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Consultation response from the AIC to *the regulation of genetic technologies*

The AIC

The AIC (Agricultural Industries Confederation) is the trade association which represents the UK Agri-supply industry which has a farmgate value of over £8 billion.

We represent a wide range of members who supply farmers with the key inputs and advice they require to produce crops and livestock products. Our industry is therefore an integral part of the agri-food supply chain. The key sectors in which our members operate are shown below.

Background

In January 2021, Defra launched a consultation on *the regulation of genetic technologies*, specially focussing on a possible Government approach to gene-editing in England, and its differentiation to Genetically Modified Organisms (GMOs). As a result of this, the consultation was split into two parts: the first focusing on the regulation of gene edited (GE) organisms possessing genetic changes which could have been introduced by traditional breeding. Depending on the results, Defra may change the legislation to amend the definition of a GMO as it applies in England. This would mean that this legislation does not apply to organisms produced by gene editing (GE) and other genetic technologies if they could have been developed using traditional breeding methods.

The second part is separate, asking for views on the wider regulatory framework governing genetically modified organisms (GMOs).

The AIC warmly welcomed the launch of this consultation and the strategic approach taken by the Government to differentiate between GE and GMOs, and more specifically to look at the possible benefits across a number of sectors, delivering a variety of beneficial outcomes.

AIC View

The AIC believes that there are a great number of challenges facing agriculture and food production in the UK that more efficient breeding technologies could help address. We should by no means consider GE and GMO applications as the only answer to challenges in our climate and food systems, however we cannot, and should not, overlook the possible opportunities that could be achieved across a variety of sectors. With pressures across a variety of systems, we must be prepared to consider the risks of *failure to act* upon these technologies, as opposed to continuing to adopt an over-precautionary approach that serves to stifle innovation.

In our response to the questions in the consultation, AIC has identified three broad themes for future innovation in GE and GMOs:

1. **Environmental outcomes.** Gene editing will allow researchers and AIC members to explore techniques or applications in plant health, livestock feed and seed breeding that can minimise emissions and disease spread, whilst allowing for new varieties or breeds that can adapt to the real challenges of climate change.

2. **Meeting the needs of consumer and animal nutrition.** It is evident that dietary requirements and demands are changing in the UK and around the world. By harnessing innovation, we have an opportunity to address nutritional challenges in crops and livestock, as well as eliminating allergens and helping to reduce food waste.

3. **Diversity**. There has been a growing concern across the UK agricultural sector that the nation's genetic diversity in crops and livestock is diminishing. We now have an opportunity to fundamentally readdress the possible availability of crop varieties and types available to farmers, which can help the UK food and feed production whilst catering for the wide variety of products that UK consumers are demanding across the food chain. Having the means by which to offer farmers more choice in their cropping options would be of clear benefit.

<u>Responses to the consultation questions</u>

Part 1

Currently, organisms developed using genetic technologies such as GE are regulated as genetically modified organisms (GMOs) even if their genetic change(s) could have been produced through traditional breeding. Do you agree with this?

AIC is of the position that Gene Editing (GE) works with the genetic potential of an organism, and changes could therefore have happened naturally. Through the use of gene editing, many of the changes that can take a number of years to achieve through conventional methods can be achieved more efficiently and new traits with their associated advantages (such as pest and disease control, improvement of input efficiency and human health and nutritional benefits) be brought to the market more quickly. By comparison, Genetically Modified Organisms (GMOs),

involve insertion of 'foreign' DNA to bring in traits from other species, or significant changes to the organism that could not have occurred through conventional breeding. Gene editing is therefore clearly different in our opinion.

GMOs are demonstrably different to products of gene editing and the distinction is important to communicate and set out. While GMOs can be traced (e.g. through identification of the foreign DNA present) it is not possible to definitively test for Gene Editing, as even by locating a particular change in the DNA, that could have occurred naturally.

If the UK were to regulate gene editing in exactly the same way as GM currently is, that would keep the UK in the minority globally. Other countries such as Argentina, Brazil, Australia, the USA, Japan and Israel regard GE and GMO as different and they are therefore treated accordingly.

Do organisms produced by GE or other genetic technologies pose a similar, lesser or greater risk of harm to human health or the environment compared with their traditionally bred counterparts as a result of how they were produced?

