

REVIEW OF

Tasmania's Genetically Modified Organisms (GMO) Moratorium

FINAL REPORT

AUGUST 2019

EXECUTIVE SUMMARY

Since 2001, Tasmania has maintained a moratorium on the commercial release of genetically modified organisms (GMOs) to the Tasmanian environment. This position was formalised in the State's *Genetically Modified Organisms Control Act (2004)* (the Act), which permits the State to be declared as an area that is free of GMOs for marketing purposes.

When the Act commenced in 2004 it had an expiration period of five years. This duration was intended to allow farmers, agribusinesses and food businesses to confidently invest in their own marketing and market development activities, while simultaneously allowing advances in research and changing market trends to be taken into account.

Over the past 15 years, the Act and hence the moratorium have been extended for a further five years on two occasions, in 2009 and 2014, on the basis that it differentiates and provides an advantage for Tasmanian products in the market place. In accordance with the Act, the current moratorium is due to automatically expire on 16 November 2019.

This review delivers the Tasmanian Government's commitment to review the moratorium prior to its expiry. It also provides an opportunity to continue to monitor developments in gene technology and listen to the latest industry and community views on the moratorium.

Review Process

In December 2018, the Minister for Primary Industries and Water, Guy Barnett MP, announced that the Department of Primary Industries, Parks, Water and Environment (DPIPWE) would undertake a review of Tasmania's moratorium on genetically modified organisms prior to the moratorium expiring in November 2019.

The review examined the potential marketing impacts of extending or amending the moratorium, or allowing it to expire under the following Terms of Reference:

- a. The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors;
- b. Domestic and international gene technology policy relevant to primary industries;
- c. Research and development relevant to the use of gene technology in primary industries; and
- d. Any other relevant matters raised during the review.

The focus of the review centred on the trade and marketing considerations associated with the GMO moratorium, the experience in other jurisdictions, and any gene technology developments that may warrant a reconsideration of the moratorium now or in the future.

Matters relating to the human health, safety and environmental impacts of GMOs, which are the responsibility of national regulatory agencies, were identified as being outside the scope of the review. The recent decision not to regulate the gene editing technique SDN-1 under the National Gene Technology Scheme in which Tasmania participates, is outside the scope of this review and does not affect the Tasmanian Government's ability to impose a moratorium for marketing purposes.

Following a five week advertised consultation period, which concluded on 26 April 2019, 76 submissions were received.

Of the submissions, 63 (83 per cent) indicated clear support for continuation of the moratorium. These included submissions from the community, businesses, and peak industry bodies from the beef, wine, honey, fruit, organics and salmonid industries. Some of these submissions proposed changes that would impose additional restrictions on the handling of GM products in Tasmania, including removal of the option to apply for exemptions for certain non-food GM crops; removal of the exemption for imported animal feed containing non-viable GM material; or application of a 'blanket moratorium' which would wind back the ability to apply for a permit to deal with GMOs in Tasmania.

Six submissions, many from businesses or organisations with an interest in the canola industry, called for the discontinuation of the moratorium.

Six other submissions expressed concerns with the restrictions of the present moratorium, noting the potential benefits of GMO cultivation in Tasmania, or proposing specific amendments to the moratorium that would relax restrictions on handling GMOs, such as lowering the adventitious presence threshold limit.

One submission did not recommend a specific policy position on the moratorium.

Findings

This report has been developed by a Government Working Group, led by DPIPW with representation from the Departments of State Growth, Treasury and Finance, Premier and Cabinet, Health and Human Services, as well as Brand Tasmania. The position of Brand Tasmania's partners were also taken into account. A list of its partners is provided at Appendix F.

To inform the review, the Department of State Growth commissioned surveys of the attitudes towards GMOs in the domestic market and in Tasmania's key export markets of Japan, China and South Korea.

This report outlines the findings and recommendations of the review, concentrating on the major themes associated with the advantages and disadvantages of the moratorium to the State's markets, marketing and brand. This is because under the national scheme for regulating GMOs, States can only regulate for marketing purposes.

Findings are made on the key issues that are most relevant to determining the future policy position on the GMO moratorium at this time.

Markets, marketing and branding

- Tasmania's GMO moratorium benefits those businesses seeking to claim GMO-free status for their products but is potentially holding back investment and advances in other businesses that would like the option to use gene technology.
- It was not possible for this review to quantify the market (or marketing) advantages or disadvantages to the State of the moratorium. As observed with previous reviews on GMOs in Tasmania and more generally, quantitative evidence around the costs and benefits of maintaining Tasmania's GMO moratorium is limited beyond discrete market examples and product offerings.

- There is extensive qualitative evidence around the market benefits of Tasmania's GMO-free status as one of a number of attributes that forms Tasmania's broader reputation in the market.
- A full or partial removal of the moratorium presents some risk to the Tasmanian Brand in the market place, due to the potential for such a change to fuel new media exposure and create a negative consumer perception.
- As a small island economy located at distance from many markets, Tasmania is disadvantaged in competing on supply-chain efficiencies. Lacking a competitive advantage in the commodity market, there is potential for Tasmania to capitalise on products which attract a premium price to improve marketing efficiencies.
- If the moratorium continues, the Tasmanian Government should continue to work with industry to build opportunities for the Tasmanian Brand.

Co-existence versus zero tolerance

- The relatively small size of Tasmanian farms could mean that co-existence would be more dependent on cooperation between neighbouring farms and hence more challenging than in mainland states.
- The capacity for GM and non-GM crops to coexist varies depending on the characteristics of each crop, and the degree to which GM and non-GM production systems and products could be separated and segregated to limit GM contamination to levels acceptable to customers and /or industry certification.
- Organic and GMO-free production systems and markets for organic and GMO-free products have zero tolerance for GM contamination and any amount of contamination could risk the loss of those markets and any premium dependant on the organic or GMO-free attributes of the products.
- The Tasmanian Government should continue to work with industry to monitor the impact of the zero tolerance threshold for GM contamination on the competitiveness of Tasmanian Agriculture.

National decision not to regulate SDN-1 modified organisms

- The decision not to regulate SDN-1 modified organisms does not affect the ability of the Tasmanian Government to impose a moratorium.

Monitoring future developments in gene technology

- With the likely increase in field trials or the commercialisation of GM crops which could be grown in Tasmania, it is important to continually assess the potential benefits and/or the implications of gene technology developments in Tasmania to determine the State's policy position.
- Regardless of the policy position taken on the moratorium, a formal mechanism should be maintained for monitoring future developments in gene technology that involves Government, industry and other stakeholders.

The form and duration of the moratorium

- Unless the Act is amended, the current moratorium on GMOs in Tasmania will automatically expire on 16 November 2019. Therefore, the first decision-point is whether to lift or maintain the moratorium.
- A decision to allow the GMO moratorium to expire would mean that Tasmania would continue to operate under the national regulatory scheme with no additional restrictions and industry self-regulation.
- If a decision is made to extend the moratorium, it may either be extended without amendment (in which case the status quo is maintained), or extended with amendment.
- Amendments could include removal of the option to apply for exemptions for certain non-food GM crops; removal of the exemption for imported animal feed containing non-viable GM material; modification to the adventitious presence threshold limit; or application of a 'blanket moratorium' which would wind back the ability to apply for a permit to deal with GMOs in Tasmania.
- The duration of the moratorium, if extended, could be 5 years as determined in previous reviews, 10 years or indefinitely to provide certainty for industry, noting the importance of a formal mechanism that would trigger a policy review.

Table of Contents

- EXECUTIVE SUMMARY 1**
- I. INTRODUCTION..... 8**
 - 1.1 Background 8
 - 1.2 Terms of Reference 9
 - 1.3 The Review Process 9
 - 1.4 Developments since the Issues Paper was released 9
- 2. OVERVIEW OF SUBMISSIONS..... 11**
 - 2.1 Acknowledgement..... 11
 - 2.2 Summary of submissions..... 11
 - 2.3 Submissions by sector..... 11
 - Community..... 11*
 - Industry..... 12*
 - 2.4 Consideration of the Terms of Reference 13
- 3. KEY THEMES 13**
 - 3.1. Markets, marketing and branding 13**
 - 3.1.1 Valuing GMO-free in the market place 14
 - 3.1.1.a International market research 17
 - 3.1.1.b Domestic market research..... 19
 - 3.1.2 Niche vs commodity markets- value of the moratorium..... 20
 - 3.1.3 Perception and markets 21
 - 3.1.4 Expanding non-GM markets 22
 - 3.1.5 Irreversibility 22
 - 3.1.6 Regulatory costs..... 23
 - 3.2. Co-existence versus zero tolerance 24**
 - 3.2.1 Submissions in support of the moratorium 25
 - 3.2.3 Capacity for co-existence 27
 - 3.2.5 Zero tolerance threshold..... 27
 - 3.2.6 Legal liability..... 28

3.3. Science, technology and innovation	29
3.3.1 <i>Competitiveness</i>	32
3.3.2 <i>AgriVision 2050</i>	33
3.3.3 <i>Criticisms of the moratorium</i>	33
3.3.4 <i>Submissions in support of the moratorium</i>	35
3.3.5 <i>Chemical usage</i>	36
3.3.6 <i>Organics</i>	37
3.3.7 <i>SDN-1 deregulation</i>	38
3.3.8 <i>Research and development</i>	40
3.3.9 <i>Alternative regulation</i>	42
3.4. Health and environmental effects	42
3.5 Other issues	43
3.6. Form and duration of moratorium	43
4. SUMMARY OF FINDINGS	44
5. REFERENCES	47
APPENDIX A - SUBMISSIONS	49
APPENDIX B - INTERNATIONAL MARKET RESEARCH	52
China	52
Japan	53
South Korea	53
APPENDIX C - SUMMARY OF DOMESTIC MARKET RESEARCH	55
Prevailing consumer views	55
Primary producers and peak industry bodies	55
Retail channel	56
Food wholesalers and distributors	56
Beverage producers and distributors	57
Food service suppliers and operators	57
Non-government organisations	58

APPENDIX D - GENE TECHNOLOGY DEVELOPMENTS BY INDUSTRY.....	59
GM canola.....	59
GM poppies.....	61
GM pasture and livestock.....	62
GM salmon.....	64
GM trees.....	64
APPENDIX E - ISSUES PAPER.....	65
APPENDIX F - BRAND TASMANIA PARTNERS.....	76
APPENDIX G - INDUSTRY CASE STUDIES.....	77

I. INTRODUCTION

I.1 Background

The importation, use and development of Genetically Modified Organisms (GMOs) in Tasmania, along with any other dealings, are regulated by laws at both Commonwealth and State levels.

At the Commonwealth level, Tasmania participates in the national regulatory scheme for GMOs, which governs matters relating to the human health, safety and environmental impacts of GMOs.

At the State level, Tasmania has maintained a moratorium since 2001 on the commercial release of GMOs to the Tasmanian environment. This is based on a provision in the State's *Genetically Modified Organisms Control Act (2004)* (the Act) which permits the State to be declared as an area that is free of GMOs for marketing purposes.

When the Act commenced in 2004 it had an expiration period of five years. This duration was intended to allow farmers, agribusinesses and food businesses to confidently invest in their own marketing and market development activities, while simultaneously allowing advances in research and changing market trends to be taken into account.

Over the past 15 years, the Act and hence the moratorium have been extended for a further five years on two occasions, in 2009 and 2014. In accordance with the Act, the current moratorium is due to automatically expire on 16 November 2019.

A decision to allow the GMO moratorium to expire would mean that Tasmania would continue to operate under the national regulatory scheme with no additional restrictions and industry self-regulation.

If a decision is made to extend the moratorium, rather than allow it to lapse, it may either be extended without further amendment (in which case the status quo is maintained), or extended with amendment.

Box 1: Overview of the Tasmanian Genetically Modified Organisms Control Act 2004

The *Genetically Modified Organisms Control Act (Tas)* came into effect in 2004 to provide a legislative basis for the State's moratorium. Its objective is to provide for the whole or any part of Tasmania to be declared a GMO-free area for the purpose of preserving the identity of non-genetically modified crops and animals for marketing purposes and to provide for persons to be allowed to deal with GMOs under permits.

The power of the Minister to declare GMO-free areas is provided in section five of the *Genetically Modified Organisms Control Act 2004 (Tas)* and is only exercisable if the Minister considers that declaring a GMO-free area would aid in preserving the identity of non-genetically modified crops and animals for marketing purposes.

The whole of Tasmania was made a GMO-free area by the *Genetically Modified Organisms Control (GMO-free Area) Order 2005 (Tas)* on 31 October 2005.

1.2 Terms of Reference

The review examined the potential marketing impacts of extending or amending the moratorium, or allowing it to expire under the following Terms of Reference:

- a. The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors;
- b. Domestic and international gene technology policy relevant to primary industries;
- c. Research and development relevant to the use of gene technology in primary industries; and
- d. Any other relevant matters raised during the review.

To provide a consistent and transparent mechanism for examining the moratorium, the Terms of Reference are the same as those used for the 2013 review.

1.3 The Review Process

In December 2018, the Minister for Primary Industries and Water, Guy Barnett MP, announced the Terms of Reference for a review of Tasmania's moratorium on genetically modified organisms (GMOs) to be conducted by the Department of Primary Industries, Parks, Water and Environment (DPIPWE) prior to the moratorium expiring in November 2019.

In March 2019, DPIPWE released an Issues Paper to help inform public submissions (Appendix E). The Issues Paper specified that the focus of the review was to be on the trade and marketing considerations associated with the GMO moratorium, the experience in other jurisdictions, and any gene technology developments that may warrant a reconsideration of the moratorium now or in the future. Matters relating to the human health, safety and environmental impacts of GMOs, which are the responsibility of national regulatory agencies, were identified as being outside the scope of the review.

A total of 76 submissions were received during the five week consultation period, which concluded on 26 April 2019. Tasmania's peak industry bodies and a number of key industry stakeholders were invited to make submissions to the review. The next section of this report summarises the submissions (refer section 2.2).

