1. INTRODUCTION

The Australian Seed Federation (ASF) is the peak national body representing the interests of Australia's sowing seed industry. The membership of ASF comprises stakeholders from all sectors of the seed supply chain including plant breeders, seed growers, seed processors and seed marketers.

In Australia, the seed industry is crucial to the development of broadacre, pasture and horticultural crops that are critical to the nation's agricultural productivity, sustainability and food security. The seed industry has always responded to society's need for increased crop yields, better tasting varieties and pest and disease resistant crops. Ultimately, plant breeding fosters sustainable farming practices to meet the needs of a growing global population.

The ASF has prepared this submission to highlight the impact the Tasmanian moratorium on genetically modified crops is having on the seed industry, and to support removal of the moratorium.

The ASF's policy position on biotechnology is that *'The ASF supports choice in relation to crop biotechnology provided that the choice is based on sound science and respects the rights of others to also choose.'*

The ASF welcomes the *'Review of Tasmania's genetically modified organism (GMO) moratorium'* to investigate the benefits and costs of the moratorium to the state of Tasmania and to the state's agricultural and food production industries. Nearly fourteen years of trade and marketing experience have shown there have been no demonstrable marketing premiums for Tasmanian agricultural produce versus like-for-like non-GM produce from states that permit the commercial cultivation of GMOs.

As at 26 April 2019, the Tasmanian GMO moratorium will have been in place for 4911 days. That's 13 years, 5 months and 12 days that Tasmanian farmers have been denied the opportunity to choose the latest seed breeding technologies with the potential to deliver economic, agronomic and environmental benefits to their farming operations. There is no evidence that Tasmania will benefit from continuing to impose this severe restriction on their farmers or have benefited in any way since the introduction of the moratorium – there are only 'vibes, anecdotes and hearsay'. The moratorium restricts farmer choice, is a costly disincentive for private investment in Tasmanian agriculture, is unnecessary for preserving the identity of GM and non-GM crops and provides no quantifiable trade or marketing benefit to Tasmanian primary producers.

The ASF is unaware of any quantitative or qualitative economic analysis to support the claim that Tasmania's moratorium on the commercial cultivation of GMOs has led to marketing premiums for agricultural produce grown in the State. Evidence from mainland states that permit the commercial cultivation of GM crops clearly demonstrates that both GM and non-GM crops can be grown and marketed side-by-side without impacting on prices or market access for primary producers.

Having the GM moratorium in place in Tasmania is restricting growth and innovation in the State's agricultural sector. It is denying Tasmanian growers and farmers access to innovative breeding technologies and new crops/ products both now and in the future, which their competitors in other Australian states have access to.

The ASF supports the lifting of the Tasmanian GM moratorium due to its significant negative implications for the seed and agriculture industry. This includes the increased cost to seed producers and delays in supplying seed to Tasmanian growers due to the additional testing required to meet Tasmania's zero tolerance (0.01%) threshold.

2. GENETICALLY MODIFIED CROPS AND PLANT BREEDING

Plant breeding depends upon genetic variability within and across related species as a basis for developing new plant varieties with improved characteristics. To create a new plant variety, plant breeders have generally relied on two sources of genetic variation as a basis for new characteristics: the inherent diversity in a plant's gene pool and new, naturally occurring variants of existing genes.

Plant breeders have always used the creation of new variations of plant characteristics to provide solutions for resistance to plant diseases and pests, to increase tolerance to environmental stress, to improve quality and yields, and to meet consumer expectations.

Breeders often make crosses between plants of diverse genetic makeup to produce new combinations of genetic characteristics which result in diverse morphological or quality characteristics in the progeny plants. The natural diversity of different sources of germplasm within a species or its close relatives is a primary source of genetic variation.

