

# Genetic Technology (Precision Breeding) Bill

## Factsheet 1 – Overview

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Department  
for Environment  
Food & Rural Affairs

## What is Precision Breeding?

Precision breeding describes a range of breeding technologies, such as gene editing, that enable DNA to be edited much more efficiently and precisely than current breeding techniques. Precision breeding technologies can make targeted genetic changes to produce beneficial traits that can also occur through traditional breeding and natural processes. This makes it different to genetic modification where modern techniques are used to insert functional DNA from an unrelated species into another species.

## Benefits of Precision Breeding

Precision breeding techniques such as gene editing have great potential and can help us to adapt to the impacts of climate change and enhance the sustainability and resilience of agricultural systems.

Precision breeding enables the development of crops that are more nutritious, resistant to pests and disease, resilient to climate change and more beneficial to the environment. This in turn could reduce the need for pesticides, increase food production and reduce costs to English farmers.

Precision breeding can also enhance the health and welfare of animals through greater resistance to diseases and reduced use of antibiotics, and improved resilience to the impacts of climate change.

## The Bill

The primary policy objective of the Bill is to ensure that plants, animals, and food and feed products developed using precision breeding technologies are regulated proportionately to risk. It will introduce simpler regulatory measures to enable these products to be authorised and brought to market more easily.

Whilst there is great potential for increasing innovation, we recognise that there is a need to safeguard animal welfare in the new regulatory framework. That is why we are taking a

stepwise approach, enabling commercial use of precision breeding technologies with plants first followed by animals later.

The four key policy changes are to:

1. Remove plants and animals produced through precision breeding technologies from regulatory requirements applicable to the environmental release and marketing of GMOs (Genetically Modified Organisms),
2. Introduce two notification systems; one for precision bred organisms used for research purposes and the other for marketing purposes. The information collected will be published on a public register on GOV.UK.
3. Establish a proportionate regulatory system for precision bred animals to ensure animal welfare is safeguarded. We will not be introducing changes to the regulations for animals until this system is in place.
4. Establish a new science-based authorisation process for food and feed products developed using precision bred organisms.

## Rationale for Change

The UK is at the leading edge of genetics and genomics research, and we want UK researchers and commercial breeders to be at the forefront of exploring what these technologies have to offer. We want to harness the benefits of these technologies to develop, amongst other things, crops that are more nutritious, more productive and less reliant on pesticides and to develop animals that are more resistant to disease.

We want to drive UK innovation and investment to help make a positive impact on the food system and generate wider benefits into the UK economy. Unlocking innovation in precision breeding will also see us take a step forward towards the goal set out by the Prime Minister for us to become a 'science superpower' by 2030.

Currently, regulations controlling the use of GMOs in the UK apply to all organisms generated using genetic technologies, including precision breeding approaches such as gene editing. This means that regulations relating to GMOs are defined by the technologies used to generate them, rather than by their characteristics and risk to human health or to the environment.

The current legislation, most of which derives from retained European Union (EU) law, is over 30 years old and has not kept pace with scientific developments and our increased knowledge of the environmental impacts associated with precision breeding technologies. Advice from the independent scientific committee ACRE is that precision bred organisms pose no greater risk than their traditionally bred or naturally arising counterparts. Leaving the EU has provided the UK with the opportunity to adopt a more science based and proportionate approach to the regulation of such organisms.

## Territorial Scope

The territorial scope of the Bill is England only. The regulation of the production, release into the environment and marketing of precision bred plants and animals, and food and feed derived from them, is devolved. Currently, both the Scottish Government and Welsh Government wish for precision bred organisms to continue to be regulated as GMOs in their territories.

## Trade

Developing a more proportionate and science-based approach will align us with many other countries that have considered, or are in the process of considering, whether to regulate precision bred organisms differently from GMOs. For example, Argentina, Brazil, Canada, Japan, and the US have taken a different approach to the EU in deciding that organisms that could have been produced by traditional breeding techniques are not to be regulated as GMOs.

In 2018, 13 countries issued a joint statement to the World Trade Organisation, stating that governments should “avoid arbitrary and unjustifiable distinctions” between those crops developed through precision breeding technologies, such as gene editing, and those developed through conventional breeding. Since then, the international regulatory environment for precision bred products has rapidly evolved and products derived through precision breeding have begun to enter the global market.

The measures in this Bill could help facilitate greater trade with countries that currently, or are planning to, make use of precision breeding technologies. As a result, this Bill would enable the creation of potential new export markets for UK-based producers. It could also lead to a greater willingness of companies to invest and sell products in the UK relative to the EU due to the creation of a more favourable regulatory environment.

The EU currently regulate the use of all genetic technologies such as precision breeding as GMOs. This means any precision bred products entering the EU from Great Britain will need to be authorised and labelled as GMOs.

However, a recent EU study<sup>1</sup> on the status of New Genomic Techniques questioned whether current EU regulations are fit for purpose. The European Commission has responded by launching a public consultation on the future regulation of gene editing techniques in EU crop production, with the intention of introducing proposals for a new legal framework in 2023.

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<sup>1</sup> [EC study on new genomic techniques \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1)

# Case Studies

## Disease resistance and reduced chemical use

- Virus Yellows are a group of viruses that can cause yield losses of up to 50 per cent in sugar beet and results in pesticide applications to control the disease.
- A UK Research and Innovation funded study has identified several promising sources of genetic resistance that can be introduced through precision breeding.
- Introducing resistance to Virus Yellows would reduce the need for pesticides, helping to protect the environment, increase food production and reduce costs to farmers.

## Climate resilience and food security

- Developing wheat that is resilient to climate change will help to increase food production from a crop that 2.5 billion people are dependent on globally.
- Researchers at the John Innes Centre in Norwich have used gene editing techniques to identify a key gene in wheat that can be used to introduce traits such as heat resilience whilst maintaining high yield.
- This discovery presents an exciting opportunity to identify variations of the gene that can give wheat varieties resilience to climate change.

## Public health

- Researchers at Rothamsted Research are testing a wheat that has been gene edited to have lower levels of the amino acid asparagine.
- When certain foods such as potatoes and cereals are heated to a high temperature, a probable cancer-causing compound called acrylamide is formed from asparagine.
- Using gene editing to reduce asparagine can help reduce the risk of acrylamide formation, which could have benefits for public health and the safe manufacturing of food products.