plant breeding.

The word 'breeding' itself was very closely linked to livestock rather than crops. This association was off-putting to some participants when it came to considering precision breeding overall, because using these techniques in animals was often seen as less acceptable. Participants suggested that 'grown' or 'cultivated' or even 'engineered' are words that are more closely associated with plants.

## Research question 2: What are their attitudes to precision breeding, what concerns do they have and why?

Overall attitudes towards precision breeding varied and were sometimes mixed even for individual participants. Many felt strongly in favour of certain potential benefits of precision bred crops but were also very concerned about potential unknown risks.

Attitudes about the 'naturalness' of precision breeding varied, with some participants viewing the technique as an extension of selective breeding, and a logical, natural progression in farming technology. However, others saw precision breeding as inherently unnatural, and something that interfered with nature, making it morally questionable.

## Research question 3: What do they perceive to be the risks and/or potential benefits?

Benefits that were most important to participants were:

- More affordable food for consumers if cost savings from higher yields are passed on by producers.
- Health benefits for consumers: allergen or coeliac safe foods, or increased vitamins and nutrition, such as Vitamin D.
- More variety available to UK consumers, based on more foods being grown in the UK climate, or grown all year round, with less dependence on seasonality.
- If more food able to be grown locally, there may be a reduction in carbon emissions caused by transporting food globally.

- Better yields and profits for farmers, due to resilient crops, in turn creating more food security for the UK, and less reliance on imports.
- Combatting the impacts of climate change by creating resilient crops, seen as particularly beneficial for countries already vulnerable to food scarcity due to drought and flooding.

The risks that were most concerning were:

- Unpredictable health impacts for consumers, particularly long-term impacts that may not be detected by initial testing or risk assessments.
- Unpredictable environmental impacts, including that disease resistant crops may eventually lead to disease mutation. There were also concerns about conventional crop varieties being overtaken due to cross-contamination.
- Increased food costs for consumers if research and development costs are passed on by producers, but cost savings are not.
- Large companies monopolising precision bred crops, meaning that small companies are priced out, and profits not shared with consumers or farmers.
- Increased global inequity if precision breeding is not accessible to countries who could most benefit from it, particularly climate change affected countries. There were also concerns about the UK reducing imports from countries reliant on exports, affecting farmers and the economy in that country.
- Precision breeding may not be moral or ethical, with some participants describing modifying the DNA of another organism as 'playing god' or 'messing with nature'.
- A lack of transparency about financial or political interests among politicians and business. Discussion of transparency often amplified other concerns, with a lack of transparency seen to undermine trust that other risks would be adequately considered and mitigated. Ultimately, participants were worried that profit would be prioritised over public benefit for decisions around precision breeding.

#### **Research question 4: What are the factors that influence the different attitudes towards the acceptability of precision bred organisms entering the food and feed market?**

There were several key factors that influenced workshop participants views on the acceptability of precision bred organisms entering the food and feed market:

- **Transparency of the organisations and money involved:** Participants were concerned that large food producers and biotech companies may unduly influence decision making in their favour if there is not transparency about the funding and potential profit involved in developing precision bred foods.
- **Thorough risk assessments:** Participants wanted there to be thorough risk assessments on all new precision bred food products, with ongoing monitoring for any long-term health impacts to consumers.
- **Consumer choice through education and labelling:** For there to be an acceptable level of consumer choice, participants felt there must be some level of public education about what precision breeding is, and what the potential benefits and risks are. They also felt strongly that precision bred products should be labelled, at least initially, so that consumers could choose whether to consume or avoid them. They suggested that lack of consumer choice or labelling may cause significant backlash, especially if long term health impacts are discovered later.
- **Precision breeding to be used for crops only, not animals:** Participants did not consider precision breeding as acceptable in animals as it is for crops. They often felt that if precision bred animal products were to enter the food system, this must be after separate legislation and public consultation, and with a separate risk assessment process to plants. Some also felt that by separating the two, precision bred crops will be able to progress

without being held back by public controversy about precision breeding in animals.

### **Research question 5: What are consumer views on the FSA's proposed regulatory framework for precision bred organisms, and how if at all does it impact on consumer confidence?**

Workshop participants largely supported the concept of a two-tier risk assessment framework, although this was not unanimous and some voiced strong concerns.

Those who supported the approach said that the two-tier framework was logical, prioritising FSA resources to focus on thorough assessments for products that were more likely to have risks. They thought this would allow safe products to enter the market more easily so that benefits can be realised sooner.

Those who did not support the two-tier system said that as precision breeding itself is new, all products must be assessed equally until more is known about long term risks to consumers. They felt that the existence of a Tier 1 assessment route would allow some products to enter the market without adequate assessment, risking consumer harm.

Some participants had confidence in the two-tier system for precision bred crops, but not for livestock. They suggested that any precision bred animal products allowed onto the market must have a separate process, as this was perceived to be more potentially harmful to consumers and animals.

### **Research question 6: What information do consumers need to come to an informed position on precision breeding?**

Participants felt that there should be at least a basic level of public education to address public concern about precision breeding, protect against misinformation, and allow informed choice. They suggested this should cover:

- What precision breeding is, and how it differs from genetic modification and conventional breeding methods. In particular, the public should know that precision breeding only achieved outcomes that could happen naturally or through conventional methods, as this information was key to participants own understanding of the technique.
- Why precision breeding is helpful or necessary, due to limitations of conventional methods. In particular, it may be helpful for the public to know how precision bred foods may help address national and global climate change challenges and food security, as well as consumer benefits such as nutrition improvements.
- How precision breeding is regulated and tested to be safe, and that it is regulated by the FSA, who are independent and non-political. This is key to consumers feeling confident that precision bred foods are safe, and that regulation is not undermined by political or commercial influences.

Aside from public education, workshop participants and survey respondents both felt strongly that precision bred products should be labelled as precision bred. Workshop participants explained that without this labelling there is no genuine consumer choice, as there is no opportunity to avoid precision bred foods if they want to.

Labelling was also seen as key to establishing trust with the public. Participants thought that without transparent labelling the public could become more worried about the food available to them, and more vulnerable to misinformation.

## Research question 7: How can the FSA best communicate with consumers about precision breeding?

Workshop participants thought that communications about precision breeding should be carefully balanced at the right level of detail. They also wanted information to be actively disseminated to ensure transparency and protect against misinformation.

They generally felt that some sort of campaign should be conducted, including TV adverts and posters in supermarkets informing consumers of the upcoming change. To avoid overwhelming consumers with too much confusing detail, participants felt this campaign should cover the basics, directing audiences to sources for more information if they wish to seek it out.

The idea of an informative unbiased documentary was also suggested by some participants, who thought this could feature scientists and possibly a trusted celebrity.

The proposed register of authorised precision bred organisms was seen as a potentially helpful communication tool to build transparency and trust with the public, even if it is not widely used by consumers. However, participants were clear that the usefulness of the register would be severely limited if it was not accompanied by compulsory labelling of precision bred foods. They felt consumers would not know when to consult the register if they did not know which foods were precision bred.



# Consumer perceptions of precision breeding

## Appendices: samples

### 1. Samples and recruitment

#### 1.1 Phase 1 sample

Quotas for the overall sample were set on age, gender and working status. These samples were weighted to be individually representative of each nation by age, gender, working status and social grade. When they were combined into an overall set UK data set, each nation was then weighted to its relative proportion.

| Category | Group            | Unweighted sample | Weighted sample |
|----------|------------------|-------------------|-----------------|
| Country  | England          | 1,900             | 3,512           |
| Country  | Wales            | 1,016             | 198             |
| Country  | Scotland         | 1,005             | 351             |
| Country  | Northern Ireland | 256               | 116             |
| Age      | 16 to 34         | 1,306             | 1,380           |
| Age      | 35 to 54         | 1,487             | 1,469           |
| Age      | 55 to 75         | 1,384             | 1,328           |
| Gender   | Male             | 1,946             | 2,066           |



| Category             | Group                          | Unweighted sample | Weighted sample |
|----------------------|--------------------------------|-------------------|-----------------|
| Gender               | Female                         | 2,207             | 2,088           |
| Social grade         | AB/C1                          | 2,997             | 2,391           |
| Social grade         | C2/DE                          | 1,180             | 1,786           |
| Location             | Urban                          | 3,150             | 3,400           |
| Location             | Rural                          | 771               | 661             |
| Employment status    | Working                        | 2,740             | 2,638           |
| Employment status    | Not working                    | 1,437             | 1,539           |
| Education            | Undergraduate degree or higher | 2,209             | 2,005           |
| Education            | No degree                      | 1,968             | 2,172           |
| Dietary restrictions | Vegan                          | 96                | 98              |
| Dietary restrictions | Vegetarian                     | 207               | 249             |
| Dietary restrictions | Food Hypersensitivity (FHS)    | 496               | 511             |