This report has been developed by a Government Working Group, led by DPIPWE with representation from the Departments of State Growth, Treasury and Finance, Premier and Cabinet, Health and Human Services, as well as Brand Tasmania. To inform the review, the Department of State Growth commissioned surveys of the attitudes towards GMOs in the domestic market and in Tasmania's key export markets of Japan, China and South Korea.

1.4 Developments since the Issues Paper was released

The Issues Paper noted that other reviews of gene technology regulation were underway at the national level and in South Australia (Appendix E). These included the Gene Technology Regulator's *Technical Review of the Gene Technology Regulations 2001*; the Food Standards Australia New Zealand (FSANZ) *Review of food derived using new breeding techniques*; and the *Independent Review of the South Australian GM Food Crop Moratorium* (Appendix E).

The FSANZ and South Australian reviews are ongoing. A report of the South Australian review was released in February 2019 and the South Australian Government is considering the report findings.

The Gene Technology Regulator's technical review concluded in April 2019, with amendments to the regulations being approved by the Legislative and Governance Forum on Gene Technology to provide clarity regarding regulatory capture of new technologies.

The amendments explicitly address the regulatory status of organisms developed using new gene editing techniques such as those involving Site Directed Nucleases (SDN). Most notably, an SDN technique known as SDN-I will not be regulated as a GMO on the basis that organisms modified using SDN-I pose the same risk as organisms carrying naturally occurring genetic changes. Technically, the targeted genomic break created by SDN-I is repaired through the same mechanisms that repair naturally occurring DNA breaks, and the same range of changes to the DNA nucleotide sequence can occur as for natural mutations. The possible changes to the characteristics of the organism are therefore the same, and are thought to pose the same risk (Australian Government, 2017).

The amendments to the regulations have been made by the Governor-General, and will commence in three stages from 8 October 2019, assuming that they are not disallowed by the Australian Parliament.

The national decision not to regulate SDN-I techniques may be relevant to the perception of Tasmanian products in some markets. However this decision not to regulate SDN-I techniques is outside the scope of this review and does not affect the Tasmanian Government's ability to impose a moratorium for marketing purposes, noting that any moratorium would not apply to SDN-I modified organisms once the amendment regulations commence.

Box 2: GMO moratoria in Australian states and territories

GMO moratoria have historically been established to allow time for examination and review of the potential market access and trade implications of the commercial release of GM crops such as GM canola. The current status of GMO legislation in Australian jurisdictions is as follows:

No restriction on approvals by the Office of the Gene Technology Regulator: Northern Territory, Queensland, Victoria, and Western Australia;

Partial restriction: New South Wales currently allows GM varieties of cotton and canola only;

Moratorium: Tasmania, Australian Capital Territory and South Australia (under review), with exemptions granted for trials.

2. OVERVIEW OF SUBMISSIONS

2.1 Acknowledgement

DPIPWE would like to thank all those who have taken part in the review by providing submissions or other pertinent information.

2.2 Summary of submissions

The three policy options this review considers are (a) maintaining, or (b) removing, or (c) relaxing Tasmania’s GMO moratorium.

In total, there were 76 submissions. Of these, 36 were from industry stakeholders and 40 were from members of the public.

Of the submissions, 63 (83 per cent) indicated clear support for continuation of the moratorium. These included submissions from the community, businesses, and peak industry bodies from the beef, wine, honey, fruit, organics and salmonid industries. Some of these submissions proposed changes that would impose additional restrictions on the handling of GM products in Tasmania, including removal of the option to apply for exemptions for certain non-food GM crops; removal of the exemption for imported animal feed containing non-viable GM material; or application of a ‘blanket moratorium’ which would wind back the ability to apply for a permit to deal with GMOs in Tasmania.

Six submissions, many from businesses with an interest in the canola industry, called for the discontinuation of the moratorium.

Six other submissions expressed concerns with the restrictions of the present moratorium, noting the potential benefits of GMO cultivation in Tasmania, or proposing specific amendments to the moratorium that would relax restrictions on handling GMOs, such as lowering the adventitious presence threshold limit.

One submission did not recommend a specific policy position on the moratorium.

Table 1. Position on the moratorium indicated in submissions

Position on the moratorium	Number	per cent
Maintain	63	83
End	6	8
Amend (Relax)	6	8
No specific position	1	1

2.3 Submissions by sector

Community

Of the submissions from members of the public, the majority expressed unequivocal support for the moratorium. The level of detail provided in submissions was variable, with almost half of the submissions from individual members of the public consisting of a very short, one- or two-paragraph statement of preference with minimal justification or supporting evidence.

Industry

The dairy industry is Tasmania's largest agricultural industry, with a gross farm gate value¹ of \$429 million. There were mixed views within this industry, with dairy processor Fonterra and the Organic Dairy Farmers of Australia (ODFA) co-operative both expressing support for the moratorium, while the State's peak industry body DairyTas noted the impediments of the moratorium and potential benefits of GM pasture species and animal feed. The Tasmanian Farmers and Graziers Association (TFGA) also noted these potential benefits for the dairy and livestock industries.

Two submissions were received from stakeholders of the \$337 million beef industry² (Greenham Tasmania Pty Ltd and the Tasmania Feedlot Pty Ltd). Both were strongly in favour of the moratorium, and provided substantial evidence to demonstrate how it has provided them with a marketing advantage. The submission from a stakeholder of the \$838 million salmon industry (Huon Aquaculture) also supported continuation of the moratorium.

Three submissions were received from members of the canola/grain industries including grain storage and canola buyer/exporter Tap Agrico, grain farmer representatives GrainGrowers and canola processor Macquarie Oil Company. Both Macquarie Oil Company and Tap Agrico advocated amending the moratorium to relax restrictions on the presence of GM contaminated material in imported seed, while GrainGrowers called directly for removal of the moratorium. Tasmanian canola seed production generates around \$4.6 million at the farm gate.

Submissions from the \$47 million Tasmanian poppy industry were varied. The submission received from Tasmanian Alkaloids noted the potential benefits of GMO cultivation without specifically calling for removal of the moratorium. The Tasmanian Agricultural Productivity Group (TAPG) supported ongoing exemptions for pharmaceutical poppies and requested policy flexibility in regards to gene technology while another submission called for the moratorium to end.

Submissions from peak bodies of the \$197 million fruit industry (Fruit Growers Tasmania), the \$49 million wine industry (Wine Tasmania), and the \$8 million honey industry (Tasmanian Beekeepers Association), all indicated support for the moratorium, primarily for branding and marketing reasons.

The TFGA and TAPG, representing farmers and agribusiness service providers respectively, both indicated support for the moratorium. The TFGA submission called for improved marketing to capitalise on Tasmania's GMO-free status, and TAPG suggested some amendments and additional exemptions.

Opposition to the moratorium was strong in all three submissions from plant breeding and biotechnology organisations Australian Seed Federation, CropLife Australia and the Australian Academy of Technology and Engineering.

Four submissions in favour of the moratorium were received from environmental or lobby groups including the Pesticide Action Group WA, the Tasmanian Public and Environmental Health Network, Friends of the Earth and Gene Ethics. Two of the submissions from individual members of the public were nearly identical to the Friends of the Earth submission. The Tasmanian Greens supported the moratorium with some suggested amendments.

¹ All industry values are taken from the Tasmanian Agri-Food ScoreCard 2017-18 (Tasmanian Government, in publication) and are gross value at the farm gate or beach unless otherwise specified.

² Of this total value of \$337 million, \$325 million is food value and \$12 million is non-food value.

Two submissions from health advocacy representatives Eat Well Tasmania and Sandra Murray indicated support for the moratorium.

Submissions from David Armstrong and Agribusiness Tasmania called for the end, or amendment of the moratorium, respectively.

The Tasmanian Institute of Agriculture raised a number of considerations surrounding the moratorium without indicating a specific policy position.

2.4 Consideration of the Terms of Reference

Only nine (12 per cent) submissions specifically addressed the Terms of Reference for the review. For this reason, the findings in this report are organised according to the key themes identified in submissions.

3. KEY THEMES

3.1. Markets, marketing and branding

[This theme aligns to Term of Reference (a): The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors].

Maintenance of Tasmania's GMO moratorium has been justified on the basis that it differentiates Tasmanian agricultural and food products in the marketplace. The evidence provided in submissions and the market analysis (refer to sections 3.1.1a and 3.1.1b) was not sufficient to quantify the marketing benefits or costs conferred by the GMO moratorium, and it was not possible to definitively state that market access or price premiums were received due to the moratorium alone. The range of submissions addressing the issue of markets, marketing and branding highlighted that different individuals and industries are impacted in varying ways by the moratorium depending on their target markets, and the goods and services they produce.

This finding is consistent with previous reviews of the State's moratorium and other reviews of Australia's moratoria legislation more broadly (Australian Government, 2016; Parliament of the Commonwealth of Australia, 2016), which have observed the difficulties in credibly quantifying the value of moratoria legislation. Many of the claims around branding, market access and price premiums are intangible or based on qualitative assessments of individual markets and consumer preferences within them.

Many submissions, including those from the honey, organics, beef and fruit industries, reflected the view that GMO-free is an important part of Tasmania's 'clean, green and safe' image, and that allowing GM crops in Tasmania would compromise, undermine or ruin the State's market position and/or branding, as well as disadvantage individual businesses.

Others took the view that the market benefits associated with the GMO moratorium are overstated or unproven, variously noting the lack of quantitative evidence and the relatively small number of products that are branded as 'Tasmanian' in the market.

While some businesses claim to benefit from the marketing opportunities derived from the moratorium, these come at an opportunity cost to some businesses that do not have

the option to benefit from the use of GMOs. Since GM canola is currently the only GM crop approved for commercial release in Australia that is suitable for cultivation in Tasmania, these costs are predominantly borne by the State's canola industry; however, this situation could change with the approval of new GM crops or animal breeds suitable for commercial production in Tasmania.

There is also a view that the State has not taken full advantage of its GMO moratorium and further work is required to capitalise on opportunities of being GMO-free, including product labelling and further development of the Tasmanian Brand.

Table 2. Industry feedback - a snapshot based on submissions received

Industry	Total farm gate/beach value ³	Industry perception: moratorium remains	Industry perception: moratorium removed
Canola	\$4.6 million	Positive for some markets, negative for others	Positive for some markets, negative for others
Dairy	\$429 million	Negative for commodity, positive for speciality	Positive for commodity, negative for speciality
Beef	\$337 million ⁴	Positive based on submissions received	Negative based on submissions received
Honey	\$8 million	Positive	Negative
Poppy	\$47 million	Negative, but submissions received indicated that continuation of the moratorium will not impact Tasmanian operations	Positive
Fruit	\$197 million	Positive based on peak industry body submission	Negative
Salmon	\$838 million	Positive based on one submission	Negative based on one submission
Wine	\$49 million	Positive	Neutral, as all wine produced in Tasmania must be GMO-free regardless of Tasmania's moratorium

Case studies for these industries are provided in Appendix G.

Specific key arguments under this theme are discussed below.

3.1.1 Valuing GMO-free in the market place

The Tasmanian Brand attributes of 'quality' and 'clean and green' are associated with cool climate production, strong biosecurity practices and safe food production methods. Tasmania's GMO-free status is not often separated from these brand attributes, but supports the overall brand position, which has been used to set Tasmania apart in both the domestic and international markets from other competitors that may have the 'clean and green' aspect of their brand, but not the 'GMO-free' component.

The potential to further capitalise on the GMO-free element of the Tasmanian Brand was raised

³ Tasmanian Agri-Food ScoreCard 2017-18 (Tasmanian Government, in publication).

⁴ Of this total value of \$337 million, \$325 million is food value and \$12 million is non-food value.

by the Tasmanian Farmers and Graziers Association, which expressed concern at a perceived lack of investment in promotion of Tasmania's GMO-free status, and noted the need for greater effort in this regard.⁵

The Tasmanian Institute of Agriculture noted the risk of relying too heavily on Tasmania's GMO-free status in the branding of Tasmanian products should there be a desire to change the status of the moratorium to realise advantages of gene technology developments.⁶ It is also possible that over-promotion of the State's moratorium could serve to attract increased scrutiny of the GMO-free claim as SDN-1 modified organisms are adopted in Australian agricultural production systems.

Submissions from the State's food, agriculture, aquaculture, food service and tourism industries noted the importance of the Tasmanian Brand to their business and how it is used as leverage for market access and to achieve price premiums. It was acknowledged that some products will not necessarily be labelled GMO-free but this attribute is implied from its identification as Tasmanian. The degree to which a product is branded as Tasmanian as a point of difference also varies from utilising the Tasmanian Brand trademark, a Tasmanian tagline, or simply an address.

Other submissions explored the concept of Tasmania's branding in more detail, including the State's GMO-free status. The co-operative ODFA markets its milk as non-GMO, grass-fed and Certified Organic and these attributes are essential components of its brand and pricing strategies, with an increasing number of consumers willing to purchase organic dairy products at the premium price.⁷

Tasmanian beef is also actively promoted by some producers as GMO-free as part of a suite of attributes used in its marketing, including hormone free, antibiotic free and certified humane. In 2017-18, beef was Tasmania's most valuable international food export, representing \$210 million out of a total food export value of \$740 million. Any change to the status of Tasmania's GMO moratorium would have significant impacts on this major export industry. For further information, see Box 3: Tasmanian GMO-free beef.

Currently the moratorium affords Tasmanian agri-food and agri-tourism businesses the opportunity, free of charge, to market Tasmania-grown product as GMO-free by virtue of its Tasmanian provenance. As noted in the Fruit Growers Tasmania submission, the moratorium removes the need for these businesses to continuously demonstrate proof-of-freedom from GMO contamination. Removal of the moratorium would reverse the onus of proof so that businesses wishing to market GMO-free product would need to establish systems and bear the cost of demonstrating the product's freedom from GMO contamination. Conversely, the benefits of ending the moratorium would accrue to GM producers, suppliers of GMOs and related agricultural inputs, and businesses utilising GM products.