Humans and animals have consumed trillions of meals including GM ingredients, without evidence of harm. AIC is not aware of any scientific evidence that GE breeding techniques have any different risk profile to existing breeding techniques. Indeed, since the resultant seeds, plants and animals from GE are chemically and molecularly indistinguishable from conventionally bred seeds, plants and animals, therefore no risk profile differences are to be anticipated.

It is well established that GMOs face stringent tests and analyses of their safety before they can be put on the market. The safety of GM products is considered on two levels: the way they are produced and their specific new characteristics resulting from genetic modification.

The environmental benefits potentially enabled by gene editing could be significant. For example through facilitating the more efficient use of resources underpinning food production and reducing environmental impacts, or matching genetic potential to suit farming and food production systems. Solutions are needed to meet the challenges of climate change adaptation and mitigation, and the potential to achieve this through gene editing should be recognised. Possible environmental benefits arising from novel technologies are very broad, and can help deliver towards reducing the impacts of agricultural production, most notably:

- Fewer crop protection products applied
- Nitrogen use and efficiency
- Weed resistance
- Fuel and GHG emissions arising from more frequent cultivations

Equally however we should use this as an opportunity to look towards possible outcomes arising from new technologies that may improve, enhance and protect natural resources, landscape features or biodiversity. There are examples of biotechnological applications being developed in trees, allowing them to overcome possible disease threats such as Dutch Elm disease and improve propagation. There are also emerging novel "bioremediation" applications that are using trees and plants to remove toxic substances from soils. Given the wider policy choices around balancing food production and environmental enhancement, the role of GMOs and GE should be considered for both.

The opportunity to incorporate nutritional benefits into products would have positive impacts on human health. Rothamsted Research have used GE to develop, and are working to field trial, wheat that is less likely to produce acrylamide when the wheat from it is toasted – acrylamide is a likely human carcinogen. We should not overlook the beneficial impacts of GM products such as 'golden rice' which is intended to produce beta-carotene in each rice grain, which in effect increases Vitamin A intake for consumers. There is therefore an open opportunity for the UK to work alongside the Foreign, Commonwealth and Development Office and the Department for International Trade to look at how the UK's world leading position in agricultural technology can help deliver solutions to nations that suffer from malnutrition, uncertain harvests, or both.

We should equally not overlook the potential applications for improvements in human health from livestock sectors too. There have been a number of research initiatives in the UK and abroad that have looked at the role of livestock diets, and how they affect fat composition in ruminant animals for meat, as well as in the dairy sector. With further market demands for products free from allergens, there are numerous possible applications where GMOs and GE could be positioned.

Are there any non-safety issues to consider (e.g. impacts on trade, consumer choice, intellectual property, regulatory, animal welfare or others), if organisms produced by GE or other genetic technologies, which could have been produced naturally or through traditional breeding methods, were not regulated as GMOs?

AIC supports modern commercial agriculture in the UK and works to enable continuous improvement in business sustainability and ability to follow opportunities. Ultimately the market will decide whether there is demand for the potential products from these breeding approaches. But to enable this, it is important that industry has the ability to investigate and develop opportunities to put to the market.

It has often been stated that there is little demand for GE or GMOs in the UK, and this is used as a precursor to opposing their development or introduction. AIC believe this is a slightly spurious argument; it is very difficult for consumers or potential producers to be able to discern market demand for a product until they have been made available to consumers. AIC would urge Defra to look at countries where both 'conventional' and GE/GMO products are offered simultaneously, as opposed to places where either one or the other is offered within one application or product line. The USA for example saw reservations from NGOs prior to commercial deregulation of GM technology in food in 1986. Since then, the consumption of GM foods has significantly increased year on year - even if clearly labelled. Meanwhile those non-GM products have used this as a point of marketing ('GMO free') to allow the consumer to make an informed choice.

It may be found through this consultation that a number of respondents indicate support for gene editing, but are not involved enough in the research work to be able to recognise or articulate the specific opportunities that this technology could unlock. Solutions to a number of issues may indeed lie in the use of this technology, but the examples do not yet exist in the UK and EU market. Therefore the government's position of support for the technologies to enable such innovation to flourish is to be welcomed.