## 1.2 Phase 2 quotas and achieved sample

| Quota              | Categories                                  | Quota (total=90)                                                                                                                    | Achieved   |
|--------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------|
| Location           | Region<br>Rural/Urban                       | 40 in England                                                                                                                       | 43         |
|                    |                                             | 25 in Wales                                                                                                                         | 26         |
|                    |                                             | 20 in Northern Ireland                                                                                                              | 28         |
|                    |                                             | A good mix                                                                                                                          | A good mix |
| Age                | 18 to 30                                    | Min 20                                                                                                                              | 24         |
|                    | 31 to 50                                    | Min 20                                                                                                                              | 34         |
|                    | 51 to 64                                    | Min 20                                                                                                                              | 21         |
|                    | 65+                                         | Min 20                                                                                                                              | 18         |
| Gender             | Male                                        | Min 38                                                                                                                              | 47         |
|                    | Female                                      | Min 38                                                                                                                              | 50         |
|                    | Other/prefer not to say                     | No quota                                                                                                                            |            |
| Ethnicity          | Black, Asian and minority ethnic background | Min 20<br>(Ensure a mix of Asian / Asian British<br>Black / African / Caribbean / Black British<br>reflective of local populations) | 27         |
| SEG                | AB, C1                                      | Min 26                                                                                                                              | 65         |
|                    | C2, DE                                      | Min 26                                                                                                                              | 32         |
| Level of education | Undergraduate degree or higher              | Min 26                                                                                                                              | 46         |
|                    | No degree                                   | Min 26                                                                                                                              | 51         |
| Household makeup   | Single household                            | Min 4                                                                                                                               | 34         |
|                    | Couple household                            | Min 4                                                                                                                               | 36         |
|                    | Family household                            | Min 4                                                                                                                               | 37         |
| Dietary habits     | Vegan                                       | Min 4                                                                                                                               | 6          |
|                    | Vegetarian                                  | Min 4                                                                                                                               | 7          |
|                    | Food Hypersensitivity (FHS)                 | Min 4                                                                                                                               | 5          |

## 1.3 Phase 2 recruitment screener

### Introduction

Hello, my name is [Recruiter]. I am currently arranging a research project and would like to ask you some questions and, if you are eligible, invite you to participate. I need to let you know some information before we go any further. I am working on behalf of Criteria Fieldwork, a research agency. They have been commissioned by Ipsos to organise some research on their behalf. The research is about food production.

The answers that you give to me to today will be shared with Criteria Fieldwork and Ipsos.

This exercise is purely a research project to help our clients develop their products and services, so anything you say during the research exercise itself or during this interview will remain confidential. You can access Criteria's privacy notice on their website: [Criteria Qualitative Fieldwork](#).

You have the right to withdraw your consent to process the information you provide or object to our processing of your information. The research activity and this interview will be conducted in accordance with the Market Research Society Code of Conduct, and the information you provide will be treated in accordance with data protection law.

This interview is just to establish eligibility for the research project and will take around 10-minutes. The research project itself will require you to participate in two online group discussions over the course of a couple of weeks and each discussion will last 3-hours. Eligible participants will receive £120.00 in total for their time (£60.00 per discussion).

During this interview I will need to ask specific questions about your ethnicity. This information will only be collected with your explicit consent and is being collected to ensure that the research is representative.

**Q1 Are you happy to continue on this basis?**

**Single code only.**

- 1 Yes (continue)
- 2 No (thank and close)

**Q2 Do you or any members of your immediate family work in any of the following areas, either in a paid or unpaid capacity?**

**Single code only.**

- 1 Journalism/the media (thank and close)
- 2 Publication relations (PR) (thank and close)
- 3 Market research (thank and close)
- 4 <insert occupation exclusions> (thank and close)
- 5 No none of these (continue) (thank and close)
- 6 Don't know (continue) (thank and close)

**Q3a How long ago did you last attend a market research group discussion/depth interview?**

**Single code only.**

- 1 In the last 6 months (thank and close)

2 6 months - 2 years ago (thank and close)

3 More than 2 years ago (ask Q3b)

4 Never (continue to Q4)

**Q3b What was each of those market research studies about?**

Write in: (if on a similar subject as this survey, close interview.

**Q3c If you are identified as having participated in other market research studies for Ipsos, or another research company, in the last 2 years during or following the session, or if any of the information you have provided is identified as being inaccurate, you may not receive monies for participating.**

**Please confirm you understand and are happy to proceed on that basis?**

1 No (thank and close)

2 Yes (continue)

**Q4 How would you describe your gender?**

**Single code.**

1 Male (recruit to quota)

2 Female (recruit to quota)

3 Non-binary (recruit to quota)

4 My gender is not listed (recruit to quota)

5 Prefer not to say (recruit to quota)

**Q5a How old were you on your last birthday?**

Write in and code exact age.

1 Under 18 (recruit to quota)

2 18 to 29 (recruit to quota)

3 30 to 39 (recruit to quota)

4 40 to 49 (recruit to quota)

5 50 to 59 (recruit to quota)

6 60 to 64 (recruit to quota)

7 65+ (recruit to quota)

**Q5b How would you describe your ethnicity?**

**Single code only.**

1 White British (recruit to quota)

- 2 White and Black Caribbean (recruit to quota)
- 3 White and Black African (recruit to quota)
- 4 White and Asian (recruit to quota)
- 5 Other mixed/multiple ethnic background, please specify: (recruit to quota)
- 6 Indian (recruit to quota)
- 7 Pakistan (recruit to quota)
- 8 Bangladeshi (recruit to quota)
- 9 Chinese (recruit to quota)
- 10 Other Asian background. Please specify: (recruit to quota)
- 11 Black African (recruit to quota)
- 12 Black Caribbean (recruit to quota)
- 13 Other Black/African/Caribbean background. Please specify: (recruit to quota)
- 14 Non-British European. Please specify: (recruit to quota)
- 15 Other. Please specify: (recruit to quota)

**Q6a What is your current employment status?**

**Single code only.**

- 1 In full time employment (recruit to quota)
- 2 In part time employment (recruit to quota)
- 3 Currently not in paid employment (recruit to quota)
- 4 In full time education/studying (recruit to quota)
- 5 Look after the home/children (recruit to quota)
- 6 Carer (recruit to quota)
- 7 Retired (recruit to quota)

**Q6b And could you tell me what it is you do for a living?**

- Position/rank/grade (recruit to quota)
- Industry/type of company (recruit to quota)

**Q6c And could you tell me what the chief income earner does for a living (if not yourself)?**

- Position/rank/grade (recruit to quota)
- Industry/type of company (recruit to quota)
- Number in charge of (recruit to quota)
- Social grade (recruit to quota)

**Q7 Who, if anyone, do you live with?**

- 1 Alone (single person household) (recruit to quota)
- 2 With a partner only (couple household) (recruit to quota)
- 3 Family household (recruit to quota)
- 4 With friends/house share (recruit to quota)
- 5 Other (recruit to quota)

**Q8 Which of the following best describes the area you live in?**

- 1 Rural (recruit to quota)
- 2 Town (recruit to quota)
- 3 City (recruit to quota)

**Q9 What is the highest level of education you have achieved?**

- 1 Not finished high school (recruit to quota, no degree)
- 2 GCSE/O Level or equivalent (recruit to quota, no degree)
- 3 A Level or equivalent (recruit to quota, no degree)
- 4 Trade or specialist school (recruit to quota, no degree)
- 5 Undergraduate degree (recruit to quota, undergraduate degree or higher)
- 6 Postgraduate degree (recruit to quota, undergraduate degree or higher)
- 7 Other (write in) (recruit to quota)

**Q10 Do you have any of the following dietary habits or restrictions?**

- 1 Vegan (recruit to quota)
- 2 Vegetarian (recruit to quota)
- 3 Pescetarian
- 4 Food Allergy (recruit to quota)
- 5 Food Intolerance (recruit to quota)
- 6 Another food hypersensitivity for example Coeliac disease
- 7 Other (write in:)
- 8 No

**Q11 It may be necessary for Ipsos to contact you by email or telephone after the research has taken place to follow up on ideas generated during the discussion. You would only be contacted if strictly necessary and only in connection with this research. This is necessary in order to take part. Are you happy to agree to be re-contacted on this basis?**

1 Yes (continue)

2 No (thank and close)

**Q12a Do you have access to a laptop, computer or tablet that you can use to take part in the online workshops?**

**Phones are not suitable due to the small screen.**

1 Yes

2 No (record answer, inform of support: we can arrange to send you a tablet to use for this research if you are selected to take part)

**Q12b Do you have a reliable internet connection, that would allow you to take part in zoom workshops with your camera on?**

1 Yes

2 No (record answer, inform of support: we can arrange to send you a pre-paid Wi-Fi dongle to use for this research if you are selected to take part)



## Consumer perceptions of precision breeding

### Appendices: polling questionnaire

**Ask all.**

**QPB1. In general, how trustworthy or untrustworthy would you say these groups are?**

Single code per row, progressive grid.