A consequence of the decision to deregulate SDN-1 gene editing in Australia is that it is likely to lead to such organisms entering Australian agricultural production systems and supply chains. The task of demonstrating freedom from these unidentified and untraceable organisms to markets and customers that may view them as unapproved GMOs will become increasingly difficult, and may result in a loss of premiums for Australian agri-food exports in some markets.

⁵ Submission 068

⁶ Submission 071

⁷ Submission 050

Similarly, there is a risk that consumers who do not understand or accept the Australian Gene Technology Regulator's technical distinction between SDN-1 and other forms of gene editing will change their buying behaviour. This is discussed further at 3.3.7 SDN-1 deregulation.

Box 3: Tasmanian GMO-free beef

Greenham Tasmania's submission provided evidence of the marketing and price benefits of Tasmania's GMO moratorium to the business, noting that the State's GMO-free status is a key part of its marketing program. All of the company's beef production is sold as 'Tasmanian' while three quarters is also specifically marketed as 'non-GMO'.

A number of Greenham's major customers in the United States, worth a combined total of \$60–\$80 million per annum, actively seek to purchase beef certified as non-GMO by global certifier the Non-GMO Project. These products reportedly command a price premium that is reflected in the higher price paid to Greenham's 1,800 Tasmanian suppliers, estimated at an additional \$125 per animal over and above conventional cattle prices.⁸

Testimonials from several of Greenham's customers demonstrate the importance of the GMO-free attribute to their purchasing decision. For example CHOMPS, an American manufacturer of beef sticks marketed as 'grass-fed' and 'non-GMO', stated that:

"We proudly call out the Non-GMO project [certification] on our consumer packaging and the certification is one of the main reasons we enjoy a rising demand for our products. If we could not source non-GMO material from Greenham, it would have a considerable impact on our business and plans for future growth. We would strongly encourage the Government to maintain the moratorium. It is a unique point of difference for all of Tasmania's natural food products".

The importance of Greenham's provenance story was also reinforced by one of its Tasmanian customers, beef jerky producer KOOEE! which stated that:

"Any downgrade in the perceived quality of Greenham Tasmania meat would cause complications for KOOEE! and reduce our ability to differentiate ourselves from cheaper offerings made interstate".

The submission from Tasmania Feedlot Pty Ltd, which finishes approximately 18,000-20,000 Angus steers per annum for Japan's largest retailer, the Aeon Group, highlighted the importance of Tasmania's GMO-free status to the State's reputation as a clean, green and safe producer of premium beef. The company indicated that any change to Tasmania's GMO-free status would likely have a negative effect on its business:

"Our Japanese meat buyers as representatives of our customers have indicated that they will have a lot of difficulty selling our beef in Japan if we are unable to continue to guarantee that inputs to that beef are free from GM material. The worst case scenarios is that our business may not be able to operate in Tasmania with the consequential loss of direct jobs, indirect employment and export dollars into the Tasmanian economy."⁹

Two surveys of the attitude towards GMOs were commissioned for the review to understand the contribution of the GMO moratorium towards Tasmania's Brand proposition in both the international and local markets.

⁸ Submission 029

⁹ Submission 069

3.1.1.a International market research

The Department of State Growth, in conjunction with Austrade, commissioned a survey in December 2018 of the attitudes towards GMO by key importers and distributors of Tasmanian food, including seafood, in China, Japan and Korea. These three markets accounted for 47 per cent of Tasmania's total export value for the food sector in 2017-18. While the sample size was small, Austrade has advised that the 20 businesses surveyed were carefully selected and were of a scale and experience that suggested the results should be considered, prima facie, representative of the broader industry and consumer attitude towards GMOs in these respective markets.

The majority of businesses interviewed regarded Australian food as having been produced in a clean and natural environment, with Tasmanian food even more so. In addition, responses indicated that these brand attributes, as well as 'organic', 'safe' and 'eco-friendly', were more important than GMO-free status.

Currently businesses do not appear to use GMO-free as a major marketing strategy, with many indicating that a product's status as GMO-free is already implied within the current Tasmanian Brand image. Although GMO-free status was not a major marketing focus, those businesses interviewed that currently import Tasmanian products place a high value on non-GM food and indicated that they would be unwilling to import GM food, with some expressing the belief that lifting the moratorium would negatively impact the Tasmanian Brand or harm their business financially.

The research also showed that consumers in all three countries have limited understanding and knowledge of GMOs, and are typically wary of GM food products, consistent with a previous study which found that countries such as the USA and Canada initially lost market share to GM-free suppliers when they first adopted GMOs (Anderson & Jackson, 2005).

These results collectively suggest that there is a market advantage to maintaining the GMO moratorium and that there is value for the Tasmanian Government to promote the value of GMO-free as a unique selling point for the State.

A more detailed summary of the main points from the research for each market is included in Appendix B.

Box 4: GMO Labelling in Australia and the key international markets of Japan and Korea

Australia

Food Standards Australia and New Zealand¹⁰ conducts a safety assessment of all GM food prior to supply in Australia. The list of approved GM foods and ingredients for use in the food supply in Australia are listed in Schedule 26 of the Food Standards Code.

GM foods and ingredients (including food additives and processing aids) that contain novel DNA or novel protein must be labelled with the words 'genetically modified'. Labelling is also required for GM foods that have an altered characteristic (e.g. altered nutritional profile) when compared to a counterpart non-GM food (e.g. soy beans with increased oleic acid content). There are some exemptions:

- highly refined food where the modified DNA or proteins resulting from it, is removed

¹⁰ See <http://www.foodstandards.gov.au/Pages/default.aspx> for further information about FSANZ.

during processing.

- processing aids or food additives where no modified DNA or protein resulting from it remain in the final food.
- flavouring where the concentration in the final food is no more than 0.1 percent.
- unintentional presence, where the ingredient is less than 1 percent of the food.
- any food consumed at the point of sale (purchased from cafes, restaurants, takeaway shops and vending vehicles).
- food derived from an animal (or other organism) which has been fed GM food, unless the animal or other organism is itself a product of gene technology, for instance meat, eggs or milk.

Japan

In Japan, genetically modified agricultural products can be imported and distributed only after their safety is confirmed through scientific assessment processes specified in a number of laws.

Currently there are eight kinds of genetically modified agricultural products and 33 processed foods that are scientifically confirmed safe, and can be distributed with mandatory labelling.

The labelling system for genetically modified foods in Japan has remained unchanged for 17 years, since its institution in 2001. It is legislated under the *Food Sanitation Act* and the *Act for Standardization and Proper Labelling of Agricultural and Forestry Products* (JAS Law). The planning and designing of Food labelling standards are under the jurisdiction of Japan's Consumer Affairs Agency.¹¹

Mandatory labelling is applicable to:

- Genetically modified: Genetically modified agricultural products and processed foods produced and distributed with identity preserved (IP) handling.
- Genetically modified without separation: Genetically modified agricultural products and processed foods produced and distributed without identity preserved (IP) handling .
- Genetically modified with unique property (e.g. High-Oleic Genetically Modified soybean): Genetically modified agriculture products that differ greatly from conventional products in composition or nutritional value, and processed foods containing these products as ingredients.

Exclusions to mandatory labelling include:

- Processed foods made from genetically modified products but their DNA or resulting proteins is not detected after processing (e.g. soybean oil, corn oil, soy sauce etc.).
- Foods with an unintended inclusion of less than 5 percent of genetically modified material provided correct IP handling is observed.

South Korea

Imports to South Korea are governed by multiple ministries and central administrative agencies which impose legislation across a range of areas, including quarantine (importing protocols and

¹¹ See <http://www.caa.go.jp/en/index.html> for further information about Japan's Consumer Affairs Agency.

certification) and food safety including standards, registration, MRLs, additives, labelling and GMO. Regulations and importation requirements vary based on each agri-food category.

The safety of GM food is assessed under the *Food Sanitation Act*, in addition to the risk assessment and approval procedure under the Living Modified Organisms and Other Related Matters (LMO Act). The Ministry of Food and Drug Safety (MFDS)¹² is responsible for labelling requirements for GM foods.

MFDS published guidelines for the labelling of GM foods in January 2017. The guidelines set out the mandatory labelling requirements for six GM agricultural products including soya and canola. Processed foods made from these ingredients and its GMO status also have to be clearly marked on labels. MFDS permits labelling exemptions for:

- Processed foods made from genetically modified products but their DNA or resulting proteins is not detected after processing.
- Foods with an unintended inclusion of less than 3 percent of genetically modified material.
- Foods from the six agricultural products that require mandatory labelling that are however GMO-free and their GMO-free status and handling process can be verified.

3.1.1.b Domestic market research

To determine the attitudes towards GMOs by key importers and distributors of Tasmanian food in the domestic market, the Department of State Growth engaged Freshlogic Pty Ltd (Freshlogic) in April 2019 to conduct a survey of 21 key stakeholders across the Australian food supply chain, including producers, peak industry bodies and consumers from the food retail, distribution, wholesale and food service sectors. These key stakeholders were surveyed concerning their perceptions of food sourced from Tasmania, their awareness of policies regarding GMOs, their expectations concerning potential price or market advantages and their views in relation to any lapse in the moratorium status. The outcomes of this study were published as a Report and the key findings include:

- The domestic market stakeholders surveyed consider Tasmanian food and beverage products to be clean and green based on a range of factors including low pollution levels, abundant natural resources and effective food standards. These perceptions are enhanced by the geographic advantage of being produced on an island.
- There is an increased level of awareness of Tasmania's moratorium in the domestic market particularly amongst industry participants and peak bodies.
- GM-free is generally not a key consideration in the purchasing decisions of industry participants or consumers. This remains influenced by product labelling conventions that only acknowledge the inclusion of GM ingredients.
- Tasmania's GM-free status is considered to form part of its broader reputation, although this specific attribute appears to have fairly low levels of visibility in marketing of Tasmanian products. There is difficulty in measuring any advantage particularly given

¹² See <https://www.mfds.go.kr/eng/index.do> for further information about the MFDS.

there is a limited range of labelled GM product in the domestic market for comparative purposes.

- There was consensus from the majority of industry participants and peak bodies surveyed that a full or partial removal of the moratorium presents some risk to the Tasmanian Brand, due to the potential for such a change to fuel new media exposure and create a negative consumer perception.

A summary of the main points from the research is included at Appendix C.

3.1.2 Niche vs commodity markets - value of the moratorium

The potential for GM technology to create productivity gains for large-scale commodity products was acknowledged in submissions both for and against retaining the moratorium. Many Tasmanian agricultural products are sold in commodity markets, as noted by CropLife Australia and Agribusiness Tasmania,¹³ where they are not differentiated and no market advantage is leveraged from the State's place-based brand. Tasmania does not have a comparative advantage in commodity markets because of its small scale and isolation from key markets, as noted in submissions from Tasmania Feedlot Pty Ltd¹⁴ and John Lord¹⁵. Therefore it makes sense for Tasmania to focus on its market positioning as a small volume, high quality producer. This is explored in Box 5: Marketing efficiency – an indicator of international competitiveness. GMOs are also not considered to be compatible with premium niche products and services, as observed by Fat Pig Farm.¹⁶

Some of the representatives from the dairy and poppy industries argued that their industries need access to GM technology to maintain industry competitiveness, especially in view of advances in gene technology and the ongoing development of new GM crops and pastures that have the potential to provide significant benefits¹⁷. Several submissions referred to a report from the consultancy group Macquarie Franklin that was commissioned by the Tasmanian Government prior to the 2013 review of the GMO moratorium (Macquarie Franklin, 2012). This report provided evidence that the inability of Tasmanian farmers to grow GM canola under the moratorium had resulted in a trade and marketing disadvantage for Tasmania.

In reference to this report, the Australian Seed Federation stated 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"¹⁸.

Tasmania's canola industry bears the opportunity cost of maintaining the moratorium as GM canola is currently the only approved GM crop suitable to Tasmania should the GMO moratorium be removed. Canola is a relatively minor crop in Tasmania, so if there is gene technology innovation in other more economically significant crops and sectors then the cost of maintaining the moratorium could be far higher. On the other hand, some canola exporters rely on Tasmania's GMO-free status to access sensitive markets, including Korea. A summary of gene technology developments by industry is included in Appendix D.

¹³ Submissions 018 and 002

¹⁴ Submission 069

¹⁵ Submission 044

¹⁶ Submission 021

¹⁷ Submissions 019, 031 and 066

¹⁸ Submission 007

Box 5: Marketing efficiency – an indicator of international competitiveness

The marketing efficiency ratio is an indicator suggested by the Rural Industries Research and Development Corporation (RIRDC) for assessing international agricultural competitiveness (Keogh, Tomlinson, & Henry, 2015). It is the ratio of prices received by farmers at the farm gate relative to the prices of those goods at major international market destinations. The concept equally applies at the interstate level.

A high marketing efficiency ratio may reflect a range of factors including: a higher quality of agricultural product; higher supply-chain efficiencies; and/or superior market access arrangements for an agricultural product.

Regardless of the reason for a comparatively higher marketing ratio, the end result will be that products from that sector will be more competitive in global agricultural markets.