Genetic variation can also be increased by mutations – changes in the DNA sequences of the plants. In plants, spontaneous mutation mechanisms and induced mutagenesis (e.g. chemical and irradiation) have long been exploited to introduce different types of mutations that confer desirable traits to breeding programs. Such mutations may range from point mutations, which include substitutions, insertions and deletions of one or a few DNA base-pairs, to larger changes including gene duplications and chromosomal rearrangements. Since the 1950s, well over 3,200 crop varieties have been directly developed by mutation breeding.

Genetic engineering is a tool to further assist plant breeders to develop plants with desired traits and has been used successfully in agriculture for over 20 years. Globally, plantings of biotech crops have increased from 1.7 million hectares in 1996 to 189.8 million hectares in 2017, and such crops are now being used by up to 17 million farmers in 24 countries.[1] Indeed, biotech crops have been the fastest adopted crop technology in the history of modern agriculture.

Plant breeders use common and well-established practices to evaluate the quality and safety of new varieties introduced into the market. Every commercial variety is checked over several generations for safety prior to launch. All foods introduced on to the Australian and New Zealand market are also subject to food safety recall and misleading and deceptive labelling requirements.

In addition to this, numerous regulatory authorities worldwide that have assessed GMOs for commercial release have concluded that these products present no unique risks to human or animal health or to the environment and are as safe as other plant breeding methods. These groups include official commissions, scientific bodies, and government regulators (including the Australian Office of the Gene Technology Regulator (OGTR) and Food Standards Australia New Zealand) and international organisations, such as the OECD and the Codex Alimentarius, which are staffed with experts from all relevant disciplines.

The OGTR in particular is responsible for protecting the health and safety of people and the environment by identifying risk posed by or as a result of gene technology in Australia and manages those risks through various processes.

GMOs approved by the OGTR for commercial release in Australia are recognised as being just as safe for human health and the environment as those produced through non-GM methods and conventional breeding techniques.

The moratorium on the cultivation of GM crops in Tasmania is denying Tasmanian growers and agricultural companies access to already approved technologies in Australia which the other States have adopted, including the use of specific weed and pest control products which could all result in having better quality products for consumers, farmers and the processing value chain in the State.

[1] ISAAA (2017) *'Global status of commercialised biotech/GM crops in 2017: Biotech crop adoption surges as economic benefits accumulate in 22 years'*. ISAAA Brief No. 53: ISAAA, Ithaca, New York.

3. IMPACT TO THE SEED AND AGRICULTURE INDUSTRY

The Australian seed industry has a demonstrated history of segregating GM and non-GM varieties to facilitate coexistence and farmer choice. The lifting of the Tasmanian moratorium would allow farmers and seed companies to have a choice and would create equal trade of GM and non-GM produce in the State and allow for more competition nationally and internationally. The Tasmanian government's preposition that the moratorium is a point of difference and that local farmers receive better prices lacks the supports of any empirical data or evidence of financial benefit to the State to prove this theory.

Prior to the previous review of the Tasmanian GM moratorium, the Government commissioned a report from the consultancy group Macquarie Franklin. This report found that over the previous decade, Tasmania's agricultural sector has suffered a net loss of $4 million per year due to the GM moratorium that had delivered little in tangible benefit to the State in return.[2] This is in stark contrast to the mainland states who have realised over $1.37 billion worth of extra income and as of 2016 had produced an additional 226,000 tonnes of canola that would not otherwise have been produced had conventional technology been used.[3]

GM technology has enabled Australian cotton and canola farmers to reduce their use of insecticides and herbicides by 22 million kilograms of active ingredient over 20 years, enhancing the sustainable use of chemical crop protection products. That's equal to a 26 per cent improvement in the environmental impact associated with pesticide use on these two crops alone. This more sustainable use of pesticides has resulted in a saving of nearly 27 million litres of fuel use and 71.5 million kilograms less carbon dioxide being released into the atmosphere.