<u>Benefits</u>

Due to the current regulatory framework it is not straightforward to give many examples of the potential benefits, as due to the regulatory uncertainty there has been little incentive to investigate or develop potential products since commercialisation was not possible in the UK or EU.

However there are a great number of challenges facing agriculture and food production in the UK that more efficient breeding technologies could help address, such as pest and disease resistance, direct consumer benefit, and towards achieving climate goals.

For example:-

- Developing new traits in crops such as disease resistance could help reduce the need for plant protection products (PPPs) used to maintain crop yield and quality. This is particularly important as availability of PPPs is becoming more limited due to regulatory requirements. With fewer PPPs with alternative modes of action against target pests, the risk of the development of resistance to the remaining PPPs increases. In-built genetic resistance would provide another tool in the toolbox for integrated pest management (IPM).
- Plant resistance to diseases that are transmitted to emerging plants by pests such as aphids could reduce the need for seed treatments. Since the withdrawal of neonicotinoid seed treatments in the EU, alternative solutions to control aphid borne virus diseases in crops such as sugar beet and cereals are needed. It took many years of conventional plant breeding to develop the Barley Yellow Dwarf Virus resistant variety of wheat (Wolverine) which came to the market in 2020.
- In principle, a high yielding variety of one crop, with a sudden reduction in resistance to a plant disease as a result of a new variant becoming prevalent, could be gene-edited and a resistant equivalent be back on the market within 2-3 seasons. This would enable growers to continue to grow a wide range of crops and varieties, thereby contributing to good IPM.
- Quickening the capability to produce crop varieties and animal breeds which have traits enabling them to adapt to more extreme weather events. Climate change adaptation and mitigation will need to move hand in hand and more rapidly than commonly realised: genetic adaption will be key. It is important to share such knowledge globally.
- Enabling the more efficient use of all resources underpinning food production and reducing environmental impacts, and a result of matching genetic potential to suit farming and food production systems. One of such recent developments is the use of CRISPR technology that has helped scientists to improve nitrogen use efficiency in rice. In the UK, this could be a game changer, as high NUE in major UK crops such as wheat can improve the environment and lower the cost of production.
- Opening up doors for plant based solutions to all manner of sustainability issues faced in rural and urban communities, perhaps including nutritional benefits.
- The opportunities in livestock are significant, for example Texel Sheep Society chief executive John Yates has said “Recent investment by the society in research and development projects has focussed on hard to measure health and productivity traits and the exploitation of genomic selection within the breed…Adding gene editing to that work could give breeders access to animals that are naturally resistant to diseases, helping reduce antimicrobial use while also improving animal welfare and productivity and ensuring the UK sheep sector remains competitive globally.”
- Significant work in the livestock area is being carried out by the Roslin Institute and includes swine flu resistance in pigs and avian flu resistance in poultry; the introduction of such disease resistance traits would have a marked impact on animal welfare as well as the economics of meat production in the UK.

- Smaller area crops such as lucerne, borage and sugar beet would benefit from greater ease of breeding as cereals and major oilseeds currently have most focus in breeding. If those breeding benefits enabled the expansion of the areas of these crops, that would add to diversity across the landscape and could contribute to IPM.
- Following on from the above, there is significant scope to look at opportunities in innovation for new sources of feed for livestock sectors. It is well documented that the UK relies upon different imported feeds across a range of livestock sectors, and any innovation that can help reduce this reliance would be advantageous to both domestic livestock and cereal farmers. There have been a number of smaller trials into certain crops for use in pig and poultry feed for example, however the possibility of using GE techniques could help speed up this process.
- Research work is ongoing to significantly reduce enzymatic browning in crops such as potato, apple and mushroom. Availability of such products would reduce food waste.
- Gene editing has been used to produce a tomato with significantly higher GABA (Gamma-Amino Butrytic Acid) that is effective at lowering blood pressure and relieving stress. This was developed at a Japanese university alongside a seed company and is the first gene edited food approved by the government in Japan. Seedlings can be purchased and grown at home for domestic consumption.

Transparency

It is recognised that the supply chain and consumers may expect a degree of transparency where GE has been used in production. AIC would welcome dialogue on how any transparency requirements could be achieved in a practical way, through existing frameworks and production requirements.