Rows - randomise but keep 1 to 2 as a block in that order (scientists codes)

1. Scientists in general
2. Scientists advising the UK government on topics relating to food FIX AFTER 1
3. Civil servants
4. Politicians
5. Regulators (for example, OFCOM, OFGEM, Financial Conduct Authority (FCA), Food Standards Agency (FSA))
6. Farmers
7. Food manufacturers
8. The ordinary person in the street

**Scale - Forward and reverse scale**

1. Very trustworthy
2. Fairly trustworthy
3. Neither trustworthy nor untrustworthy
4. Fairly untrustworthy
5. Very untrustworthy

6. Don't Know [FIX]

**Ask all.**

**QPB2. How concerned, if at all, are you personally about the following issues:**

Single code per row, progressive grid.

Rows - randomise

1. Climate change
2. Food availability/food shortages
3. Animal welfare standards in the UK
4. Food safety/ hygiene standards in the UK
5. The impact of the food you eat on the environment

**Scale - Forward and reverse scale rows 1 to 4**

1. Highly concerned
2. Somewhat concerned
3. Not very concerned
4. Not at all concerned
5. Don't know [FIX]

**Ask all.**

**QPB3. Which, if any, of the following applies to you? Please state all that apply.**

Multicode randomise rows 1 to 7

1. Vegetarian [INFO BUTTON: a person who does not eat meat or fish]
2. Pescatarian [INFO BUTTON: a person who does not eat meat but does eat fish]
3. Vegan [INFO BUTTON: a person who does not eat or use animal products]
4. Mainly vegetarian but occasionally eat meat
5. Avoid certain foods due to food allergies, intolerances and/or coeliac disease
6. Avoid certain foods due to following a Halal, Kosher or other religious diet
7. Avoid certain foods because of how they have been produced (e.g., avoid battery farmed eggs, non-organic certified foods)
8. None [FIX SINGLE CODE ONLY]
9. Don't know or prefer not to say [FIX SINGLE CODE ONLY]

**Ask all.**

**QPB4. The following questions ask about your household's personal situation.**

Please say whether the statement below was often true, sometimes true or never true for you/people in your household in the last 12 months.

Single code per row, progressive grid.

Rows - randomise

1. I/We worried whether our food would run out before we had money to buy more.
2. The food that we bought just didn't last, and I/We didn't have money to get more.
3. I/We couldn't afford to eat balanced meals.
4. I/someone in my household had to cut the size of meals or skip meals because there wasn't enough money for food

5. I/someone in my household had to use a food bank / received a free food parcel

**Scale - Forward and reverse scale rows 1 to 3**

1. Often true
2. Sometimes true
3. Never true
4. Don't know or prefer not to say [FIX]

**Ask all.**

**QPB5. How much, if at all, do you personally agree or disagree with the following statement: I like to try unfamiliar foods?**

Single code, forward and reverse scale 1 to 5.

1. Strongly agree
2. Tend to agree
3. Neither agree nor disagree
4. Tend to disagree
5. Strongly disagree
6. Don't know [FIX]

**Ask all.**

**QPB6. Have you heard of precision breeding before?**

Single code, forward and reverse scale 1 to 3.

1. Yes, and I know what it is
2. Yes, but I don't know what it is
3. No, I have not heard of it

**Ask all.**

**(new screen)**

**Sample 1**

"Precision Breeding" means a range of a scientific techniques that make changes to a plant or animal that could have happened naturally through cross-breeding, but can now be made to happen more quickly or more predictably. This might be for many reasons but some examples of why this is done might be to make things more resistant to disease, need less water to grow, or to increase the nutritional content.

**(new screen)**

**Sample 2**

"Precision Breeding" means a range of a scientific techniques that make changes to a plant or animal that could have happened naturally through cross-breeding, but can now be made to happen more quickly or more predictably. This might be for many reasons but some examples of why this is done might be to make things more resistant to disease, need less water to grow, or to increase the nutritional content.

Precision Bred foods would only be allowed to be sold in the UK after being independently scientifically assessed by the Food Standards Agency (FSA) and other UK government bodies to make sure that they are safe to eat. In Scotland, Food Standards Scotland has the responsibility for assessing certain food and animal feed products which require authorisation before sale.



**Ask all.**

**QPB9. Do you think that precision bred food products should, or should not, be available for sale in the UK in the future?**

Single code, forward and reverse scale 1 to 4.

1. Yes –they definitely should be available for sale in the UK in the future
2. Yes –they probably should be available for sale in the UK in the future
3. No – they probably should not be available for sale in the UK in the future
4. No – they definitely should not be available for sale in the UK in the future
5. Don't know [FIX]

**Ask all.**

**QPB12. To what extent do you think that precision bred food products are safe, or not safe, to eat?**

Single code, forward and reverse scale 1 to 4.

1. Very safe to eat
2. Fairly safe to eat
3. Fairly unsafe to eat
4. Very unsafe to eat
5. Don't know [FIX]

Ask to Sample 1 only.

**QPB17. Precision Bred foods would only be allowed to be sold in the UK after being independently scientifically assessed by the Food Standards Agency (FSA) and other UK government bodies to make sure that they are safe to eat. In Scotland, Food Standards Scotland has the responsibility for assessing certain food and animal feed products which require authorisation before sale.**

Knowing this, how confident are you that...

Progressive grid single code per row.

Rows - randomise rows.

- 1... the food you currently buy in the UK is safe to eat?
2. ... if precision bred food became available to buy in the UK, it would be safe to eat?

Forward/Reverse scale 1 to 4.

1. Very confident
2. Fairly confident
3. Not very confident
4. Not at all confident
5. Don't know / Don't know enough to say

Ask to sample 2 only.

**QPB17. Given what you know about how food is regulated in the UK, how confident are you that ..**

Progressive grid single code per row.

Rows - randomise rows.

- 1... the food you currently buy in the UK is safe to eat?
2. ... if precision bred food became available to buy in the UK, it would be safe to eat?

Forward/Reverse scale 1 to 4.

1. Very confident
2. Fairly confident
3. Not very confident
4. Not at all confident
5. Don't know / Don't know enough to say

**Ask all.**

**QPB10. How acceptable or unacceptable, do you think it is to use the following in food production:**

Progressive grid single code per row.

Rows - fix order.

1. Precision breeding of plants
2. Precision breeding of animals

Scale - Forward/Reverse scale 1 to 5.

1. Very acceptable
2. Fairly acceptable
3. Neither acceptable nor unacceptable
4. Fairly unacceptable
5. Very unacceptable
6. Don't know [FIX]

**Ask all.**

**QPB11. If precision bred food products became available for sale in the UK, what do you think the impact might be on the following?**

Progressive grid single code per row.

Rows - rotate order.

1. On the welfare of animals bred using precision breeding techniques
2. The health of people eating precision bred food products
3. On the environment
4. On small-scale farmers if they cannot access precision breeding technology
5. How precision bred food tastes
6. How nutritious precision bred food products are
7. The affordability of food

Scale - Forward/Reverse scale 1 to 5.

1. Very positive
2. Somewhat positive
3. Neither positive nor negative
4. Somewhat negative

5. Very negative
6. Don't know [FIX]

**Ask all.**

**QPB11a. Thinking about precision bred food, please put these issues in the order that they are the most important to you, where 1 is the most important and 6 is the least important.**

Rank from most important to least important, rotate order.

1. Animal welfare
2. Health and nutrition
3. The environment
4. Small scale farmers
5. Taste
6. Affordability

**Ask all.**

**QPB13. How important, if at all, would it be for you to know if you were buying a food item that had been precision bred, or contains precision bred ingredients, before you buy it?**

Single code, forward and reverse scale 1 to 4.