As a small island economy, Tasmania is disadvantaged in competing on supply-chain efficiencies. Lacking a competitive advantage in the commodity market, there are growth opportunities for Tasmania to focus on products which attract a premium price to improve marketing efficiency, as shown in Box 3 with the experience in the beef industry. Fonterra has recently developed a segregated milk pool in New Zealand for non-GMO certified products and these products are achieving a greater market share and/or price premium in some international markets. The company identified Tasmania as a potential source for non-GMO milk.¹⁹

3.1.3 Perception and markets

Many submissions indicated support for the moratorium due to a personal preference for non-GM food based on its perceived 'naturalness', 'authenticity' or 'purity', combined with an intrinsic mistrust of GMOs or general misgivings about the technology used to produce them. These perceptions strongly influence food choices, which in turn drives markets.²⁰

The ODFA noted that the organic dairy industry is being increasingly led by consumer demand for "products and production methods that are variously sustainable, humane, organic, biodynamic, natural, clean/green, and paddock-to-plate".²¹ Tasmania Feedlot Pty Ltd observed the importance of consumer perception over actual technology:

*"We have learnt over more than 40 years of dealing with the Japanese consumers that they regard as important the **perception** related to any aspect of the food production system rather than the actual technical or scientific impacts. Tasmania with its 'island status' and clean and green image is regarded by Japan as a very safe producer of food. Therefore any introduction of GM crops into Tasmania, even though those crops may not be used directly by our operation, may be perceived by Japanese consumers as creating a risk to our food production system".²²*

Tasmania Feedlot and seed producer Tim Parsons²³ went on to state that they may lose customers or access to the Japanese market if the GMO moratorium was lifted.

The Tasmanian Beekeepers Association Inc, Tasmania's peak industry body, also referred to the

¹⁹ Submission 022

²⁰ Including submissions 048, 052 and 071

²¹ Submission 050

²² Submission 069

²³ Submissions 069 and 051

importance of consumer perception, noting that their competitiveness in world markets would be diminished if the State was to lose its GMO-free status. The current moratorium allows Tasmanian honey to be sold in domestic and international markets as 'GMO-free'. Losing this ability would be extremely harmful to the \$8 million honey industry.²⁴

The Tasmanian Institute of Agriculture noted the gap between the rapid acceptance of GM crops for cultivation for efficiency and productivity gains and the limited acceptance by consumers, noting that supporters of gene technology have not successfully managed to market the benefits of GM products.

One study found that New Zealand's 'clean and green' image did exist and had export value but that increasingly sophisticated consumers were not inclined to take such claims at face value (Chang & Kristiansen, 2006). Examples of successful food branding based on safety and healthy claims are starting to emerge, such as the popularity of Australian infant formula in the Chinese market. However, there is little evidence to link the 'safe and healthy' traits to a premium price, and in contrast, the guarantee of food safety has become a prerequisite for access to many markets.

3.1.4 Expanding non-GM markets

According to Cargill, the world's largest manufacturer of processed food components, non-GMO is one of the fastest growing claims in the food industry. With its GMO-free status, there is potential for Tasmania to take advantage of this rapidly expanding market, capitalising on the positive image of non-GM food products and a general wariness of GM products.

'GMO-free' packaging and marketing is uncommon in Australia, since consumers largely take the non-GM status of their food for granted. However, in the USA where GM products are more prevalent in the food chain, this claim can be used as a point of difference in marketing; for example, the submission from Greenham Tasmania noted that its US customers specifically call out the non-GM status of their products. This insight into US marketing strategies may provide a glimpse of how the non-GM claim may increase in importance and relevance as the number of GM products in the Australian food chain increases.

Around 26 submissions made reference to the growing demand for non-GM and organic food products, and the accompanying expansion of organic farming practices. For example, Dr Paull presented data showing that over the past 19 years, the global organic agriculture industry has grown at 12 per cent per year, with particularly rapid growth of 22 per cent per year in Australia over the past five years.²⁵

Sandra Murray from the School of Health Science at the University of Tasmania noted that the generic house brands stocked by Coles, Woolworths, Aldi and IGA are all free of GM ingredients. With approximately 64 per cent of Australians choosing to buy their food from these major supermarkets, and with consumers increasingly selecting generic house brands, the domestic market share of non-GM food is likely to continue to increase.²⁶

Several submissions discussed surveys and polls; a *Choice Australia* poll (2016) reported that 84 per cent of Australians are concerned about eating food with GM ingredients, while Dr Paull

²⁴ Submission 067

²⁵ Submission 052

²⁶ Submission 048

referenced survey data from an international 2017 online food choices survey which showed that 60 per cent of Chinese participants indicated that 'GM-free' is an important factor in making their food choices, compared to 33 per cent of Australians.²⁷ These findings differ from the international market research undertaken for this review (refer to sections 3.1.1a and 3.1.1b).

Alternative evidence was provided in other submissions. The Australian Seed Federation²⁸ discussed a survey conducted by FSANZ in which 1,200 Australians were asked which types of foods they have concerns about, with fewer than three per cent nominating food containing GM ingredients (Food Standards Australia New Zealand, 2008).

This submission also notes that 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. The submission notes that:

*"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".*²⁹ This sentiment was observed in the market research undertaken by Freshlogic (refer to section 3.1.1b).

3.1.5 Irreversibility

One of the benefits of retaining Tasmania's current moratorium is that it preserves the option of Tasmania maintaining its GMO-free status. The irreversible nature of the moratorium was highlighted in many submissions as a risk to their branding and/or market access.

Some submissions also noted that maintaining the moratorium protects Tasmania's markets against potential future shifts in consumer sentiment and buying behaviour until further information about the health and safety of GMOs, particularly in food, is obtained. From a market perspective, Fonterra requested that the moratorium not be lifted until there is conclusive evidence about consumer preference against foods made from GMOs.³⁰

3.1.6 Regulatory costs

The costs of maintaining a moratorium on the commercial use of gene technology in primary industries, such as import control and eradication of GMOs, either as a result of barrier breaches or from former GM canola trial sites in Tasmania, can be substantial. Moreover; quarantine barrier and incursion response costs can be expected to increase in the event that more of Tasmania's domestic and international trading partners adopt GM crops and perhaps GM production animals.

As more GM crops are introduced to Australia and globally, the regulatory cost of maintaining Tasmania's GM-free status are likely to increase. At present, these costs cannot be separately quantified from other biosecurity controls.

On the other hand, in support of the moratorium a view expressed by others was that the loss of GMO-free status would immediately add business costs, as to differentiate their products

²⁷ Submission 052

²⁸ Submission 007

²⁹ Submission 007

³⁰ Submission 022

they would have to market the GMO-free status themselves. The decision not to regulate SDN-1 modified organisms may increase this cost. The task of demonstrating freedom from these organisms to markets and customers that may view them as GMOs may be difficult, potentially resulting in a loss of market access, customers or premiums for Australian agri-food exports in some markets. SDN-1 modified organisms are defined as GMOs in under New Zealand's regulatory framework. The process for identifying and/or tracing these organisms in the supply chain is not currently specified.

The decision not to regulate SDN-1 modified organisms is discussed further in section 3.3.7.

3.2. Co-existence versus zero tolerance

[This theme aligns to Term of Reference (b): Research and development relevant to the use of gene technology in primary industries].

Beyond the benefits versus costs of the moratorium is the question of whether maintenance of the moratorium is necessary to ensure the integrity of Tasmania's GMO-free production systems, including organic production, or whether equivalent benefits could be obtained through co-existence between GM and non-GM production systems built on a system of segregation and identity preservation. A secondary consideration is whether the moratorium needs to be based on zero tolerance for GMOs entering the State to maintain the integrity of GMO-free production and the benefits of Tasmania's GMO-free brand attribute.

Most submissions opposed to the moratorium argued that it is unnecessary because of the demonstrated capacity for GM and non-GM production systems to coexist. 'Co-existence' essentially refers to the ability to concurrently grow GM and non-GM crops without compromising the value of the non-GM crop. Co-existence typically requires measures to prevent GM contamination of non-GM crops, including physical crop separation, systems for maintaining product segregation throughout the supply chain, and tolerance thresholds for GM contamination (also commonly referred to as 'adventitious presence' or 'low level presence') that reflect customer requirements.

Several submissions noted that co-existence is not a new concept, pointing out that systems for segregating canola, barley and wheat varieties existed in Australia prior to the commercialisation of GM canola. The introduction of GM canola required an additional segregation, sampling and testing protocol to be put in place at the grain storage site. The submissions argued that co-existence of a wide range of production methods is possible, provided technical and procedural guidelines are followed and there is cooperation between neighbouring farms.

The submission from GrainGrowers, the peak industry body representing over 17,000 Australian grain growers, reiterated that industry supply chains have a demonstrated capacity to segregate crops from different production systems, including GM and non-GM crops, in line with domestic and international standards. It asserted that Tasmania's supply chain would be capable of segregating product to ensure that customer needs are met, and accordingly supported the removal of Tasmania's moratorium to allow Tasmanian grain growers access to nationally approved GMOs.³¹

CropLife Australia's submission claimed that co-existence has been successfully managed in

³¹ Submission 028

Australia and numerous other countries where GM and non-GM crops are grown, noting that sampling and testing can be used to validate co-existence strategies and product integrity. The submission highlighted the *Delivering Market Choice with GM Canola* framework (Australian Oilseeds Federation, 2007) developed to manage the introduction of GM canola in Australia, suggesting that it could be used to manage the co-existence of commercial GMOs in Tasmania and that it provides confidence that GM products could be managed alongside non-GM and organic products to meet market and consumer requirements.³²

One Tasmanian submission observed that while the moratorium benefits Tasmanian businesses seeking to claim GMO-free status for their products, it is holding back investment and advances in other industries³³. As such, the marketing advantage enjoyed by some businesses comes at a disadvantage for businesses that may wish to utilise GMOs. The submitter suggested that producers who wish to be GMO-free can do so on their property, in cooperation with other like-minded businesses, while producers who wish to use GMOs should be able to do so, overseen by the Regulator.

Another Tasmanian submitter contended that the Government should focus on systems and protocols that allow for co-existence so that Tasmanian agriculture can enjoy the productivity-enhancing benefits of GMOs while retaining the potential for producers to market their product as GM-free. The submission noted the growth of organic production systems in states without moratoria and the local example of Tasmania's vegetable seed industry, which depends on strict crop separation to avoid unintended cross-pollination, as evidence of the capacity for different production systems to coexist.

3.2.1 Submissions in support of the moratorium

Many submissions in support of the moratorium expressed concern that the introduction of GMOs into Tasmania would threaten the viability of the organics industry and other GMO-free producers due to the risk of contamination from GM seed or pollen affecting their certification, and/or markets for their products. Many also stressed the importance of the GMO-free attribute to the Tasmanian Brand that in turn underpins and provides a key marketing advantage for the State's premium food and beverage sectors and tourism industry, including agri-tourism³⁴.

Several submissions expressed the belief that GMOs would be impossible to contain and that the effects of introducing GMOs on Tasmania's GMO-free status and reputation would be irreversible, some noting the ongoing challenge and cost of eradicating GM canola from past field trial sites in Tasmania. Conversely, several submissions suggested that Tasmania's geography and island status provided the State with a unique opportunity to avoid contamination from GMOs and GM products.

In addition to the impact on organic and other GMO-free producers, some submissions expressed particular concerns for the State's beef, fruit, wine, honey and pollination industries.

The submission from Wine Tasmania noted that the *Commonwealth Wine Australia Regulations 2018* and *Australian Grape and Wine Genetically Modified Organisms Policy* do not permit any GMOs to be utilised in the growing or making of Australian wine, hence there would not be any

³² Submission 018

³³ Submission 031

³⁴ Submission 052

direct impact on Tasmanian wine businesses if the moratorium was to be lifted³⁵. However, it also noted that the moratorium is seen as a complementary aspect of the State's reputation and brand. Lifting the moratorium could impact on the Tasmanian Brand in particular markets, which could affect Tasmanian wine sales. The submission supported retention of the moratorium and noted that there may be benefits for individual sectors, products and the Tasmanian Brand if the State's GMO-free status was more widely promoted.

Box 6: Co-existence of GM crops with honey production

Tasmania's honey industry presents unique challenges for co-existence because of the potential for pollen from GM crops to contaminate the honey stored in hives. Some submissions claimed that wind-pollinated GM crops, such as poppies and ryegrass, could coexist with non-GM honey production because they are not attractive to bees. One of these cited the poppy industry's long-term success in preventing the spread of pharmaceutical poppies beyond production areas as further evidence that GM poppy production could coexist with non-GM crops.

The submission from the Tasmanian Beekeepers Association, the peak body representing the State's beekeeping industry, opposed any GM crops being grown in Tasmania due to the risk of contamination from GM pollen, including from GM poppies. It argued that a change to the moratorium could mean that key markets in Japan, the EU and United Arab Emirates could be lost and this could in turn threaten the future security of honey production and pollination services in the State at a time when the number of hives required for pollination is growing as agriculture expands in line with the Tasmanian Government's AgriVision 2050 plan.

The Association's submission noted that the Tasmanian honey industry's main competitor, New Zealand, also markets its honey as a GMO-free. The implication of the deregulation of SDN-1 modified organisms on market access and consumer acceptance for Tasmanian honey is unclear, however there is a risk that it could give New Zealand a marketing advantage in premium markets sensitive to GMOs, or potentially lock Tasmanian honey out of the markets entirely. As an unregulated gene edited organism, Exzact™ perennial ryegrass or any other SDN-1 modified species could be grown anywhere in Tasmania. Perennial ryegrass is extensively used in the agricultural landscape and wind pollinated, hence cross-pollination between UGMO and non-GM ryegrass pastures appears inevitable.³⁶

The submissions from Gene Ethics and Dr Paull explicitly criticised the concept of co-existence.³⁷ The Gene Ethics submission observed that Australian non-GM canola can contain up to 0.9 per cent GM canola, noting that "GM co-existence and segregation can only function when some measure of GM contamination is permitted in production, supply chains and products". Dr Paull's submission claimed that the term 'non-GM canola' is misleading and that there is no longer any GM-free canola in Western Australia where GM canola is widely grown.

The Gene Ethics submission noted that GM and non-GM canola co-existence and segregation results in increased costs and risks that are borne by the grains industry, including non-GM

³⁵ Submission 076

³⁶ Submission 067

³⁷ Submissions 025 and 052

producers. These include additional infrastructure, transportation, time and other expenses to maintain co-existence and segregation; extra quality assurance, compliance and possible insurance costs; and the risk of contamination incidents leading to price discounts and the loss of markets and reputation. It also pointed to claims that risk aversion at grain receival sites in Western Australia had led to thousands of tonnes of non-GM canola being pooled with GM canola and sold at the discounted price for GM canola.