The London-based economic analysts Brookes and Barfoot (2017) estimate the average net increase in gross margins for GM canola in Australia in 2015 was US$38/ha (eq. to AU$48.50/ha based on exchange rate of 0.78).

While the global acreage of GM crops has increased at a significant rate, commercial organic acreage has also grown. There is no evidence that the global increase in GM crops has had any negative impact on the organic or conventional farming sectors. All evidence points to the organic and conventional farming sectors growing over the same period.

Most Australian farmers embrace the concept of coexistence, whereby various agricultural production practices can be employed in parallel to each other without one harming the other. In its current form, the GM crop moratorium serves as a significant barrier to the adoption of innovation and modern farming technologies that would serve Tasmanian growers well now, and in the future. Tasmanian farmers do not have access to the same crops as their national (Vic, Qld, NSW and WA) and global competitors, primarily in Canada, the United States and Latin America. It is like competing in the final of the 100m freestyle with one hand tied behind your back.

In addition to existing varieties, new GM crops are being developed that are more nutritious, higher yielding and resistant to pests and environmental stress. Developing technologies specifically designed for Australian conditions in the future could be severely inhibited due to the unnecessary moratorium legislation. Exemptions to or repeal of the moratorium provides a significant opportunity to ensure Tasmania's farmers maintain access to the world's best crop innovations.

3.1 Impact on forage and pasture grasses seed breeding and development

Tasmania's pasture seed sector has more than doubled over the past 10 years and around 6500ha of pasture seed crops are grown across the state each year, with the pasture seed industry worth an estimated $20 million at the farm gate.[4] The seed industry is a critical service industry for the pasture-based livestock sector in Tasmania, in particular dairy. It is the seed industry that brings to dairy farmers new innovations (often developed by the public sector Research and Development Corporations) that are critical to improving pasture productivity and quality and therefore business profitability.

---

[2] Macquarie Franklin (2012) *'Market advantage of Tasmania's GMO-free status'*. Devonport, Tasmania.
[3] Brookes G (2016) *'Adoption and impact of GM crops in Australia: 20 years' experience*'. Report prepared for CropLife Australia Ltd., Canberra.
[4] *Tasmanian Seed Industry Group: Pushing for seed success to continue*, Tasmanian Country, 20 October 2017.

Gene technology is a key tool for breeding forages and pasture grasses that are higher yielding, longer lasting and have improved nutritional qualities. For example, the dairy industry has invested significant funding into using specific techniques of gene editing (termed SDN-1) to deliver perennial ryegrass with increased digestibility and reduced risk of hay fever from pollen allergens.[5] The pasture feed base is the mainstay of dairying in Tasmania (an industry worth $429 million at the farm gate) and the use of new gene technologies to improve pasture varieties is expected to have the greatest economic impact of all new plant breeding innovations in the future.

Regulatory clarity is critical to ensuring gene technology innovations have a place in the Australian dairy farming system. Until recently, products developed using these specific gene-editing techniques may have been treated as GMOs, and, even if approved for commercial cultivation by the Gene Technology Regulator, would have been prohibited from cultivation in Tasmania.

The Gene Technology Regulator has recently concluded a technical review of the Gene Technology Regulations to clarify the regulatory status of organisms developed using a range of new technologies and ensure that the new technologies are regulated in a manner commensurate with the risks they pose. One gene-editing technique, known as SDN-1, will be excluded because SDN-1 organisms present no different risk than organisms carrying naturally occurring genetic changes. The amended Regulations will take affect from 8 October 2019.

While the amended gene technology regulations may result in greater access to some plant breeding innovations for Tasmania's pasture seed industry; if the GM moratorium remains in place the door will remain firmly closed to the broad range of gene technologies that continue to be regulated as GMOs. Maintaining access to new innovations in the pasture feed base is critical to maintaining not only seed industry competitiveness but cascades to dairy industry competitiveness as well.