1. Very important
2. Fairly important
3. Not very important
4. Not all important
5. Don't know [FIX]

**Ask all.**

**QPB14. When shopping for food, how important would it be to you, to have the following information about precision bred foods?**

Progressive grid single code per row.

Rows - Randomise but keep 1 to 2 as a block in that order (ingredients)

1. That a food product contains something precision bred, but not which specific ingredients are precision bred
2. Which specific ingredients in a food product are precision bred FIX AFTER 1
3. The reason for the precision breeding (for example, increased resistance to disease or drought; larger crop yields)
4. Any changes in nutritional content (for example, levels of vitamins and minerals, or fibre) as a result of the precision breeding
5. Any information relevant to people with allergies, who are pregnant or have other health conditions

Scale, forward and reverse scale 1 to 4.

1. Very important
2. Fairly important
3. Not very important
4. Not at all important
5. Don't know [FIX]

**Ask all.**

**QPB15. If Precision Bred food products became available for sale in the UK, would you or would you not be willing to eat...?**

Progressive grid single code per row. Randomise rows.

Rows.

1. Precision bred meat
2. Precision bred dairy products (for example, milk, cheese, yoghurt, butter, etc)
3. Precision bred cereals/grains/flour
4. Processed foods that have been precision bred (for example, bread or chocolate)
5. Precision bred fruit or vegetables

Scale.

1. Yes – I definitely would be willing to eat it
2. Yes – I probably would be willing to eat it
3. No – I probably would not be willing to eat it
4. No – I definitely would not be willing to eat it
5. Don't know [FIX]

**Ask all.**

**QPB16. If Precision Bred food products became available for sale in the UK, would you eat a product if you knew...?**

Progressive grid single code per row. Randomise rows.

Rows.

1. It had health benefits (for example, increased vitamins and nutrients)
2. It was safer for people with food allergies, intolerances, and coeliac disease
3. It tasted better than food that had not been precision bred
4. It was cheaper than food that had not been precision bred
5. It was better for the environment than food that had not been precision bred
6. It had been precision bred to be more resilient to changing climates
7. It had been precision bred to improve animal welfare

Scale, forward and reverse scale 1 to 4.

1. Yes – I definitely would be willing to eat that food product
2. Yes – I probably would be willing to eat that food product
3. No – I probably would not be willing to eat that food product
4. No – I definitely would not be willing to eat that food product
5. Don't know [FIX]

**Ask all.**

**QPB8. Before today, how much, if anything, did you know about precision breeding?**

Single code.

Scale- Forward/Reverse 1 to 5.

1. A great deal
2. A fair amount

3. Just a little
4. Heard of it but knew nothing about it
5. Had never heard of it
6. Don't know



# Consumer perceptions of precision breeding

## Appendices: deliberative workshop materials

### 3.1 Workshop 1: Discussion guide

#### FSA Precision breeding: Workshop 1 Discussion Guide

##### Objective:

Capture initial views and awareness of precision breeding, introduce participants to the basic concepts of precision breeding, explore perceived benefits and risks, capture participants' attitudes to inform workshop 2 mini-group allocation.

Dates/times: D2

- England group: Tues 11th Oct, 6pm-9pm
- Wales group: Weds 12th Oct, 6pm-9pm
- Northern Ireland group: Thu 13th Oct, 6pm-9pm

##### Discussion guide:

##### 5:30pm to 6pm Arrival

Participants enter the 'zoom room' and any that have not already done so are asked to change their screen name to first name and initial of their surname.

##### 6pm to 6:30pm Plenary 1: Introduction

##### Introduction to workshop and research (5 mins)

- **Chair to talk through slides:**
- Why are we here? The FSA wants to better understand public views on precision bred food
- The workshop process, what to expect
- Housekeeping, ground rules
- **POLL: What is precision breeding?**
- Have you heard of 'precision breeding' before?
- What do you think 'precision breeding' means? (please post replies in chat)
- Overall, how positive or negative do you feel about precision breeding?

##### Introduction to precision breeding: (25 mins)

- I am going to introduce the basics of precision breeding now – please write down questions you have or post them in the chat – we will aim to answer them later in the workshop – or in the next one.
- Plays FSA precision breeding video (slide 6 - should be downloaded to desktop in advance.)
- Chair talks through slides 7-11
- Plays CRISPR video (slide 12 - should be downloaded to desktop in advance.)
- Chair talks through slides 13-15

We will now go to our breakout rooms to discuss what we have heard – please wait to be moved automatically.

### **6:30pm to 6:55pm Breakout 1**

#### **Introductions (5 mins)**

Welcome to your breakout room – this is the smaller group we will stay in for most of the session and where we will have our conversations. Therefore, it would be good to quickly introduce ourselves.

#### **Moderator shows slide 16 and goes first:**

- What is your name?
- Roughly where do you live?
- Do you see much farmland where you live?

#### **Initial reactions (20 mins)**

**Now that we've heard a bit about precision breeding, I want to get your initial thoughts.**

#### **How much of that information felt familiar to you?**

- What had you heard about before?
- Where had you heard about that? (School, news, friends, reading?)
- Was there anything that particularly surprised anyone?
- How about other traditional breeding methods – were you surprised about selective breeding, induced mutation?
- Why was that surprising?

#### **What was the most interesting thing that you heard?**

- Why was that interesting to you?
- What else do you want to know about that?

#### **Who was confused by any of that information?**

- What is confusing?
- Is anybody else confused by this, or does anybody feel they can clarify?

#### **If you wanted to know more about precision breeding, what sources would you trust to give you accurate information?**

- News (what type?), friends, specific internet sources, government?

### **6:55pm to 7:10pm Break**

Stay within breakout rooms, show break slide displaying time to return.

## **7:10pm to 7:25pm Breakout**

### **Perceived risks and benefits (15 mins)**

Now that we have spoken a bit more about what precision breeding is, we will talk about some possible benefits and risks. Before I show some on screen, I want to see which you think there are:

Show slide 18 and type on screen as they make suggestions.

What benefits do you think there may be for precision breeding?

- Who would benefit from this?
- How important/significant is that benefit?
- How likely do you think that benefit is?
- What risks do you think there are?
- Who would be impacted by this risk?
- How significant do you think that impact would be?
- How likely is that risk?

We are going to go back to the main room now, and hear about potential benefits and risks, as well as some example uses of precision breeding.

## **7:25pm to 7:45pm Plenary 2 (20 minutes)**

### **Example use cases (10 mins)**

Now I'm going to show you some specific examples of ways in which precision breeding is being used for food production. They are currently in development stages, and not yet available to buy.

**Chair present slides 19 to 22.**

### **Benefits and risks (10 mins)**

As precision breeding is an emerging technology in food production, there has been a lot of discussion amongst scientists, policymakers, and campaigners, about what benefits and risks there are.

In your groups you have already discussed some of these, but now I'm going to share some of the key ones that are commonly argued.

Chair show slides 23 to 24

#### **Benefits:**

- Changes achieved using precision breeding could help to make crops more resilient to climate change impacts, such as drought
- Changes achieved using precision breeding could also reduce crop disease
- Some crops could be edited with precision breeding to make them healthier. For example, more nutrients, safer for those with food allergies or Coeliac disease
- Who may benefit?
- Farmers could be protected from loss of crops
- People living in areas vulnerable to food scarcity could have more consistent food supplies/crops
- Farmers and food producers may have lower costs to grow or process crops
- Consumers could see cheaper food products
- Consumers could see products that are better for their health

## **Risks:**

- Transparency and choice: because precision bred crops can't always be identified by testing, some consumers worry that they wouldn't know if they are eating precision bred foods
- Some also worry that precision bred crops may spread and mix with other crops. This could mean the precision bred crops are untraceable or could replace other crops if they are more resilient.
- As precision breeding is relatively new, there may be low trust in the safety of these foods
- Some are also concerned about the potential risk for "off-site mutation" - that parts of a plant or animal might be changed in ways other than those intended by the producer.
- Cost saving benefits may not be shared equally; larger producers may have better access to the technology than smaller ones, or saving may not be passed to consumers
- Who may be impacted?
- Consumers who don't want to eat precision bred foods may find it hard to avoid if it is not traceable
- Biodiversity could be reduced if precision bred crops replace other crops or don't perform the same role in ecosystems as their conventionally bred counterparts
- Consumers may not have trust in the safety of precision bred foods
- Smaller farmers/producers may be priced out by larger food producers if they cannot access precision breeding technology equally

## **Poll (5 mins)**

You've heard a lot and spoken a lot about precision breeding so far, and we want to see how you are feeling about it as a group – so we have two quick poll questions:

- Q1: Overall, how positive or negative do you feel about precision breeding?
- Very positive, fairly positive, neither positive or negative, fairly negative, very negative
- Q2: How likely would you be to choose to eat a food made with precision bred crops?
- Very likely, fairly likely, neither likely or unlikely, fairly unlikely, very unlikely

We are going to go back to breakout rooms now – please wait to be automatically moved.