Noting the comparatively small scale of canola production in the State, Gene Ethics contended that segregation would be disproportionately expensive in Tasmania and that the risks and hazards of GM contamination and its potential costs to markets, trade and the environment outweigh the potential benefits of growing GM canola in the State. The submission cited several examples of GM contamination events from around the world that had led to costly disruptions to the supply chain in the United States and the country's exports to China, Japan and South Korea.

3.2.3 Capacity for co-existence

In Tasmania, the relatively small size of farms could make co-existence more dependent on cooperation between neighbouring farms and hence more challenging than in mainland states. The capacity for GM and non-GM crops to coexist would also vary depending on the characteristics of each crop, and the degree to which GM and non-GM production systems and products could be separated and segregated to limit GM contamination to levels acceptable to customers. Nonetheless, co-existence typically requires acceptance of at least some level of GM contamination.

On the other hand, organic and GMO-free production systems and markets for organic and GMO-free products have zero tolerance for GM contamination. Any amount of contamination could risk the loss of those markets and any premium dependant on the organic or GMO-free attributes of the products. Many submissions in support of the moratorium expressed concern that ending or relaxing the moratorium would result in GM contamination of non-GM productions systems and products, and adversely affect the viability of organic and GMO-free producers.

3.2.5 Zero tolerance threshold

In 2005, the then Primary Industries Ministerial Council set the maximum allowable level of GM canola contamination in non-GM canola at 0.9 per cent for grain and 0.5 per cent in seed for sowing. This 'tolerance level' or 'threshold' applies in all Australian jurisdictions that have specified a standard, with the exception of Tasmania. Tasmania maintains a 'zero tolerance' policy in relation to GM canola in imported canola grain and seed for sowing, as well as canola present in shipments of other grains. The current limit at which GM canola can be detected is one in ten thousand seeds, or 0.01 per cent.

A number of submissions, including some not opposed to the moratorium, drew attention to the implications of Tasmania's zero tolerance policy for businesses that import GM canola. These submissions advocated for a relaxation of the zero tolerance threshold if the moratorium is extended.

Tasmania's largest cereal grain storage business, TAP Agrico, expressed concern that Tasmania's

zero tolerance threshold for imported non-GM canola seed for sowing is harming Tasmania's competitiveness as a non-GM canola supplier. The company is reportedly seeking to increase non-GM canola exports to Korea over the next 3-5 years, capitalising on Tasmania's reputation for fresh, clean and natural food production. However, its submission warned that the State's inability to supply the volumes customers require is putting export markets at risk and has resulted in the loss of the Japanese export market to Kangaroo Island in South Australia.

TAP Agrico expressed concern that the importation of improved non-GM canola varieties into Tasmania is risky and prohibitively expensive due to the cost of demonstrating compliance with the zero tolerance policy. The company warned that access to new varieties is being severely restricted, leading to many farmers and merchandisers retaining outdated seed. This in turn is impacting on the productivity and competitiveness of canola in crop rotations, limiting growth in the canola industry. TAP Agrico's submission supported retention of the moratorium, but observed that the current threshold serves no apparent commercial purpose³⁸.

The Macquarie Oil Company's submission expressed similar concerns that Tasmania's zero tolerance threshold significantly increases the time, cost and risk involved in locating, testing and importing grain into the State. The company operates Tasmania's only commercial canola cold-pressing facility and reportedly processes around 4,000 tonnes of canola per annum (more than Tasmania's annual production of canola) and has sufficient demand to expand processing to 7,000 tonnes per annum by 2020. None of the company's customers specifically request product from GM-free canola, hence the moratorium presents only a cost to the business.

Macquarie Oil Company considers that there is a significant opportunity to expand Tasmania's canola industry through the introduction of GM varieties. The company suggested that removal of the moratorium would enable Tasmanian growers to access higher-yielding GM canola varieties with the potential to increase the competitiveness of canola among alternative crop rotations. This could in turn lead to an expansion of the area of canola grown in Tasmania, increased local production of canola, and more efficient processing and economies of scale with consequent benefits for the company's viability and competitiveness. However, even with a significant expansion of canola production in Tasmania, the company would reportedly still need to import canola grain into the State.

Macquarie Oil Company's submission acknowledged that ending the moratorium would result in a loss of the State's identity as a region free of GMOs, and that businesses would instead need to provide evidence to support their GMO-free and GM-free claims, but questioned the extent to which the State's brand would be damaged by the loss of the GMO-free attribute.³⁹

3.2.6 Legal liability

Several submissions noted the issue of legal liability for GM contamination of non-GM crops. Two of these pointed to the high profile Western Australian case of *Marsh v Baxter* as evidence that the common law is inadequate as a compensation mechanism for farmers claiming economic loss caused by GM contamination⁴⁰. The case concerned an unsuccessful claim for damages for pure economic loss by an organic farmer, Mr Marsh, against a neighbouring farmer,

³⁸ Submission 064

³⁹ Submission 045

⁴⁰ Submissions 052 and 070

Mr Baxter, for contamination of his land by wind-blown GM canola seed.

The issue of legal liability has been considered by parliamentary inquiries and reviews in a number of jurisdictions, including Tasmania. In February, Western Australia's Legislative Council Standing Committee on Environment and Public Affairs ('the Committee') issued a report on its inquiry into mechanisms for compensation for economic loss to farmers in Western Australia caused by contamination by genetically modified material (Legislative Council of Western Australia, 2019). The Committee initiated the inquiry in response to public debate following the *Marsh v Baxter* decision of the Western Australian Supreme Court and Court of Appeal, and the tabling of petitions calling for farmer protection legislation. This included a petition tabled in the Legislative Council calling for the introduction of farmer protection legislation to compensate non-GM farmers who suffer economic loss from contamination by GM crops.

Dr Paull's submission argued that the *Marsh v Baxter* case "effectively gave a licence to contaminate to the GM sector" and that the subsequent Legislative Council inquiry failed to come up with a solution to the problem of such contamination⁴¹. The Tasmanian Greens' submission interpreted the outcome of the case, and experiences elsewhere with the use of court mechanisms to solve co-existence disputes, as confirming the concerns raised in the 2013 moratorium review, which noted that "Questions remain about the ability of the liability system in Australia to deal with GM contamination under a co-existence framework" (Tasmanian Government, 2013).

The Committee report acknowledged the challenges that have been identified with the common law as a compensation mechanism, the perception the common law is inadequate for this purpose, and that *Marsh v Baxter* may have had a cooling effect on the making of claims for GM contamination (Legislative Council of Western Australia, 2019). However, it found that "Farmers seeking compensation for economic loss arising from contamination by genetically modified material face many of the same inadequacies in the common law as a compensation mechanism for economic loss as cases that do not involve contamination by genetically modified material" (Finding 7).

3.3. Science, technology and innovation

[This theme aligns to Term of Reference (c): Research and development relevant to the use of gene technology in primary industries]

Gene technology continues to evolve rapidly, led by advances in several new breeding techniques including gene editing. Gene editing itself encompasses a suite of techniques used to produce site-directed genetic modifications that are either guided, through the attendant use of a genetic template, or unguided so that the resulting genetic modification is random. Some new breeding techniques are even capable of altering the expression of genes in target organisms through 'epigenetic' effects without changing the DNA sequence of the organism's genome.

Historically, public debate around GMOs has mainly focused on GM crops developed using transgenic technologies pioneered in the 1980s and earlier. However many gene technologies, including transgenic modification and gene editing, are applicable to plants, animals and microorganisms. While public debate is likely to continue to focus on GM crops, it will

⁴¹ Submission 052

increasingly need to consider the implications of a growing number of other transgenic and gene edited organisms with potential commercial applications, some of which are in the early stages of commercialisation in North America, such as transgenic Atlantic salmon and gene edited non-browning mushrooms.

The rapid advancement of new gene technologies is making the regulation of GMOs and GM products considerably more complex. There is currently no global consensus on how new gene technologies should be regulated, or whether some should be regulated at all, and little prospect that a consensus will emerge in the foreseeable future. The resulting mosaic of regulation in different countries and regions affects the incentives for the development and adoption of GMOs, increases the complexity of global markets and trade and increases the risk of trade disruptions.

The Tasmanian Institute of Agriculture (TIA) submission noted that the regulatory cost of maintaining the State's GMO-free status is likely to increase as more GM crops are introduced to Australia and globally. Furthermore, depending on how new gene editing techniques are legally defined, it may become very difficult or impossible to distinguish genetic changes resulting from the use of gene editing from unregulated techniques, including the products of conventional plant breeding.

TIA acknowledged the complex issues associated with the adoption of gene technologies, including:

- Rapid developments in plant and animal breeding techniques;
- Increasing difficulty of distinguishing between regulated and unregulated breeding techniques;
- Consumer preferences strongly influenced by perceptions of 'naturalness'; the difficulty of quantifying economic benefits and costs of policy and regulation;
- Perceived negative environmental and human health implications of gene technologies;
- Perceived negative implications of the concentrated ownership of gene technologies; and
- Real and potential economic and environmental benefits that gene technologies can provide.

The submission did not recommend a specific policy position to maintain, remove or alter Tasmania's existing moratorium but highlighted the challenge posed by new gene technologies.

The submission also noted there are well-established economic methods for evaluating the costs and benefits of adopting different crop varieties, including GM and non-GM alternatives, citing the recent *Independent Review of the South Australian GM Food Crop Moratorium* that estimated the costs and benefits of South Australia's moratorium with respect to canola, and preliminary estimates of the economic benefits of a new variety of GM ryegrass developed in Australia. While canola is currently the only relevant crop for which a comparison of commercially available GM and non-GM varieties could be undertaken, this situation could change as technologies develop. In this respect the future proliferation of novel applications of these technologies is likely to increase the demand for this type of analysis and make the future consideration of the costs and benefits of Tasmania's GMO moratorium increasingly complex.

Noting recent insights into community attitudes to GMOs resulting from broader social and economic research, TIA suggested that Tasmania may need to develop processes for assessing potentially useful GMOs on a case by case basis that include comprehensive and inclusive public debate as part of the assessment. Its submission cited examples of European policy innovations for addressing highly contested issues with complex social, technical and market dimensions. A feature of these approaches is that they establish participatory processes through which the community can contribute to assessments, enabling more inclusive and thorough debate than is possible through expert assessments alone. The submission noted that a fixed moratorium period and the annual GMO Environmental Scan conducted by DPIPWVE offer an opportunity to establish and trial such an approach, which could be used to develop criteria with which to evaluate new GM crops in conjunction with expert assessments.

TIA observed that while lifting Tasmania's GMO moratorium would irreversibly end the State's GMO-free status, maintaining the moratorium risks creating its own path dependency because the more explicitly it is associated with the Tasmanian Brand and mobilised in marketing, the harder it will be to change the moratorium in future without disadvantaging some sectors. The submission highlighted the distinct strategies of Tasmanian agri-food producers that focus on either supplying commodity markets or high value niche products, and their different relationship to Tasmania's brand and GMO-free status.

Agribusiness Tasmania's submission observed that the vast bulk of Tasmanian agricultural production is in unbranded commodities and that producers of these commodities need to use the most productive and efficient inputs to remain profitable. Without access to the best available technologies, many farmers and industry sectors will become unviable. The submission noted the development of gene editing, especially the disruptive effect of CRISPR-Cas9 which is cheaper, faster and more accurate than alternative technologies and already being used internationally in major crops, livestock and human health applications. It compared modern genetic modification with traditional selective breeding used in agriculture for thousands of years and claimed that many gene technologies are essentially no different to the processes that occur in nature and pose no risk to human health and safety or the environment.

While noting that there is little to be gained in lifting the moratorium for the time being, Agribusiness Tasmania cautioned that Tasmania must be able to quickly reassess this position in light of potential changes in markets and technologies applicable to Tasmanian agriculture. It argued that any extension to the moratorium must be accompanied by a process to enable regular assessment of the constantly changing technologies, availability of GMOs and consumer and market trends, with the potential to trigger an earlier review of the moratorium.

The TFGA noted that the moratorium impacts on each industry differently and hence all industries needed to be considered when evaluating the moratorium. It acknowledged the rapid advances in gene technology and potential disadvantages of remaining GMO-free due to the restrictions it places on access to technologies that can provide production benefits, but also noted that remaining GMO-free provides Tasmania with a significant marketing advantage. On balance it supported maintaining the moratorium due to the potential economic benefits to Tasmanian agriculture of remaining GMO-free, but on the condition that this status is utilised and marketed correctly. It advocated greater investment from the State Government

in promoting Tasmania's GMO-free status to ensure that the benefits are fully realised, and to constantly monitor and regularly review the moratorium in light of changes in technologies and markets. Importantly, the TFGA reserved the right to change its position if the benefits of the moratorium no longer outweigh the costs.

Several other submissions opposed to the moratorium sought to highlight the similarities between modern 'genetic engineering' and traditional plant breeding, the growth in global GM crop production, the safety and benefits of transgenic crops, and the opportunities that emerging gene technologies present for producers and consumers. Some of the submissions pointed to the unprecedented disruption posed by emerging technologies and global trends, including the challenge of feeding a growing world population in the context of production constraints and a changing climate. They noted the opportunity this poses for Tasmania to contribute to global food security and profit from supplying the increased demand for agricultural products.

The submission from the Australian Seed Federation claimed that GM crops have been the fastest adopted crop technology in the history of modern agriculture, noting that global plantings of GM crops have increased from 1.7 million hectares in 1996 to 189.8 million hectares in 2017. The Australian Academy of Technology and Engineering (AATE) and CropLife Australia submissions claimed that modern agricultural biotechnology, including the use of molecular markers, DNA sequencing and transgenic technology, has resulted in benefits such as improved agricultural yields and quality, reduced environmental impacts from modern farming practices, reduced crop losses caused by various biotic and abiotic stresses, improved breeding efficiencies and strengthened ability to regulate plant growth⁴².