It is important to remember that no Tasmanian government since the GM moratorium was introduced has been able to demonstrate any evidence of a trade and marketing benefit to the state from maintaining the GM moratorium. This equally applies to the pasture and forage seed industry, who will continue to be denied access to innovative plant breeding tools, with no tangible (or measured) trade and marketing benefit in return.

4. GLOBAL DEMANDS AND CONSUMER ATTITUDES ON GM CROPS

World trade in commodities (such as soybeans, corn, cottonseed and canola) is dominated by countries which have widely adopted genetically modified varieties. This indicates that, while some consumers are concerned about food containing genetically modified ingredients, these concerns are not reflected in buyer behaviour at the supermarket; nor do they result in widespread trade barriers or price premiums for non-genetically modified products.

Even in the European Union, which has some of the strictest regulations regarding genetically modified imports and labelling, more than 50 genetically modified crops are approved for use as food and feed. These include maize, soybean, rapeseed, sugar beet and cotton.[6]

Focussing on canola, which is the emphasis of GM crop adoption in Tasmania, Brookes and Barfoot (2018) have shown that that 21 per cent (15.9mmt) of global canola production in 2016-17 was exported, with Canada being the main global trading country. The share of global trade accounted for by the three main GM canola producing countries (Canada, the US and Australia) was 89 per cent. These authors conclude that, "as there has been only a very small development of a market for certified conventional canola globally, non-segregated GM exports probably account for 89% of global trade."[7]

The barriers that have been erected in some countries in response to perceptions of consumer concerns about GM crops have increased the importance of supply chain management to keep genetically modified, organic and conventional grains separate (within agreed thresholds), from planting seeds through to end use.

---

[5] *Australian Dairy Industry response to OGTR Technical Review of the Gene Technology Regulations 2001*, December 2016.

[6] http://ec.europa.eu/food/dyna/gm_register/index_en.cfm

[7] Brookes G and Barfoot P (2018) *'GM crops: global socio-economic and environmental impacts 1996-2016'*. PG Economics, Dorchester, UK.

A series of local and international consumer surveys has found that consumers around the world are happy to continue to eat food containing GM ingredients. One of the most recent Australian surveys, conducted in 2017 on behalf of the Office of the Gene Technology Regulator, found that support for gene technology has remained constant over the past few years.

Segmenting the audience into four groups based on their support for GM foods, almost half the respondents were open to the production of GM food provided regulations were in place to make sure it was safe. About a quarter were against the production of food this way until the science could prove it was safe.[8]

In another survey, conducted by FSANZ, 1,200 Australians were asked, "which types of foods do you have concerns about?", fewer than three per cent nominated food containing GM ingredients. They also listed 16 other elements before genetic modification when asked, "what information do you usually look for" on a food label when purchasing a product for the first time.[9]

A 2010 Eurobarometer survey of 16,000 Europeans found that just eight per cent spontaneously nominated food containing GM ingredients when asked about "possible problems or risks associated with food and eating".[10]

Furthermore, several studies have shown that voiced negative consumer attitudes to GM foods expressed in surveys is not a reliable guide for what consumers purchase at the supermarket when pricing of products becomes a competitive factor in decision-making.[11] "What consumers say they will choose in a survey and what they actually choose in a real-purchase situation may differ substantially when their decision is framed by a socially charged issue such as genetic modification".[12]

5. COEXISTENCE BETWEEN GM AND NON-GM CROPS

All agricultural production systems should have an equal opportunity to contribute to the agri-food production system. Preference for one production system over another should not be the result of artificial, discriminatory and impractical public policy decisions made on a false premise by governments at any level.

Coexistence is the practice of growing crops with different quality characteristics or intended for different markets in the same vicinity without becoming commingled and thereby possibly compromising the economic value of both. Coexistence is based on the premise that famers should be free to cultivate the crops of their choice using the production system they prefer, be it conventional, organic or GM.

