

## Response to the Government Consultation on *Genetic Technology (Precision Breeding) Bill*

Professor Julie Gray,  
Leverhulme Royal Society Senior Research Fellow,  
University of Sheffield

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**1.1. Executive Summary:** The [plant scientists at the University of Sheffield](#) are well-placed, and enthusiastic, to apply their expertise in precision breeding technologies, and to contribute to the UK economy, net-zero carbon targets, and global food security, by producing novel crop varieties that are better suited for growth under climate change.

**1.2.** My long-standing expertise in plant biotechnology and experience with commercialisation of novel crops leads me to recommend that the *Genetic Technology (Precision Breeding) Bill* should be passed by parliament. This could allow the UK to re-establish itself as a leader in agri-food innovation.

**2.1. Institutional Reputation:** I am a professor at the [University of Sheffield](#), a Russell Group university in the north of England that is in the top three UK universities for Biological Sciences ([REF2021](#)). Sheffield has one of the strongest groupings of plant scientists in the UK with world-leading [experimental facilities](#) – allowing controlled crop trialling under future carbon dioxide atmospheres. The [Institute for Sustainable Food](#) was recently established as a flagship that unites our science and social science expertise to deliver solutions and ensure future food supplies.

**3.1. Individual Expertise:** I have a deep understanding of plant genetic technology having led [a research group](#) in this area for three decades. My [publications](#) on plant fertilisation, fruit ripening and environmental response genes have been cited over 10,000 times and I have been granted 16 patents describing crop improvements achievable through modifying these. In my [early career](#), I was [part of the team](#) that, with Zeneca (now Syngenta), produced the world's first genetically modified food – tomatoes that were [successfully marketed](#) as puree in Safeways and Sainsburys. However, despite being cheaper, selling well, and having reduced environmental impact, the tomatoes were withdrawn due to [perceived ethical and social issues associated with the introduction of GM food](#).

**3.2 Current Aims:** I have remained committed to crop innovation through genetic technology. My current objective is to provide novel crop varieties to farmers, that are high yielding and adapted for growth under future warmer/drier climates, combined with the potential for lower GHG emissions. My recent work has identified genetic controllers of plant water loss and using precise [gene editing technology](#) I have been able to develop more resource efficient and [drought-tolerant crop plants](#). Several UK and European plant breeding companies have supported my work, and my most recent [patent](#) is licenced to a US plant biotechnology company. I am therefore confident that if the *Genetic Technology (Precision Breeding) Bill* is passed, and legal barriers are lifted, I will be able to provide 'climate-ready crops' to farmers in a way which both addresses ambitions within the UK's 25 Year Environment plan and promotes UK economic growth.

**4.1 Wider Objectives:** Other academic colleagues in Sheffield are leading similar initiatives. Together we are applying our expertise in [plant development](#), genetics and biochemistry to produce a range of crops with increased [photosynthetic capacity](#), [resistance to agricultural pests](#), enhanced tolerance to [drought or heat stresses](#), reduced spoilage, and improved [carbon capture](#). We are using our in-depth understanding of plant genes to improve agronomic traits in wheat, barley, potato, tomato and maize crops. Through our active links with most UK plant breeders and global agri-food partners, if precision bred crops were to be legalised, we could quickly provide innovative crops to generate

income for UK companies and to contribute to the government's levelling up, innovation nation and zero carbon agendas.

**4.2.** Sheffield plant scientists lead international consortia, working with partners in ODA countries to improve globally important food crops. For example, my own collaborations include [rice improvement projects](#) in partnership with teams in China, Philippines, Thailand and Vietnam, and improvement of [bean crops](#) in partnership with teams in Mexico and Chile (a [Newton prize](#) winning project). However, existing legislation restricts the use of crops produced through genetic technologies and prevents the use of numerous improved crops.

**4.3.** The UK, as a science superpower, has enormous potential to improve future global food security. The acceptance of precision bred crops by the UK, will set a precedent for acceptance of genetically improved crops in other countries where food supplies are becoming increasingly more vulnerable to climate change. Thus, the passing of this bill is set to have far-reaching impacts on improving food security and mitigating climate change on a global scale. I recommend that the bill be passed.