## **7:45pm to 8:10pm Breakout 2**

### **Revisit benefits/risks (25 mins)**

What did you think about each of the examples?

- Probe:
- What benefits stood out to you from the examples?
- How important are these benefits?
- Emphasise – each PB product is likely to focus to one change to begin with, rather than lots of different changes at once.

Now that we've heard more, what do you think of the benefits/risks?

- Which stand out the most to you and why?
- Any new one's spring to mind?

Thinking about both the benefits and risks we have spoken about – how do you feel about precision breeding for food overall?

- Do the benefits outweigh the risks, or the other way around?
- Would you be happy to eat precision bred food?



### **8:10pm to 8:25pm Break**

During break, moderator to copy the additional risks raised by participants to slide 28 for final exercise.

### **8:25pm to 8:50pm Breakout room**

#### **Trust in our food (25 mins)**

Now, thinking just of the risks we have discussed, let's think about what you would like to see in place to have trust in precision bred food.

Show risks on screen (slide 28) and ask about each risk in turn.

What would you need to see in place to have trust that this risk is being managed effectively?

Allow spontaneous answers then probe: Testing, rules for producers, rules for shops/restaurants, information for the public?

- Why would this be reassuring?
- If applicable: Do you think this is already in place in the UK food system?
- How much do you trust or distrust that the FSA is able to make sure that food is safe and what it says it is?
- What makes you say that?
- How confident are you that the FSA is able to regulate precision bred foods appropriately?
- What makes you say that?

### **8:45pm to 9pm Plenary, wrap up**

#### **Precision Breeding Bill and national context (5 mins)**

Welcome back everyone!

Before we finish, here is some quick context about precision breeding which we will discuss further in the next workshop.

- In England Group present slide 29 only
- In Wales/NI Groups: present slide 29 and slide 30/31 as applicable.

#### **Thanks and close (5 mins)**

Thank you for all of your hard work today! We've heard really interesting conversations.

Next steps:

Remind of next workshop date:

- England group: Tues 25th Oct, 6pm to 9pm
- Wales group: Weds 26th Oct, 6pm to 9pm
- Northern Ireland group: Thu 27th Oct, 6pm to 9pm

A small task before then – please speak to family/friends/colleagues about what you have discussed today, and see what other views you hear!

### **9pm to 9:15pm Very short debrief**

Once all participants have left, 5-15 mins to discuss:

- How it went

- Any key observations from moderators and FSA.
- Anything to adapt for following workshops?

## 3.2 Workshop 1: Slide deck

1. Precision Breeding: Public Engagement workshops (title slide)
2. The Food Standards Agency (FSA) wants to better understand public views on precision bred food. We are interested in your thoughts, views, concerns and questions! You, Ipsos, FSA (the client) and note takers.
3. The process: You will attend two workshops (including this one). Each one will be from 6pm to 9pm. You will spend quite a bit of time in smaller breakout rooms with around five other participants, where your moderator will guide you through discussions. Housekeeping: Keep distractions to a minimum (for example, mobile phones), take a break if you need to (for example, use the bathroom or attend to anything urgent and we will have two official breaks for 15 minutes).
4. Ground rules: listen respectfully without interrupting, listen actively and with an ear to understanding others' views. (Don't just think about what you are going to say while someone else is talking), any question is a good question, criticise ideas not individuals, commit to learning, not debating. Comment in order to share information, not to persuade, stay on topic and try to be concise, avoid blame, speculation and inflammatory language, allow everyone the chance to speak, avoid assumptions about any member of the group or generalisations about social groups. Do not ask individuals to speak for their (perceived) social group, be patient with other participants and the team, we have a lot of information to get through, feel free to share your thoughts about this event with friends and family, if posting about this event on social media please do not share any detail of the discussions.
5. What is precision breeding? Before we jump in, we want to know Have you heard of precision breeding before? (let us know in the zoom poll which will show on your screen.) What do you think precision breeding means? (let us know by typing in the chat - can you let us know if it's just a guess). Overall, how positive or negative do you feel about precision breeding? (let us know in the zoom poll which will show on your screen).
6. Precision breeding: FSA Explains video
7. Precision breeding is a term used to describe a range of modern scientific methods for editing an organism's DNA. Precision Breeding makes changes to a plant or animal that could have happened naturally through traditional breeding methods but can now be made to happen more quickly and more predictably. This might be done to make things more resistant to disease, need less water to grow, or to increase the nutritional content. So that we can discuss precision breeding, we will need to do a very brief walk through about DNA, and how this process works...
8. What is DNA and what are genes? You find DNA inside an organism's cells. All living things are made up of cells. DNA contains instructions for an organism's growth coded with four bases known as A, T, C and G. Genome means the complete set of the DNA code or the full set of instructions. Genes refer only to specific sections of this code.
9. Humans have been changing genes of crops and livestock for food production for thousands of years. Artificial selection: selecting and breeding two closely related animals or plants to try to achieve a desired trait. The first evidence we have of this being done is 7800BC. Induced mutation: exposing plants to X-rays and chemicals to bring useful mutations. This is commonly used to change genes to make them more useful. Example: Plant breeders developed seedless grapes by treating seeds with radiation and chemical agents to encourage mutations and then selecting seed with desirable traits.
10. Humans have been changing genes of crops and livestock for food production for thousands of years. Precision breeding: genome changed with genes from sexually compatible species or by making changes to the genes directly and which could be achieved naturally or by traditional breeding methods. Example: Around 20% of potato

crops are lost due to a disease called potato blight each year. Scientists bred a blight resistant potato by adding two resistance genes from a South American wild potato to a domesticated potato variety. Genetic modification: genome changes with genes from a sexually incompatible organism by making changes to the genes directly and which could not be achieved naturally or by traditional breeding methods. Example: Researchers copied the gene that makes many purple foods produce a beneficial antioxidant into the DNA of tomatoes. This meant the tomatoes also produce this healthy antioxidant.

11. One technique used in precision breeding is called CRISPR video.
12. Can you tell if a food has been precision bred? There are currently challenges to testing whether an organism is precision bred or not..., Full genome sequencing can reveal changes that have been made to an organism's DNA..., BUT because these could also have been achieved through traditional breeding, it is difficult to say for sure whether the changes are due to precision breeding. Let's look at an example...
13. Can you tell if a food has been precision bred? Earlier we talking about how DNA is made up of four bases known as A, T, C and G. In precision breeding you might make a one letter change to a plant's DNA in order to get a particular outcome (for example, a bigger fruit). These sorts of change happen all the time naturally. In a field of apple trees, each tree will be a little different to an other. If you were to pick an apple at random you couldn't say for certain which was created by precision breeding and which was created by chance.
14. When and where does precision breeding take place? Precision breeding would be conducted on crop seeds within research and development facilities, for example, a laboratory. They would then test the resulting seeds in controlled crop trials. Trials may first be grown and monitored in greenhouses, before final varieties are trialled in fields. By using precision breeding rather than conventional methods, genetic selection can be made in a more targeted way with less trial and error.
15. Breakout rooms: Please wait to be moved automatically into your breakout room.
16. Introductions: what is your name? Roughly where do you live? Do you see much farmland where you live?
17. Comfort break: please be back by 7:10pm.
18. Benefits: Who would benefit from this?, How important/significant is that benefit, How likely do you think that benefit is? Risks: Who would be impacted by this risk?, How significant do you think that impact would be?, How likely is that risk?
19. Example A Disease and climate change resistant chocolate: Cocoa plants are sensitive to drought and crop disease. The plant may be extinct by 2080 because climate change is increasing these threats. Cocoa is one of the important sources of income in Ghana, so the country's GDP and the livelihoods of thousands of small-scale farmers could soon be badly damaged. Many other globally popular foods face this threat, including coffee and bananas. Cocoa pods grow on trees, which are very slow to breed. Therefore selective breeding will be too slow to achieve changes in time to beat these climate change effects. Researchers removed a specific gene that suppresses the plant's disease response. In the testing stage, the new plants are showing strong disease resistance and grow fast. The researchers hope to have the resilient crop available for farmers in West Africa in 5 to 10 years.
20. Example B Removing a potentially harmful compound from wheat: When certain food products such as potatoes, cereals and coffee are heated to a high temperature potentially cancer causing compound called acrylamide is formed. This happens when foods that naturally contain the amino acid asparagine and certain sugars are heated to 120 degrees and can be found in fried, baked and roasted products. A researched in Hertfordshire is testing a crop of wheat that has been precision bred to have lower levels of the amino acid asparagine. They think that this will reduce the health risk in products which use this wheat (like bread) when they are heated (for example, toasted, baked into bread). This has the long-term potential to benefit public health.
21. Example C Tomatoes precision bred to contain Vitamin D: 50% of Europeans and one billion people worldwide have vitamin D insufficiency. Vitamin D is essential for maintenance of healthy muscles and bones. It can be found in oily fish, foods that have