Coexistence of various production methods is not a new concept to the agricultural community. Farmers have practiced coexistence for generations to meet demands for different types of products. Historical experience shows that coexistence of a wide range of production methods is not a problem, provided the basic rules of good farming practices are followed and cooperation between neighbouring farmers is encouraged.

Coexistence is not about environmental or health risks, it refers only to the growing of crops that have been authorised as safe for the environment and for human health by the regulatory authorities in the country in which they are being grown, and which are therefore available commercially to farmers in the area.

---

[8] Cormick C and Mercer R (2017) *'Community attitudes to gene technology'*. Prepared for the Office of the Gene Technology Regulator,Canberra

[9] FSANZ (2008). *'Consumer attitudes survey 2007: A benchmark survey of consumers' attitudes to food issues'*. Food Standards Australia New Zealand, Canberra.

[10] European Commission (2010). *'Special Eurobarometer 354—Food-related risks'*. Retrieved from http://ec.europa.eu/public_opinion/archives/ebs/ebs_354_en.pdf

[11] Sleenhoff S & Osseweijer P (2013) *'Consumer choice'*. GM Crops & Food, 4:3, 166-171; Knight, J. G., Mather, D. W., Holdsworth, D. K., & Ermen, D. F. (2007). *'Acceptance of GM food—an experiment in six countries'*. Nature biotechnology, 25(5), 507.

[12] Mather, D. W., Knight, J. G., Insch, A., Holdsworth, D. K., Ermen, D. F., & Breitbarth, T. (2012). *'Social stigma and consumer benefits: trade-offs in adoption of genetically modified foods'*. Science communication, 34(4), 487-519; as quoted in Lucht, J. M. (2015). *'Public acceptance of plant biotechnology and GM crops'*. Viruses, 7(8), 4254-4281.

In Australia, different types of wheat, barley and rice are grown in close proximity and channeled to different uses (e.g. bread wheat versus noodle wheat; malt barley versus feed barley and short-grain versus long-grain rice). Farmers follow simple but effective procedures to achieve agreed standards of quality and purity in their harvested products. It is important to note that agricultural crops are never 100 per cent pure: coexistence means meeting agreed, low level thresholds of admixture.

In Australia, GM and non-GM canola has been grown side-by-side successfully, productively and profitably without creating marketing issues. With Australia having more than eight years' experience of growing GM canola, there has not been one incident across more than 6.5 million tonnes of canola delivered domestically, or more than 19 million tonnes delivered internationally, where an end user (seed crusher / oil or meal buyer, or food / feed manufacturer) has not received what they had ordered in terms of the GM status.[13] Australia has continued trading all other agricultural commodities, including certified non-GM canola without incident since the commercialisation of GM canola.

6. CONCLUSION

For more than thirteen years, the Tasmanian government has failed to produce any empirical or fact-based evidence of a trade and marketing benefit to the state from the imposition of the moratorium on the commercial cultivation on GM crops. Agricultural policy should be based on fact, not anecdotes or hearsay. For too long now, successive Tasmanian governments have relied on the mythical belief that the GM moratorium was bringing trade and marketing benefits to the state; however, the only publicly available report that has examined this, in fact found completely the opposite.

Tasmania's agricultural industry is being significantly disadvantaged through the denial of access to the newest and most innovative seed technologies. Seed breeding innovations could not only help the profitability of Tasmania's farmers, but also allow them to farm more sustainably.

The ASF strongly recommends that Tasmanian farmers be given the right to choose the seed breeding technologies that are most appropriate for their farms, and accordingly calls on the Tasmanian government to either immediately repeal the Tasmanian GM moratorium or allow it to expire in November 2019.

[13] Statistics provided by Australian Oilseeds Federation as cited in the CropLife Australia submission to the *Independent Review of the South Australian GM Food Crop Moratorium* available from https://www.croplife.org.au/wp-content/uploads/2018/12/FINAL_CLsub_IndRev_SAGMmor_20181025.pdf