The AATE noted that a range of more precise gene technologies with agricultural applications, including gene editing, provide Australia with a renewed opportunity to participate in global biotechnology. These applications reportedly offer potential benefits such as enhanced yield, more efficient use of inputs such as fertilisers, herbicides and pesticides, increased drought, pests and disease resistance, improved food quality and nutrition, removal of allergens and environmental benefits. The submission likened gene editing to the products of traditional mutagenesis used in conventional plant breeding and noted that gene-edited products are beginning to appear in the global marketplace, potentially putting Tasmanian producers at a competitive disadvantage.

Several submissions, including from the AATE and CropLife Australia, highlighted opportunities for Tasmanian agriculture from current research and development into GMOs such as transgenic GM ryegrass being trialled in Victoria, potato plants resistant to viral and fungal pathogens, cereals with increased iron levels, and crops with healthier starches and oils modified to be lower in saturated fats and with improved cooking qualities. CropLife suggested that Tasmania needs to modernise its views on biotechnology to allow farmers to access innovative varieties that can contribute to a cleaner, greener economy.

3.3.1 Competitiveness

A common sentiment expressed by submissions opposed to the moratorium was that Australia needs to encourage innovation and best practice technology adoption in agriculture to remain

⁴² Submissions 006, 007 and 018

globally competitive, including the adoption of new gene technologies. The AATE submission noted that Australia's comparative advantage in agriculture was gained through the adoption of science and technology innovations. It warned that even when SDN-1 modified organisms are deregulated, the moratorium will continue to deprive Tasmanian farmers of the benefits of new gene technologies that remain regulated, including some gene edited crops, and the ability to remain competitive in domestic and international markets.

Several submissions contended that the moratorium negatively impacts on the productivity, profitability and innovativeness of Tasmanian agriculture by limiting the options available to farmers to manage their businesses. They argued that instead of imposing an artificial, discriminatory and impractical 'one-size-fits-all' approach that preferences one production system over another, the Tasmanian Government should respect the right of farmers to make decisions in the best interest of their business, including choosing the production systems and markets they pursue. Removal of the moratorium would allow choice and ensure that each production system has an equal opportunity to contribute to the sector.

The GrainGrowers submission supported a science-based approach to the use of technology, including GMOs, stressing that access to gene technologies is essential for the continued development and growth of Australia's grains industry, which includes canola production. The submission highlighted the inequity of Tasmanian grain growers not having access to the same technologies that are available in other Australian states.

3.3.2 AgriVision 2050

A small number of submissions suggested that the Tasmanian Government's vision to grow the value of Tasmanian agriculture to \$10 billion per year by 2050 will only be achievable through the adoption of new and innovative technologies, including GMOs, and that hypothetical premiums for GMO-free produce alone will be insufficient to achieve the target. CropLife suggested that lifting the moratorium would help achieve the 'Grow', 'Make' and 'Protect' elements of the Government's AgriFood Plan by giving farmers access to better crops and promoting more sustainable farming practices.

Agribusiness Tasmania's submission asserted that Tasmanian farmers should have the right to choose the best products and technologies available to maximise their productivity and competitiveness. It argued that if the 2050 target is to be achieved, the State Government must support efforts to enable the Tasmanian agriculture sector to maximise outcomes in terms of production diversity, profitability and competitiveness. However, if the Government decides to intervene in market processes it must be prepared to invest in activities that go some way to redressing these constraints on trade that do not apply to Tasmania's competitors. The submission nominated market measures to promote the supposed advantages of Tasmania's GMO-free status and support for GM and non-GM research as two areas in which government investment would enhance efforts to achieve the 2050 target.

3.3.3 Criticisms of the moratorium

A number of submissions were critical of the moratorium for denying Tasmanian farmers access to innovative gene technologies that would help them to farm more profitably and sustainably, suggesting that the State has missed out on significant economic, agronomic and environmental

benefits resulting from the cultivation of GM crops. Several of these submissions pointed to the claimed benefits of GM canola compared to non-GM canola to illustrate this point.

CropLife's submission criticised successive Tasmanian Governments for ignoring evidence of the benefits of GM crops, claiming that GM crops could offer all the agronomic, economic, environmental, social, trade and marketing benefits that are sought by Tasmanian primary producers. It pointed to a global study that found that the use of herbicide resistant GM varieties globally has enabled a reduction in ploughing and cultivation of land, leading to less soil erosion, increased soil water holding capacity and more efficient land use.

CropLife's submission further noted Australian research showing that the commercialisation of GM cotton and canola in Australia has resulted in increased productivity and income for growers, reduced pesticide and herbicide use, reduced fuel consumption and fewer greenhouse gas emissions. It claimed a number of agronomic benefits of GM herbicide-tolerant canola, including increased options for in-crop weed control and increased yields in subsequent cereal crops that are sensitive to the herbicide used with conventional non-GM triazine tolerant (TT) canola varieties. Similarly, the ASF's submission pointed to a study by the London-based economic analysts, Brookes and Barfoot, that estimated an average net increase in gross margins for GM canola relative to non-GM canola in Australia of US\$38 per hectare in 2015.

An overview of gene technology developments in the canola, poppies, pasture and livestock, salmon and forestry industries is included in Appendix D, with a brief industry snapshot below in Box 7: Gene technology developments – a snapshot.

Box 7: Gene technology developments - a snapshot

GM canola

GM canola is currently the only GM food crop approved for commercial release in Australia, and the only approved GM crop that is suitable for commercial cultivation in Tasmania. As such, the direct costs of Tasmania's GMO moratorium are mostly confined to this sector.

According to the Australian Bureau of Statistics (ABS), Tasmania produced 3,519 tonnes of canola valued at \$2,017,951 in 2017-18, or less than 0.1 per cent of Australia's total production (Australian Bureau of Statistics, 2019). The next largest canola producing state, South Australia, produced almost one hundred times as much canola in the same year⁴³. Due to the operation of GMO moratoria, the canola produced in both states is exclusively non-GM canola.

A recent Independent Review of the South Australian GM Food Crop Moratorium undertook a detailed analysis of the economic costs and benefits of South Australia's GMO moratorium for the State's canola production, both retrospectively (covering the period from the introduction of the moratorium in 2004 until 2018) and from the present day until the moratorium is due to expire in 2025 (Anderson & Jackson, 2005).

Using a number of assumptions, it estimated the cumulative cost of the moratorium to South Australia's canola farmers to be up to \$33 million over the period 2004-2018, and at least

⁴³ In 2017-18, South Australia reportedly produced 335,052 tonnes of canola with a gross value of \$168,167,281 from 236,511 hectares of land. Source: Australian Bureau of Statistics

another \$5 million if the moratorium were to be kept until 2025.

While canola production in South Australia and Tasmania is not directly comparable due to differences in yields, the analysis of South Australia's moratorium suggests that the retrospective cumulative cost of Tasmania's moratorium to the State's canola producers is likely to be relatively modest if similar assumptions to those used in the South Australian analysis were to be applied to Tasmania's much smaller canola industry.

GM poppies

The submission from Tasmanian Alkaloids Pty Ltd, one of Tasmania's largest poppy processors, noted that the company can continue to operate without any adverse effect on its current Tasmanian operations if the moratorium were to be extended in its current form, including the exemption for pharmaceutical poppies.

Tasmanian Alkaloids estimated that GM technologies could be used to increase alkaloid production in poppies by twenty per cent or more, compared to conventional plant breeding over a one to three year period. Other potential benefits including reductions in pesticide usage, specific disease resistance and additional traits that could assist the industry's competitiveness. Tasmanian Alkaloids

The company is continuing to conduct research and development exploring the opportunities presented by gene technology but currently has no intention to commercialise any GMOs at this stage.

GM pasture and livestock

The DairyTas submission amongst others noted ongoing research and development into new GM perennial ryegrass varieties that offer significant potential benefits to Tasmania's pasture-based industries, especially the dairy sector.

While the submission from DairyTas highlighted the potential opportunities for dairy farmers through the use of GM pasture, fodder and cattle, the submission from Fonterra Australia, Tasmania's largest milk processor, noted that the company remains concerned about consumer preference against foods made from GMOs. Fonterra supplies branded dairy products unbranded dairy ingredients to customers in Australia and overseas and would like to see more conclusive consumer insights before there is any reduction in controls on the use of GMOs.

3.3.4 Submissions in support of the moratorium

Several submissions in support of the moratorium were sceptical of the claimed benefits of GM crops, arguing that the 'big promises' of drought and salt tolerance, nitrogen fixation, increased yield and protein content, and faster growth have not materialised. Instead, herbicide tolerance and insect resistance remain the most common GM traits.

Many submissions rejected the assertion that GM crops are necessary to feed a growing world population, arguing that there is already enough food produced to feed the world. They pointed to a range of social, political and economic factors contributing to hunger and food insecurity, including wars, inadequate distribution, inequality and affordability of food. Several highlighted

the need to address food waste and unsustainable diets. One submission observed that the 1960s 'Green Revolution' had reduced crop diversity, resulting in the loss of nutrient dense and resilient plants, and argued that what is needed is diversity in the gene pool rather than GMOs⁴⁴.

The submission from the ODFA noted the organisation's preference for a non-GMO solution to the global food system challenge and belief that organic agriculture can produce enough nutritious food to feed the world without destroying the environment, while being more resilient to climate change and improving the livelihoods of farmers. Another submission referred to a CSIRO study into food production methods and climate stability that reportedly found that organic farming outperformed conventional farming during drought due to better soil health⁴⁵.

A number of submissions articulated the belief that large multinational corporations are the primary beneficiaries of GMOs and that growers receive only small benefits, if any, from GM crops. Several of these submissions expressed concern at the patenting of GMOs, including GM food crops, the impact of GM crop licences on the practice of seed saving, the implications of GMOs for corporate control of food production, and the risk of the world becoming reliant on only a few GM crop varieties.

Gene Ethics' submission argued that the concentrated ownership of GM crops and agrochemicals among a few multinational companies has implications for the cost of seed and other inputs, suggesting that the introduction of GM canola varieties into Tasmania may adversely impact on gross margins and the profitability of farm businesses over time⁴⁶.

Although technically outside the scope of this review, many submissions in support of the moratorium sought to link GM crops and associated chemical use with risks to human and animal health and the environment, including biodiversity, ecosystems, soil health and bees.

3.3.5 Chemical usage

While several submissions opposed to the moratorium cited studies indicating that GM crops have resulted in a reduction in the use of pesticides, herbicides and fertilisers, many submissions in support of the moratorium claimed that the use of herbicide-resistant GM crops, including Roundup Ready varieties resistant to the herbicide glyphosate, has increased the use of herbicides.

Many submissions claimed that glyphosate is toxic, carcinogenic and/or results in adverse health outcomes⁴⁷, several noting recent high profile court cases against Monsanto/Bayer in the US. Several also argued that the over-use of herbicides in GM crop production has led to the emergence of herbicide-resistant 'super weeds'⁴⁸. One even suggested that the overuse of glyphosate and GM crops leads to land degradation and Colony Collapse Disorder in bees⁴⁹.

Among the pro-moratorium submissions, the submissions from Gene Ethics, Dr Paull and the Tasmanian Public and Environmental Health Network provided the most in-depth examination of chemical use⁵⁰.

⁴⁴ Submission 015

⁴⁵ Submission 017

⁴⁶ Submission 025

⁴⁷ Submission 052

⁴⁸ Submissions 023, 025, 052 and 072

⁴⁹ Submission 011

⁵⁰ Submissions 025, 052 and 072

Dr Paull's submission cited research indicating that glyphosate contaminates water, air, soil, plants and animals, is ingested by humans through food, beverages and other routes, is carcinogenic and can cause multi-generational disease through epigenetic effects. The submission noted that GM Roundup Ready canola grown in Australia is dependent on multiple applications of glyphosate.

The Gene Ethics submission provided an in-depth account of the current global controversy surrounding the safety of glyphosate-based herbicides, including ongoing litigation in the United States, and highlighted the potential risk to export markets if authorities in Europe or China were to impose a zero tolerance threshold for glyphosate residue in imported grain. The submission warned that allowing glyphosate-resistant GM canola to be grown in the State would make Tasmania more dependent on glyphosate, lead to a spike in glyphosate use, and expose Tasmania to the aforementioned risks. The submission rejected the conclusion of the Australian Pesticides and Veterinary Medicines Authority that glyphosate does not pose a carcinogenic risk to humans and that registered glyphosate products are safe provided they are used as per the label instructions.

3.3.6 Organics

Many of the submissions in support of the moratorium advocated for organic production or other agricultural approaches and practices as an alternative to conventional agriculture and the use of GMOs (e.g. biodynamics, regenerative agriculture, permaculture, agro-ecology, crop rotation and botanical and biological pest management). A number of these submissions were from individuals and businesses involved in organic food and beverage production, distribution, agribusiness, and/or agri-tourism. While the majority of these businesses were small-scale, some submissions were from larger enterprises, including dairy farms that have converted to organic production and significant agri-tourism operators such as Fat Pig Farm⁵¹. Some submissions highlighted the role of the moratorium in enabling the organics industry to expand and attract organic producers to Tasmania while several suggested that Tasmania was on the cusp of a rapid expansion in organic agriculture and advocated for increased government support to realise the sector's growth potential.

Dr Paull's submission presented a range of statistics on the growth of organic markets and production in Australia and globally to underline the opportunity for Tasmania from organic production. The submission noted that:

- Australia accounts for 51 per cent of the world's certified organic agricultural hectares, compared to just 0.5 per cent of the world's land area used for the production of GM commodities, which is mostly concentrated in the USA, Brazil and Argentina.
- Globally the area of certified organic agricultural land has been growing at 12 per cent per annum since the year 2000.
- In Australia, the area of certified organic agricultural land has grown at 22 per cent per annum over the past five years and now accounts for 8.8 per cent of all agricultural land.

The submission also noted that Tasmania is currently under-represented in certified organic hectares but over-represented in terms of certified organic producers. It argued that this

⁵¹ Submission 021

provides a sound foundation to substantially grow the size and value of the organics sector in Tasmania, and that growth of the sector could be accelerated with the assurance of an enduring GMO moratorium⁵².