fortified with vitamin D (for example orange juice where vitamin D has been added as an ingredient) and in food supplements (for example, vitamin pills). It is also produced by the skin when we are exposed to the sun. Researchers are testing a new type of tomato which has been precision bred to have more vitamin D in both the fruit (the tomato) and the leaves. This could help millions of people globally by increasing the amount of vitamin D in their diets. They could also be a source of vitamin D for people following plant-based diet or who have allergies to vitamin D rich foods (for example, fish). These leaves could also be used to produce supplements (for example, vitamin pills) which may help reduce food waste globally.

22. Benefits: changes achieved using precision breeding could help to make crops more resilient to climate change impacts, such as drought, and reduce the need for chemical fertilisers and pesticide helping support biodiversity. Changes achieved using precision breeding could also reduce crop disease. Some crops could be edited with precision breeding to make them healthier. For example; more nutrients, safer for those with food allergies or Coeliac disease. These changes can also be made faster and more reliably. Who may benefit? Farmers could be protected from loss of crops, people living in areas vulnerable to food scarcity could have more consistent food supplies/crops, farmers and food producers may have lower costs to grow or process crops and may benefit from increased sales, consumers could see cheaper food products and consumers could see products that are better for their health.
23. Risks: Transparency and choice

## 3.3 Workshop 2: Discussion guide

### FSA Precision breeding: Workshop 2 Discussion Guide

#### Objective:

Explore expectations of regulation of precision breeding, reactions to any proposed regulatory approach, what participants felt the public should be informed about, and how information should be communicated to members of the public.

#### Dates/times:

- England group: Tues 25th Oct, 6pm-9pm
- Wales group: Weds 26th Oct, 6pm-9pm
- Northern Ireland group: Thu 27th Oct, 6pm-9pm

#### Discussion guide:

**5:30pm to 6pm Arrival:** Participants enter the 'zoom room' and any that have not already done so are asked to change their screen name to first name and initial of their surname.

#### 6 to 6:25pm Plenary 1: Introduction (20 minutes)

Introduction to workshop and research (5 mins)

Chair to talk through slides:

- why are we here? The FSA wants to better understand public views on precision bred food
- the workshop process, what to expect
- housekeeping, ground rules

Workshop 1 rec-cap (10 mins)

- recap of what precision breeding is
- recap of the context: new bill in England
- Wales/Northern Ireland: England only bill but we want to hear what you think in case precision bred foods are one day available in Wales/Northern Ireland.
- chair shows some of the key themes and concerns raised by participants in Workshop 1
- questions from workshop 1 – FSA answers presented

What does food regulation look like? (10 mins)

- who are the Food Standards Agency?
- how does the FSA work with other parts of government?
- what is the Food Standards Agency's mission?
- how does the FSA deliver its mission and meet its responsibilities?
- introducing new types of food to the market

Now we will go to breakout rooms.

### **6:25pm to 6:50pm Breakout (25 minutes)**

Introduction (5 minutes)

- name
- where you live
- what's your favourite thing to have for dinner in the winter?

### **Feedback on views/discussions since Workshop 1 (10 minutes)**

- how did you feel about what you learned/discussed in Workshop 1?
- did you discuss precision breeding with any friends or family?
- what did they say? Did you agree?

### **Initial reactions to food regulations (10 minutes)**

Show UK Food Regulation side(s)

What did you think about what we just heard about how food is regulated in the UK?

- Moderator can show plenary slides as/if needed.
- did anything sound familiar? Where had you heard about this before?
- Was there anything that you weren't familiar with? Were you aware of what the FSA do 'behind the scenes' to make sure that food is safe and what it says it is?
- what do you think about the level of regulation?
- now that you know what is going on behind the scenes, how do you feel about the process overall?
- how confident do you feel that the food you can buy in the UK is safe to eat?
- do you trust that the FSA is achieving its mission?

We are going to have a quick break now - as usual you can just turn your camera microphone off, but please don't leave the meeting.

### **6:50pm to 7pm - Break (10 minutes)**

Stay within breakout rooms, show break slide displaying time to return.

### **7 to 7:15pm - Breakout (15 minutes)**

### **Expected approach to regulating precision bred food (15 minutes)**

In workshop 1, we ended the session discussing 'what you would like to see in place to have trust in precision bred food'. Now that you have heard a bit more about how new foods are regulated, let's revisit that.

Moderator can show plenary slides as/if needed.

What do you think the FSA should be doing behind the scenes in relation to precision bred foods?

Allow for spontaneous responses, then probe:

How can the FSA continue to deliver its mission in terms of precision bred foods?

Show slide 8 if helpful:

What should the FSA take into account that may help you to trust precision bred foods are safe?

What should the FSA take into account that may help you to feel that precision bred foods are not misleading?

What should the FSA take into account that may help you to trust that precision bred foods are healthy and sustainable?

What else would you expect to be in place for precision bred foods?

Allow for spontaneous responses, then probe:

- control over who can use the technology?
- transparency – about what?
- information for consumers – what information?

### **7:15pm to 7:30pm Plenary (15 minutes)**

#### **The proposed precision breeding bill (15 minutes)**

Welcome back everyone!

We have mentioned already that there is a new Precision Breeding Bill being proposed. I'm now going to outline what that means, who is involved, and how this relates to the FSA's role.

Chair presents 'The proposed precision breeding bill, and the FSA's role': Slides 15-21

Refer to slide notes when presenting.

Wales: Show slide 22

If this bill does indeed become law in England, then the FSA will need to be ready with a set of regulations to manage precision bred foods.

Slides 23-24

- how will PB be classified: Having its own regulatory framework, separate from genetically modified crops and also different from traditionally bred crops?
- reasoning for not being classed as Genetically Modified: Changes from precision breeding could have happened through traditional methods, unlike genetic modification
- reasoning for not being classed as traditional bred crops: Precision bred crops could be developed faster, and new precision breeding technologies are being developed so a separate category allows more scrutiny than traditional crops
- two-tiered approach: separating smaller changes from more significant ones, so they can have suitable levels of risk assessment and scrutiny. This aims to give flexibility and be 'future proof', so that the Tiers still work in the future when precision breeding technology has advanced.

Going back to breakout rooms now to discuss!

### **7:30pm to 7:50pm Breakouts (20 minutes)**

#### **Reactions to bill / FSA regulatory framework (20 minutes)**

Moderator can show plenary slides as/if needed:

- did you have any questions about the bill, and what that means for the FSA?
- is the FSA's role clear?
- what do you think about a new category being created for precision bred foods (slide 19)?

#### **If negative:**

- o Why is that?
- o Do you feel it should be in one of the existing categories instead (Which? GMO or traditional)?
- o Why is that: probe on the reasoning clarifications below.

#### **If positive:**

- o Why is a new category good?
- o Is this reassuring?
- o Why?

#### **Clarifications if needed:**

How will PB be classified: Having its own regulatory framework, separate from genetically modified crops and also different from traditional crops.

Reasoning for not being classed as Genetically Modified: Changes from precision breeding could have happened through traditional methods, unlike genetic modification.

Reasoning for not being classed as traditional bred crops: Precision bred crops could be developed faster, and the technology is still developing so a separate category allows more scrutiny than traditional crops.

What do you think of the two-tier system (slide 23)?

Moderator recap on previous discussion if needed:

- how well do you think this will 'future proof' the framework?
- thinking about the variation of types of PB products that may be developed, do you think the two-tier system is flexible enough, too restrictive, too flexible?
- how important is it to communicate the way that precision bred products will be regulated (Tier 1 and 2) to consumers?
- why is that?
- where is the balance between too much and too little information?
- what do the consumers need to know?
- is this different to traditionally bred foods?
- what don't they need to know?
- would you also want to know this about traditionally-bred foods with exactly the same properties?