Conversely, it should be noted that since the resultant seeds, plants and food are chemically and molecularly indistinguishable from those of conventional breeding, there are no tests for gene-editing available today or envisaged in the future, making labelling extremely difficult to monitor or enforce. Any requirements around labelling could create administrative burdens and reduce uptake of products of GE.

A pragmatic way forward is needed so that industry and consumers can benefit from this technology where it chooses, but information is available to those who require it, and choice of use is retained.

The AIC would also point Government towards recent moves by the Canadian authorities regarding oversight and transparency of GE and GMOs. It is proposing that gene edited organisms that do not contain 'foreign' DNA will not be subject to regulatory oversight provided they are not classified as 'novel'. Novel in this case meaning those organisms not naturally occurring and have not been previously approved for sale by Canadian authorities. Plant breeders will be given the opportunity to participate in a voluntary transparency initiative, which will publish information on new plants on Government websites. However there are no plans for statutory labelling and traceability of gene edited products, because non-novel gene-edited plants are deemed safe to consumers without further regulatory oversight. The AIC would endorse this position and urge UK Government to look at this example.

Impacts on Trade

AIC represents companies in the agrisupply sector and many export cereals, pulses, oilseeds, animal feed and seed to the EU and globally. If the EU were to continue classifying what it views as GE products as GM, that would be a significant barrier to trade, including from GB into NI. Therefore the outcome of the European Commission study on the legal status of GE, due in April, is of great interest. Under the Trade and Co-operation Agreement between the UK and the EU, the chapters on level playing field and the environment could be brought under greater scrutiny with regard to a deviation in policy position on gene editing or genetic modification. The Government must consider how such a regulatory deviation would be considered, with any prospect for a challenge from the EU.

The UK is reliant on a number of imported products, particularly soy for animal feed. This is primarily sourced from the USA and South America, and the views held there on GE are very relevant for the UK as our imports will need to continue.

For some other countries if it does not contain foreign DNA, it is not regulated as a GMO. But this is examined on a case by case basis. Therefore the legal position in England must be clear.

This matter will be crucial very shortly, as the UK may be able to import GE products sooner than the EU. A robust way of monitoring what is and is not permitted in the UK will be essential for the continued flow of trade, and for recognising any challenge in exporting any UK manufactured products containing GE materials (such as potentially animal feed) can be exported to NI and the EU, and beyond.

Finally, we should not overlook the importance of maintaining continuity and consistency across all parts of the UK with regards to GE and GMOs. It would add comprehensive complexity to businesses if there is an inconsistent approach to the UK internal market whilst potentially distorting the market for farmers in different parts of the UK. Whilst devolved decision making must be respected, the need to include other administrations as far as possible must be taken into account.

What criteria should be used to determine whether an organism produced by gene editing or another genetic technology, could have been produced by traditional breeding or not?

The criteria should have a robust scientific basis and be clearly defined, recognising that in most cases, gene-edited seeds, plants and animals are chemically and molecularly indistinguishable from conventionally bred seeds, plants and animals.

Given that gene editing involves working with what was already in the plant or animal, and could have occurred naturally, there is the significant challenge that this may not be possible to distinguish between mutations that have occurred naturally, and those that are a result of human intervention.

Part 2

There are a number of existing, non-GM regulations that control the use of organisms and/or products derived from them. The GMO legislation applies additional controls when the organism or product has been developed using particular technologies. Do you think existing, non-GM legislation is sufficient to deal with all organisms irrespective of the way that they were produced or is additional legislation needed?

AIC is in favour of the opportunity for all new technologies to be properly evaluated from a scientific point of view and the marketplace allowed to deliver its subsequent view on their suitability. Education and communication will be key to realising the opportunity as well as transparency. GMOs are demonstrably different to the products of GE (which could have occurred in nature). The use of GM currently requires significant attention to traceability and labelling of food and feed products. Due to trade requirements and market expectations on transparency around the used of GMOs, it is sensible that this continue to be the case for GMOs.

AIC aims to support an environment which allows members to operate on the basis which best suits them and their business. Provision of choice is held to be key to consumer acceptance.

The existing regulatory frameworks for both GM and conventional production are robust, and this should be promoted in government communications.

ENDS.

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