Several other submissions specifically pointed to the recent growth in organic dairy production in Tasmania and the adoption of many organic farming practices by conventional farmers over the past 50 years, including more diverse crop rotations, composting, use of cover crops and conservation tillage.

The joint submission from the organic dairy cooperative Organic Dairy Farmers of Australia Ltd (ODFA) and four organic dairy farmers from North West Tasmania, including the co-founders of the Organic Milk Group (OMG) milk brand, suggested that Tasmania is poised to develop a new organic industry. ODFA and its members are seeking to grow organic milk production in Tasmania, however the submission noted that any change to the current moratorium would present a risk to the organic industry because of the incompatibility of GM seeds and plants with organic farming principles. The submission highlighted the need for further work to close some of the critical knowledge gaps about organic farming systems, to better understand its achievements and help address its challenges, and recommended further research and investment in Tasmania's organic agriculture, food and beverage industries to further strengthen Tasmania's brand⁵³.

3.3.7 SDN-I deregulation

Several submissions in support of the moratorium explicitly opposed the proposed national deregulation of the SDN-I gene editing technique⁵⁴. On the other hand, the TFGA submission noted the potential productivity benefits of being able to use SDN-I modified ryegrass⁵⁵ in Tasmania while maintaining the State's GMO moratorium⁵⁶. TIA's submission commented that the decision to deregulate SDN-I will add to the complexity of administering Tasmania's GMO moratorium and that in the absence of a separate Tasmanian regulatory regime, it is likely that individual industries will be responsible for self-regulating the use of SDN-I modified organisms.

Gene Ethics criticised the move to exclude SDN-I modified organisms from regulation, noting that the definition of a GMO in the Gene Technology Act and Regulations was intentionally made broad in anticipation of technological innovation to ensure that new technologies were captured by regulation.

The submission noted that the deregulation of SDN-I would allow animals, plants and microbes to be gene edited for any reason and resulting organisms to enter the environment and food supply without safety assessment or labelling, making it difficult to identify and trace off-target effects in products. It encouraged Tasmania and other GMO-free jurisdictions to insist on the regulation of all new and existing GM techniques and their products within the current regulatory framework.

⁵² Submission 052

⁵³ Submission 050

⁵⁴ Submissions 023, 025, 040, 042, 060, 070 and 072

⁵⁵ Genome editing using the Site Directed Nuclease (SDN) technique employs an enzyme known as a nuclease to cut a specific DNA sequence recognised by the enzyme. When the break is allowed to repair naturally and results in a random change to the DNA sequence, the resulting organism is known as an SDN-I organism. The SDN technique typically uses one of four nucleases: a Zinc Finger Nuclease (ZFN), a transcription activator like effector nuclease (TALEN), a meganuclease or clustered regularly interspaced short palindromic repeats (CRISPR)-associated protein 9 (Cas9)

⁵⁶ Submission 068

Friends of the Earth amongst others urged the Tasmanian Government to take action at the State level to regulate SDN-I modified organisms, including amending the definition of a GMO in the *Genetically Modified Organisms Control Act 2004* to explicitly include SDN-I modified organisms⁵⁷.

At a practical level, in the absence of any requirement to register them at the national level, it is unlikely that SDN-I modified organisms entering Tasmania could be detected unless they are voluntarily disclosed as such. This is because use of the SDN-I technique results in random site-directed mutations and does not leave a genetic signature that is readily distinguishable from spontaneous mutations or random mutations produced through traditional plant breeding.

The submission from the Tasmanian Greens was unique in expressing concern at the deregulation of the SDN I technique and another new breeding technique, RNA-delivered RNA interference (RNAi), which will also be deregulated when the amendment regulations commence. The submission noted that the State's GMO moratorium would not apply to organisms resulting from either technique and warned that deregulation would place Tasmania's primary production sector at risk if overseas jurisdictions with strict import controls consider SDN-I modified organisms to be GMOs, as is the case in the European Union and New Zealand. It questioned Tasmania's preparedness for such an outcome, sought a full analysis of the implications for the State, and recommended that the review examine options for implementing controls over organisms modified by SDN-I or RNAi techniques if they are deregulated.

Several of the submissions that specifically addressed the implications of deregulating SDN-I modified organisms highlighted the potential risk to trade and markets for Tasmanian and Australian exports if Australia's definition of a GMO were to be inconsistent with the definitions used by international trading partners or out of step with consumer sentiment in those countries.

The submission from Gene Ethics noted that deregulating SDN-I modified organisms and their products nationally would nullify the rights of any State or Territory to review them for impacts on markets or trade, fundamentally compromising Tasmania's GMO moratorium and the Tasmanian Parliament's discretion to review GM proposals for marketing reasons. It suggested that the implications for Tasmania's export markets and trade were 'enormous', and warned that deregulating new GM techniques and products would put food and beverage exports at unprecedented risk of rejection.

The submissions from Gene Ethics, Friends of the Earth and Tony Scherer all noted the implications of the July 2018 ruling by the European Court of Justice (Europe's highest court) that newer gene editing techniques pose similar risks to older GM techniques and need to be assessed for safety in the same way⁵⁸.

More broadly, several submissions observed that most countries, including many of Australia's major trading partners, have zero tolerance for unapproved GMOs. Gene Ethics noted that the EU, China, South Korea and Japan all have low or zero tolerance for GM contamination, and for products made using unapproved GM ingredients.

⁵⁷ Including submissions 023, 025 and 060.

⁵⁸ See <https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-07/cp180111en.pdf>

Box 8: Regulation of GMOs and SDN-I in New Zealand

In New Zealand, GMOs are defined and regulated as 'new organisms' under the *Hazardous Substances and New Organisms Act 1996* (HSNO Act) administered by the Ministry for the Environment. Approval from the Environmental Protection Authority (EPA) within the Ministry is required for the development, field-testing, release or importation of GMOs into the country. To date, no fresh produce originating in New Zealand is produced using GMOs.

In 2013 the EPA determined that SDN-I gene editing did not result in GMOs, however the determination was successfully challenged in New Zealand's High Court. In August 2016 the New Zealand Government responded to the court's decision by amending the regulations under section 141(1) of the HSNO Act. The amendments clarified that all genetic modification techniques not in use before 29 July 1998 (including gene editing) are considered to create organisms that are GMOs.

The HSNO Act is enforced at the New Zealand border by the Ministry for Primary Industries (MPI) in accordance with section 28 of the Biosecurity Act 1993. Importers must take appropriate precautions to ensure that consignments of seed for sowing and nursery stock for planting do not contain unapproved GM plant material (New Zealand Government, 2019a).

While SDN-I modified organisms are GMOs under the HSNO Act and regulations, New Zealand's capacity to regulate the organisms at its border is less certain. The testing methods detailed in the MPI's Protocol for Testing for the Presence of Genetically Modified Plant Material (New Zealand Government, 2019b) rely on prior knowledge of genetic modifications to detect GMOs and would be incapable of detecting unregulated SDN-I modified organisms. On the other hand, the requirement to sign a non-GM assurance declaration (with severe penalties for making a false or misleading declaration) could act as a strong deterrent to the importation of unapproved SDN-I modified organisms. One implication is that Australia's decision to deregulate SDN-I modified organisms could increase the perceived risk of importing seed for sowing or nursery stock for planting from Australia into New Zealand, potentially affecting Tasmania's growing pasture seed and vegetable seed industries.

3.3.8 Research and development

Only a small minority of submissions commented on the impact of the GMO moratorium on research and development in Tasmania and those that did comment provided mixed views. CropLife Australia's submission asserted that the moratorium is stifling agricultural biotechnology research and development in Tasmania, claiming that potential investors in research and development are bypassing the State, as demonstrated by the fact that Tasmania is the only state without GM crop field trials⁵⁹.

The Tasmanian Agricultural Productivity Group (TAPG) submission commented that gene technology offers potential productivity improvements and that Tasmania must be able to take advantage of such developments. It suggested that research trials into non-food crops should be allowed to proceed under strict regulation so that they do not threaten the State's agricultural economy, and advocated for flexibility to ensure that Tasmanian industries remain competitive

⁵⁹ Submission 018

should adoption of gene technologies become more commercially attractive⁶⁰.

Considering the poppy industry, some submissions claimed that the moratorium discourages long-term investment in research and development, which will undermine the industry's competitiveness over time. One submission noted that the conditions attached to the moratorium exemption for pharmaceutical poppies are too onerous, even for small field trials, while another claimed that the State's moratorium had forced the CSIRO to abandon the commercialisation of a herbicide resistant poppy variety it had developed⁶¹. In this respect it should be noted that the expansion of poppy cultivation into states and territories without moratoria means that the approval of the Regulator is the only legal obstacle to the commercialisation of GM poppies in Australia. Currently there are no licence applications before the Regulator concerning GM poppies.

Several submissions expressed concern that despite pharmaceutical poppies enjoying an exemption from the moratorium, the permits and licences required to undertake research and development into GM poppies, including field trials, impede the commercialisation of GMOs in Tasmania. On the other hand the submission from Tasmanian Alkaloids, one of the State's largest poppy processors indicated that the company is continuing to conduct research and development involving the genetic modification of poppies to inform its conventional plant breeding program. It noted the potential for the Tasmanian Government to attract investment and scientific research programs to Tasmania by establishing a robust regulatory regime to enable suitably qualified and secure entities to conduct GMO-related research and development in the State. Furthermore, it noted that if the Tasmanian Government considers that research and development involving GM technologies offers advantages, the company would consider programs and protocols to further commercialise its existing capabilities.

Few submissions in support of the moratorium directly addressed the issue of research and development, although the Gene Ethics submission made a general reference to research conducted by the CSIRO and UTAS to claim that there is no evidence that the moratorium adversely affects Tasmanian biotechnology research or development⁶². Wine Tasmania also confirmed that the moratorium has not impacted on wine research in Tasmania and that there is no current, proposed or needed research that would require the moratorium to be lifted⁶³.

The TIA submission noted that most researchers consulted did not see their own research as being substantially constrained by the moratorium, except that it has led to field trials of GM crops being conducted in other jurisdictions⁶⁴.

A more fundamental constraint on research into GMOs noted in TIA's submission is the lack of strong consumer demand for GM products, which is reflected in industry demand for research in this area. Similarly, while genetic modification techniques are a standard part of UTAS teaching and research training in relation to plant and animal genetics, the lack of demand and the regulatory regime concerning GMOs currently limits the attractiveness of these techniques. Nonetheless, the deregulation of SDN-I has the potential to spark a rapid increase in research and development involving SDN-I modified organisms.

⁶⁰ Submission 065

⁶¹ Submission 031

⁶² Submission 025

⁶³ Submission 076

⁶⁴ Submission 071

3.3.9 Alternative regulation

One submission from the AATE advocated for the regulation of GMOs and products based on their safety, instead of the technology used to produce them, and for the deregulation of all gene editing. The issue of regulatory triggers was addressed in Chapter 1.3 of the Final Report of the Scheme Review while the Technical Review explicitly considered options for the regulation of gene editing techniques. Both matters are outside the scope of Tasmania's GMO moratorium.

3.4. Health and environmental effects

[The following themes align to Term of Reference (d): Any other relevant matters raised during the review].

The implications of GMOs for human health and safety or the environment are outside the scope of this review since they are regulated nationally through the Gene Technology Scheme. Nonetheless, this topic was clearly viewed as an important aspect of the GMO moratorium, with twenty four submissions expressing concerns that GMOs, or the agricultural practices associated with their cultivation, may be harmful to the health of humans and organisms in the environment.

Some of these submissions expressed concern about a lack of long-term evidence for the safety of GM foods, and the potential for unforeseen off-target effects arising from modern gene editing techniques⁶⁵. However, most comments on this topic related to the safety of the glyphosate-based herbicides associated with the cultivation of herbicide-tolerant GM canola, and cited recent lawsuits in the United States against its manufacturer, Bayer⁶⁶.

Some submissions contended that there is a lack of objective evidence to suggest that GMO products present any unique risks to human or animal health or to the environment, noting that all GMOs approved by the Office of the Gene Technology Regulator (OGTR) for commercial release in Australia are as safe as their conventional (non-GM) counterparts⁶⁷.

Several submissions noted the future potential for health or environmental benefits from the use of GM products in Tasmania, including improved human nutrition, reduced pesticide inputs, greater water use efficiency, reduced allergies, and reduced greenhouse gas production associated with more digestible pasture species⁶⁸. While acknowledging the potential for these benefits, it must be noted that many, if not all of the crops that would be able to deliver these benefits remain under development.

⁶⁵ Submissions 035, 054 and 072

⁶⁶ Submissions 025 and 052

⁶⁷ Submissions 006, 007 and 018

⁶⁸ Submissions 002, 006, 007, 018, 019 and 031

3.5 Other issues

Several submissions raised ethical or moral arguments concerning GMOs and the moratorium. For example, some submissions expressed concerns that the introduction of GMOs will result in a loss of independence for farmers due to concentrated ownership of gene technology and genetic resources. These submissions also noted the potential for ‘corporatisation’ of farming to result in food sovereignty concerns, loss of local or heirloom varieties, and greater inequality in food production chains⁶⁹.

Others argued that the current moratorium is an unfair restriction on the freedom of farmers to cultivate the crops of their choice using the production system they prefer, and that there is insufficient justification for the Government’s intervention in the market. The submission from GrainGrowers commented that:

*“GrainGrowers believes that grain farmers should have the freedom of choice for the production systems and markets they pursue – be that genetically modified organisms (GMO), conventional, organic or any combination of these. Removal of the moratorium would allow choice for Tasmanian farmers and marketers in the crops they grow and purchase. The ability to access gene technology is essential for the continued development and growth of the grains industry in Australia”.*⁷⁰

3.6. Form and duration of moratorium

Several submissions made direct recommendations concerning the duration of the GMO moratorium review cycle. Of the 63 submissions that recommended that the moratorium be maintained without amendment, 17 explicitly requested that the moratorium be extended indefinitely. The Tasmanian Greens commented that section 36 of the *Genetically Modified Organisms Control Act 2004*, which prescribes the automatic expiration of the act, creates an inappropriately precarious legal situation and should be repealed⁷¹.