If the two-tier system was in place, to what extent would you feel you could trust precision bred foods for sale in the UK?

- what is reassuring/concerning to you?

Probe on FSA missing (show slide 8 if helpful)

- trust it is safe?
- trust it is what it says it is?

- trust it is healthy or sustainable?
- what do you feel needs more attention in the FSA's approach?
- what do you think is important information for consumers to know?

Thinking back to your concerns from Workshop 1, how well do you feel this process could address these concerns?

**Show slide 24:**

To what extent does the process address the concerns/risks they raised in workshop 1: for example, allergens, risks affecting specific consumer groups (for example, too much vit D), environmental impact, poorer taste,/flavours, etc... What questions do you have about the FSA approach?

**7:50pm to 8pm - Break (10 minutes)**

**8pm to 8:55pm - Breakout rooms (55 minutes)**

**Informing consumers – introduction (5 minutes)**

Now that we have spoken about the bill and rules for PB foods, we want to speak about information for consumers.

If Precision Bred foods were to become available on shelves next week, what information do you think you want to know about these foods?

- why would you want to know this?
- would you also want to know this about non-PB foods with exactly the same properties (nutrition, allergens etc)?
- how important would it be to you to have this information?
- how would you want this information made available to you?
- who would you like to receive the information from? (for example, the FSA, food related magazines/ websites, news releases?

**Labelling (20 minutes)**

The topic of labelling has already come up in this workshop.

A lot of the information that food businesses provide to you is mandatory – businesses are required by law.

Some examples are ingredients lists, allergen labelling, and information on how much of each ingredient is in a product. Some common labelling is voluntary, such as nutritional information (for example, the amount of protein, carbohydrates fat etc. in a product)

The FSA can't guarantee that the precision bred food product would be labelled as precision bred.

If asked why this may not be possible, moderator to say: The FSA is not the sole decision maker on labelling. Their role is to provide independent advice to government, which will include consumer views on this matter.

- would you want precision bred foods to be labelled as Precision Bred?
- why is that?
- what would you expect the label to look like/say?
- how likely would you be to notice a PB label on a product?
- please explore underlying drivers for this – esp. how this links with issues around health/safety concerns, ethics



Talk through slide 29 (has animations to click through arrows if too cluttered)

What do you think about the amount of information you already have available to you?

How often do you make food decisions based on information on the label

Probe:

Mandatory: allergens, ingredients

Other labels: nutrition, organic, free-range, eco-friendly

If PB foods were not labelled as PB, would the existing mandatory labelling tell you what you need to know? (e.g. nutrition, allergens, ingredients)

Probe on: Ingredients, Allergen labelling, nutritional info (all on Slide 29)

- why/why not?
- what is missing?
- **probe** on key safety mandatory labelling where there is an overlap.
- if applicable: Would you expect that for traditionally bred foods too?
- **probe**: What if the PB change doesn't change nutrition, allergen etc (e.g., just changed to produce more fruit)
- Knowing that this mandatory information will still be required for precision bred foods, how necessary do you feel it is to label foods as precision bred?
- why?
- would you also recommend having all foods including PB foods labelled with information on how it was produced (for example, conventionally bred)?
- what other information would you want and why?
- is labelling the right place for this? Why/Why not?
- what other options may be suitable?

## Register (15 minutes)

Show slide 30

One way that the FSA may communicate with consumers is through a precision bred foods register. This would be an online site where all precision bred organisms that have been approved for sale in England are listed.

It is possible that this register will list PB ingredients, but not further consumer products produced using that ingredient (for example, PB wheat may be listed, but bread made with this wheat may not be).

Moderator show examples on screen: click through to a specific food/business

What do you think about an online precision bred food register?

How helpful would that be?

What information do you think should be on the register?

Spontaneous responses first, then probe:

- for all suggestion ask: Why is that information important/helpful?
- where else it is sold (for example, what other countries in the world sell/eat this product)
- who sells it – businesses
- who was involved in the research?
- what the benefits are / reason for the PB
- how useful is the register if it includes PB ingredients, but not other products made with that ingredient?

## Would you use the register?

- when? What would prompt you to use it?
- what information would you be looking for? Why?
- would you base any decisions off the information on the register?
- how would you access it? Phone in shop? At home?

- how regularly might you use it? Frequently when shopping, once? Never?
- would a QR code on a PB product, linking to the register be helpful?
- probe if not mentioned: accessibility of QR codes.

### **What types of consumers might use the register most?**

- spontaneous responses first, then probe: businesses, researchers, everyday consumers?
- why may they use it? When?

### **Do you think there are any drawbacks or limitations to the register approach to sharing PB information?**

- what are they? Who would be affected?
- how important is this?

### **Level of public education needed (10 minutes)**

Now that we've spoken about how people can find out about individual PB products, we are going to talk about how the general public should be informed about precision breeding overall.

### **How important or unimportant is it that the public are informed about precision bred foods?**

- why is/isn't it important?
- who may need to be informed about PB?
- how helpful will an understanding of PB be to consumers?

### **What information do you think the public should understand?**

- why would this information be important?
- are there limits on how much information is helpful?
- probe on level of scientific detail needed.

### **How would you explain precision breeding to other consumers?**

- what is the helpful information you have heard when learning about it?
- what information is key to share when educating consumers?
- what terminology and wording is helpful?
- what wording has been confusing?

### **How do you think this information could be shared?**

- what channels would be suitable? Why?
- are there any audiences in particular that need to understand PB? How might they best be reached?

### **8:55pm to 9pm - Plenary**

#### **Final poll (5 minutes)**

Q1 - Overall how positive or negative do you feel about precision breeding? Very positive, fairly positive, neither positive or negative, fairly negative, very negative.

Q2 - How likely would you be to choose to eat a food made with precision bred crops? Very likely, fairly likely, neither likely or unlikely, fairly unlikely, very unlikely.

Wrap up and thank you.

### **9pm to 9:15pm - Very short debrief**

Once all participants have left, 5 to 15 minutes to discuss. How it went, any key observations from moderations and FSA. Anything to adapt for following workshops?

## 3.4 Workshop 2: Slide deck

1. Precision Breeding: Public Engagement workshops

2. The Food Standards Agency (FSA) wants to better understand public views on precision bred food. We are interested in your thoughts, views, concerns and questions! You, Ipsos, FSA (the client) and note takers.

3. Welcome back! This is your final workshop. As before, you will spend quite a bit of time in smaller breakout rooms with around five other participants, where your moderator will guide you through discussions. This workshop will focus more on the new bill, the FSA's role and how precision bred foods should be regulated. Housekeeping: Keep distractions to a minimum (for example, mobile phones), take a break if you need to (for example, use the bathroom or attend to anything urgent and we will have two official breaks for 15 minutes.

4. Ground rules: listen respectfully without interrupting, listen actively and with an ear to understanding others' views. (Don't just think about what you are going to say while someone else is talking), any question is a good question, criticise ideas not individuals, commit to learning, not debating. Comment in order to share information, not to persuade, stay on topic and try to be concise, avoid blame, speculation and inflammatory language, allow everyone the chance to speak, avoid assumptions about any member of the group or generalisations about social groups. Do not ask individuals to speak for their (perceived) social group, be patient with other participants and the team, we have a lot of information to get through, feel free to share your thoughts about this event with friends and family, if posting about this event on social media please do not share any detail of the discussions.

5. Recap of workshop 1: Precision breeding makes changes to a plant or animal that could have happened naturally through traditional breeding methods but can now be made to happen more quickly and more predictably. **Precision breeding:** changes to the genes which could be achieved naturally or by traditional breeding methods. **Genetic modification:** changes to the genes directly and which could not be achieved naturally or by traditional breeding methods. **Possible benefits are:** making crops more resistant to disease, need less water to grow or to increase the nutritional content. **Common concerns are:** transparency, traceability, public trust in safety, predictability.

6. **Key questions you asked in workshop 1: Content:** who is going to make final decisions about precision breeding? Who funds scientific trials? Who will benefit financially? What about precision breeding in other countries? Will we import precision bred foods? **Potential impact:** Will precision bred food be more expensive? How will this impact farmers? Could there be adverse health impacts for people or animals? Could this potentially create new allergies? What does this mean for organic produce?

7. **What is the Food Standards Agency?** The Food Standards Agency (FSA) is the independent government department working to protect public health and consumers' wider interests in relation to food in England, Wales and Northern Ireland. Although the FSA is part of the Civil Service, the FSA does not have a minister and is not political. The FSA is evidence led and gives independent advice to government departments about different parts of the food system. The FSA has their own scientists and experts and work with independent external experts to ensure they are acting on the latest science.

8. **What is the Food Standards Agency's mission?** 'Food you can trust...A food system where: Food is safe, food is what it says it is, food is healthier and more sustainable.'

9. **How does the FSA deliver its mission and meet its responsibilities?** Things you might already know: (pictures of) Food Hygiene rating sticker, Allergy alerts and Food allergy or intolerance information. Things you might not be aware of: regulations, risk assessments, exercise our own regulatory powers to take action and provide advice to governments.

10. **Introducing new foods to the market:** Risk analysis is the process of assessing, managing and communicating food and animal feed safety risks. It's how the FSA ensures high standards, checking if the food is safe, how it impacts on health, nutritional value and the environment. Foods that have not been consumed by people within the UK or EU must be risk assessed before being authorised. Depending on the level of risk and available evidence the process of risk assessment can take from 4 months to 2 years (or in some cases longer). The FSA will only recommend authorisation of a new food if it is assessed as safe. This is part of its mission to ensure that food is safe.

11. **Introducing new foods to the market:** examples of foods that have been risks assessed and come to market are: Chia seeds: now widely used in the UK but were once new to our market. They had a shorter risk assessment process as they have been widely used in Europe for a long time and there was plenty of evidence that they were safe. Quorn (vegetarian 'meat' products) and cholesterol lowering spread: these were both new products with little or no consumer consumption in other countries to assess risk by. They therefore had a longer risk assessment. FSA may ask for additional scientific data and evidence as part of a more extensive risk assessment.

12. **Breakout rooms:** please wait to be moved automatically into your breakout rooms.

13. **Introductions:** What is your name? Roughly where do you live? What's your favourite thing to have for dinner in the winter?

14. **Comfort break:** please be back by 7pm.

15. How does the FSA work with other parts of government? The FSA is responsible for some important elements of the foods system, but not the whole food system. For example, sometimes laws about food are decided by the government or the Department for Environment, Food and Rural Affairs (Defra), rather than the FSA. Some of the government bodies the FSA provide independent advice to include: HM Government, Defra, Northern Ireland Executive, Department of Health and Social Care, Welsh Government.

16. The proposed Genetic Technology (Precision Breeding) Bill, and the FSA's role: Some decisions about precision bred foods are not made by the FSA; 1) the bill itself is agreed in Parliament 2) Defra sets initial laws to implement the Bill 3) the FSA then sets further laws to manage how individual precision bred food or feed products are regulated.

- **Members of Parliament** includes the House of Commons, House of Lords, Royal Assent
- **Defra:** Defra Secondary legislation
- **FSA:** FSA secondary legislation, FSA regulatory framework

17. The proposed Genetic Technology (Precision Breeding) Bill and the FSA's role:

**Stage 1:** Parliament will decide if the new Bill becomes law. This includes:

- allowing precision bred foods to be sold if they comply with regulations
- prohibiting sale of precision bred foods that are not authorised
- implementing traceability measures and an enforcement regime

**Stage 2:** Then Defra will set secondary laws about how and when a product is classed as precision bred

**Stage 3:** The FSA will be given specific tasks, and set out further secondary laws:

- it will create a framework for the authorisation process for new precision bred products
- it will communicate with consumers about precision bred foods

**18. Precision breeding:** changes to the genes which could be achieved naturally or by traditional breeding methods. **Genetic modification:** changes to the genes directly and which could not be achieved naturally or by traditional breeding methods.

**19. The proposed Genetic Technology (Precision Breeding) Bill, and the FSA's role:** What does the Bill intend to change? Currently Precision Bred food and feed is regulated in the same way as Genetically Modified food and feed - they are both risk assessed under the same regulatory framework. If the Bill is passed, a separate category called 'Precision Bred food and feed' will be created. The FSA will then set up a new process to risk assess Precision Bred food and feed. This will be separate from the process to risk assess Genetically Modified food and feed, which will remain the same.

**20. Why do we need a separate regulatory framework for Precision Bred foods?** Precision Bred foods and Genetically Modified Foods are different from each other - the organisms grown using precision breeding techniques are more similar to those produced using conventional methods. While precision bred foods will be considered to be similar to traditionally bred foods they will need their own set of rules because:

- they can be developed faster than conventionally bred crops, and so a bespoke set of rules is needed to give confidence that new precision bred products have been adequately assessed
- the FSA wants the rules to be future proof - so that any new precision breeding technologies introduced in the future still have the appropriate level of scrutiny.

**Precision breeding:** changes to the genes which could be achieved naturally or by traditional breeding methods. **Genetic modification:** changes to the genes directly and which could not be achieved naturally or by traditional breeding methods.

**21. What would the journey of a Precision Bred food and feed product be?** (this is just part of the process, some products will be assessed by other organisation and regulators).

1. Lab based research and development takes place.
2. A new crop and seed is developed
3. The Department for the Environment, Food and Rural Affairs (Defra) looks at the seed/crop and how it has been produced and decides if it is a precision bred organism.
4. The FSA conducts a risk assessment for its safety and other important factors.
5. If the precision bred organism passes the risk assessment, the FSA provides advice to the relevant government minister to decide if it should go on sale.
6. If the minister decides that the product should go on sale, then the crop or seed is authorised and the FSA can put it on the register of precision bred foods.
7. Businesses can now use these seeds to grow precision bred crops or import the authorised precision bred crops from overseas. These can be sold direct to consumers, used to make other foods, or fed to animals as animal feed.

**22. What would all this mean for Wales?**

- the Genetic Technology (Precision Breeding) Bill is England only. That means that, if the Bill becomes law, products that go through the process we've just described would only be authorised in England.
- currently, no Precision Bred products are authorised in Wales (or the UK). If the Bill is passed and a precision bred food is authorised for sale in England, businesses could sell

Precision Bred foods direct to consumers in England, Wales and Scotland under the market access principles of the UK Internal Market Act (2020)

- Precision Bred food and feed produced in Wales would still be treated as a Genetically Modified product, That would mean Precision Bred products produced in Wales would be subject to different regulations than they are in England.

23. **What are the FSA considering for their framework?** The FSA are exploring a two-tiered approach to authorising precision bred foods, which is proportionate, transparent and based rigorously on the science. This would distinguish between minor change that might typically result from the traditional breeding, and major changes that while theoretically possible to achieve through traditional breeding, may or may not significantly alter the safety of the consumed product. **Tier 1 (smaller changes):** all applications for new products are screened for similarity to traditionally bred varieties where the risk is understood and not of concern for consumers. **Tier 2 (larger changes):** Applications for new products where the Tier 1 screening does not allow the risk to be understood are subject to an additional step. These applications require a risk assessment to determine the level of risk for consumers. The FSA feels this would give flexibility across a broad range of products and future proof the process as technology develops. Scientists will use known evidence to decide how new products are classed as Tier 1 or Tier 2. This will be independent from the government or manufacturers.

24. **What are the FSA considering for their framework?** The criteria for Tier 1 and 2 are currently being developed by the FSAs independent scientific committees. **The criteria for whether a product is Tier 1 or 2 may consider:**

- any risk of scientific errors
- impacts on quality of food
- ethical questions about how far is 'too far', and what type of alterations are more significant
- uncertainty about long term health impacts and what risk management is needed
- **The FSA also conduct an an assessment of other legitimate factors (OLFs) which may include:**
- impacts on environment, biodiversity, eco systems
- costs and food inequality impacts
- **There are some things that are already covered by existing rules and laws, such as:**
- potential changes to allergen information (all allergen information must always be declared on the label)
- safety to consumers: no new food will be permitted unless it is deemed as safe to consumers

25. Breakout rooms: Please wait to be moved automatically into your breakout room.

26. Comfort break: please be back by 8pm.

27. Food Businesses are required by law to provide certain types of information to consumers - this will stay the same for precision bred foods. Examples of mandatory labelling: a list of ingredients, allergen labelling, quantitative declaration of ingredients (where required), nutritional declaration.

28. **Informing consumers: a precision bred foods register.** The FSA will create an online register of authorised PBOs. Here are some examples of other registers: register of regulated products: products that are regulated and have undergone a risk assessment. Food hygiene ratings: information on the food hygiene ratings of businesses.

The FSA will need to decide: what is displayed in the register (what is helpful, what is feasible)

29. Your current views: poll. After today's discussions we want to capture how you currently feel about precision breeding: overall, how positive or negative do you feel about precision breeding?

How likely would you be to eat a food made with precision bred crops?

30. Thank you.

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