By contrast, submissions from DairyTas and Agribusiness Tasmania called for a shorter review frequency to enable measurement of efficiency gains against market advantages on a more regular basis⁷². It should be noted the option for early review in the event of significant developments already exists: the Tasmanian Government’s Tasmanian Gene Technology Policy 2014-2019, requires an environmental scan to be conducted on an annual basis, and this scan can recommend the triggering of a full scale review.

Submissions from the TFGA and the Tasmania Feedlot argued for an extension of ‘no more’ than five years, and ‘at least’ five years, respectively, suggesting a degree of consensus for the current duration, while Huon Aquaculture recorded their support for the moratorium’s provision to seek review every 12 months in the event of research emerging that is of relevance to the use of gene technology in primary industries⁷³.

A small number of submissions also made statements about the scope and extent of the current GMO moratorium. For example, around four submissions called for the moratorium to be extended to include imported animal feed containing GM material in order to “Protect

⁶⁹ Submissions 011, 035 and 044

⁷⁰ Submission 028

⁷¹ Submission 070

⁷² Submissions 002 and 019

⁷³ Submissions 037, 068 and 069

and properly capitalise on Tasmania's GM-free status", and these same four submissions requested that exemptions no longer be provided for pharmaceutical crops or open air field trials "due to contamination risks".⁷⁴

By contrast, other submissions specifically called for certain non-food crops (such as pasture species) and pharmaceutical crops (such as poppies) to be exempt from future moratoria, and requested that the exemption provisions for the poppy industry be made more practical and less onerous, without precisely defining how this might be achieved.⁷⁵

4. SUMMARY OF FINDINGS

The issues associated with the use of gene technology in primary industries are varied and complex.

This review concentrated on major themes associated with the advantages and disadvantages of the moratorium to the State's markets, marketing and brand. This is because under the national scheme for regulating GMOs, States can only regulate for marketing purposes.

Findings are made on the 5 key issues that are most relevant to determining the future policy position on the GMO moratorium at this time.

Markets, marketing and branding

- Tasmania's GMO moratorium benefits those businesses seeking to claim GMO-free status for their products but is potentially holding back investment and advances in other businesses that would like the option to use gene technology.
- It was not possible for this review to quantify the market (or marketing) advantages or disadvantages to the State of the moratorium. As observed with previous reviews on GMOs in Tasmania and more generally, quantitative evidence around the costs and benefits of maintaining Tasmania's GMO moratorium is limited beyond discrete market examples and product offerings.
- There is extensive qualitative evidence around the market benefits of Tasmania's GMO-free status as one of a number of attributes that forms Tasmania's broader reputation in the market.
- A full or partial removal of the moratorium presents some risk to the Tasmanian Brand in the market place, due to the potential for such a change to fuel new media exposure and create a negative consumer perception.
- As a small island economy located at distance from many markets, Tasmania is disadvantaged in competing on supply-chain efficiencies. Lacking a competitive advantage in the commodity market, there is potential for Tasmania to capitalise on products which attract a premium price to improve marketing efficiencies.
- If the moratorium continues, the Tasmanian Government should continue to work with industry to build opportunities for the Tasmanian Brand.

⁷⁴ Submissions 023, 042, 060 and 040

⁷⁵ Submission 031 and 065

Co-existence versus zero tolerance

- The relatively small size of Tasmanian farms could mean that co-existence would be more dependent on cooperation between neighbouring farms and hence more challenging than in mainland states.
- The capacity for GM and non-GM crops to coexist varies depending on the characteristics of each crop, and the degree to which GM and non-GM production systems and products could be separated and segregated to limit GM contamination to levels acceptable to customers and /or industry certification.
- Organic and GMO-free production systems and markets for organic and GMO-free products have zero tolerance for GM contamination and any amount of contamination could risk the loss of those markets and any premium dependant on the organic or GMO-free attributes of the products.
- The Tasmanian Government should continue to work with industry to monitor the impact of the zero tolerance threshold for GM contamination on the competitiveness of Tasmanian agriculture.

National decision not to regulate SDN-1 modified organisms

- The decision not to regulate SDN-1 modified organisms does not affect the ability of the Tasmanian Government to impose a moratorium.

Monitoring future developments in gene technology

- With the likely increase in field trials or the commercialisation of GM crops which could be grown in Tasmania, it is important to continually assess the potential benefits and/or the implications of gene technology developments in Tasmania to determine the State's policy position.
- Regardless of the policy position taken on the moratorium, a formal mechanism should be maintained for monitoring future developments in gene technology that involves Government, industry and other stakeholders.

The form and duration of the moratorium

- Unless the Act is amended, the current moratorium on GMOs in Tasmania will automatically expire on 16 November 2019. Therefore, the first decision-point is whether to lift or maintain the moratorium.
- A decision to allow the GMO moratorium to expire would mean that Tasmania would continue to operate under the national regulatory scheme with no additional restrictions and industry self-regulation.
- If a decision is made to extend the moratorium, it may either be extended without amendment (in which case the status quo is maintained), or extended with amendment.
- Amendments could include removal of the option to apply for exemptions for certain non-food GM crops; removal of the exemption for imported animal feed containing non-viable GM material; modification to the adventitious presence threshold limit; or

application of a 'blanket moratorium' which would wind back the ability to apply for a permit to deal with GMOs in Tasmania.

- The duration of the moratorium, if extended, could be 5 years as determined in previous reviews, 10 years or indefinitely to provide certainty for industry, noting the importance of a formal mechanism that would trigger a policy review.

5. REFERENCES

- Anderson, K, & Jackson, LA. (2005). GM crop technology and trade restraints: Economic implications for Australia and New Zealand. *Australian Journal of Agricultural and Resource Economics*, 49, 263-281.
- Australian Bureau of Statistics. (2019). 7121.0 - Agricultural Commodities Australia, 2017-18. ABS, viewed 3 June 2019.
<https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02017-18?OpenDocument>
- Australian Government. (2016). *Regulation of Australian agriculture: Productivity Commission inquiry report*. Productivity Commission, viewed 29 January 2018.
<https://www.pc.gov.au/inquiries/completed/agriculture/report/agriculture.pdf>
- Australian Government. (2017). *Updating gene technology regulation in Australia: Consultation quick guide*. Department of Health, Office of the Gene Technology Regulator, viewed 20 June 2019. [http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/39DB72B3BB9AA790CA25823B00812B73/\\$File/Consultation%20Quick%20Guide.pdf](http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/39DB72B3BB9AA790CA25823B00812B73/$File/Consultation%20Quick%20Guide.pdf)
- Australian Oilseeds Federation. (2007). *Delivering market choice with GM canola: An industry report prepared under the Single Vision Grains Australia process*, viewed 30 July 2019.
http://australianoilseeds.com/__data/assets/pdf_file/0019/2935/Delivering_Market_Choice_with_GM_canola_-_FINAL_-_IMB.pdf
- Chang, HS, & Kristiansen, K. (2006). Selling Australia as 'clean and green'. *Australian Journal of Agricultural and Resource Economics*, 50, 103-113.
- Choice Australia. (2016). *Are you eating genetically modified food?*, viewed 4 June 2019.
<https://www.choice.com.au/food-and-drink/food-warnings-and-safety/food-safety/articles/are-you-eating-gm-food>
- Food Standards Australia New Zealand. (2008). *Consumer Attitudes Survey 2007: A benchmark survey of consumers' attitudes to food issues*, viewed 20 June 2019.
<https://www.foodstandards.gov.au/publications/documents/Consumer%20Attitudes%20Survey.pdf>
- Keogh, M, Tomlinson, A, & Henry, M. (2015). *Assessing the competitiveness of Australian agriculture*. Rural Industries Research and Development Corporation, Barton, ACT.
- Legislative Council of Western Australia. (2019). *Mechanisms for compensation for economic loss to farmers in Western Australia caused by contamination by genetically modified material*. Standing Committee on Environment and Public Affairs, Report 49, pages 5-8.
- Macquarie Franklin. (2012). *Market advantage of Tasmania's GMO-free status*. Devonport, TAS.
- New Zealand Government. (2019a). *Import Health Standard BNZ.GCFP.PHR: Importation of Grains/Seeds for Consumption, Feed or Processing*. Ministry for Primary Industries, viewed 30 July 2019. <https://www.mpi.govt.nz/dmsdocument/1661>

New Zealand Government. (2019b). *Operational code: Protocol for testing for the presence of genetically modified plant material*. Ministry for Primary Industries, viewed 30 June 2019. <https://www.biosecurity.govt.nz/dmsdocument/10250-protocol-for-testing-for-the-presence-of-genetically-modified-plant-material-plant-import-requirement>

Parliament of the Commonwealth of Australia. (2016). *Smart farming: Inquiry into agricultural innovation*. House of Representatives Standing Committee on Agriculture and Industry, viewed 29 January 2019. <https://www.aph.gov.au/~media/02%20Parliamentary%20Business/24%20Committees/243%20Reps%20Committees/AgInd/AgInnovation/Report.pdf?la=en>

Tasmanian Government. (2013). *Review of the moratorium on genetically modified organisms (GMOs) in Tasmania*. Hobart, TAS, page 7.

Tasmanian Government. (In publication). *Tasmanian Agri-Food ScoreCard 2017-18*. Department of Primary Industries, Parks, Water & Environment. When published, the Agri-Food ScoreCard will be available at <https://dpiuwe.tas.gov.au/agriculture/facts-figures/tasmanian-agri-food-scorecards>

APPENDIX A - SUBMISSIONS

Submission No.	Name
1	Accornero, Greg
2	Agribusiness Tasmania
3	Apspand Pty Ltd
4	Armstrong, David
5	Austin, Susan
6	Australian Academy of Technology and Engineering
7	Australian Seed Federation
8	Bekkema, Marianne
9	Bellchambers, Marie
10	Beveridge, Jazmin
11	Biodistributors
12	Booth, Kerin
13	Casburn, John
14	Confidential
15	Chin, Richard
16	Collins, Shirley
17	Coombs, Corrine and Steve
18	CropLife Australia
19	DairyTas
20	Eat Well Tasmania Inc
21	Fat Pig Farm
22	Fonterra Australia Ltd
23	Friends of the Earth
24	Fruit Growers Tasmania Inc
25	Gene Ethics
26	Good Life Permaculture
27	Graham, Alice
28	GrainGrowers
29	Greenham Tasmania Pty Ltd
30	Hadkins, Evan
31	Hartnett, Brian
32	Harvest Feast
33	Herold, Robert

Submission No.	Name
34	Hes, Dominique
35	Hodge, Jess
36	Holland, Nicola
37	Huon Aquaculture
38	Jackson, Bruce
39	Johns, Chris and Sally
40	Johnston, Joyce
41	Kingston, Tom
42	Langfield, Russell
43	Layton-Bennett, Anne
44	Lord, John
45	Macquarie Oil Company
46	Marques, Carlos
47	Mueller, Ute
48	Murray, Sandra
49	Neeson, Robyn
50	Organic Dairy Farmers of Australia Ltd
51	Parsons, Tim
52	Paull, John
53	Paull, Kerry
54	Pavlov, Jenny
55	Pesticide Action Group WA, Save Our Trees
56	Ross, Estelle
57	Rowland, Michael
58	Ruthven, Elizabeth
59	Ryan, Malcolm
60	Scherer, Tony
61	Schindler, Anthony
62	Smith, Elizabeth
63	Southern Wild
64	TAPAgriCo
65	Tasmanian Agricultural Productivity Group
66	Tasmanian Alkaloids
67	Tasmanian Beekeepers Association

Submission No.	Name
68	Tasmanian Farmers and Graziers Association
69	Tasmania Feedlot Pty Ltd
70	Tasmanian Greens
71	Tasmanian Institute of Agriculture
72	Tasmanian Public and Environmental Health Network
73	Thomas, Robin
74	van Kann, Frank and Hartley, Susan
75	Confidential
76	Wine Tasmania

APPENDIX B - INTERNATIONAL MARKET RESEARCH

The Department of State Growth, in conjunction with Austrade, commissioned a survey in December 2018 of the attitudes towards GMO by key importers and distributors of Tasmanian food, including seafood, in China, Japan, and Korea. Results from this survey are presented below:

China

The Department of State Growth commissioned via Austrade an in-market Business Development Manager based in China, who in March 2019 interviewed six businesses which are key importers and distributors of Australian products.

All six businesses currently, or have previously, imported Tasmanian food products.

Respondents stated that they consider Australian food products of a high quality produced in a clean and safe environment. They viewed Tasmanian food products to be produced in an even more natural and pollution free setting.

Five of the six respondents said that they do not import GMO foods, or purchase from countries or regions which grow GM crops commercially, with half stating that they have a policy for sourcing food from countries that ban production of non-GM foods.

Interviewed businesses stated that 'GMO-free' label is not generally used for marketing or promotional purposes, with the exception of sensitive foods such as oil products. One company stated that Chinese consumers have limited understanding of GM foods, but do pay attention to GM labelling when purchasing bean products. Another company said that they prefer to promote 'organic' instead of 'GMO-free' for fruit and meat products.

GMO presence or GMO-free environment was not marked as a high priority by respondents, with half indicating that country of origin was the biggest factor influencing their food purchasing decisions. Reliability or reputation of producers was also considered a high priority for five out of six respondents.

Respondents provided mixed responses around the importance of 'GMO-free' being part of Tasmania's brand image, with two respondents indicating that the 'pure and clean' brand component is of greater importance, however did not specify how the current GMO-free status implicitly contributes to the perception of this image. Half the respondents said that GMO-free status is very important.

Half of the respondents stated that GMO-free products attract a market advantage.

Interviewed businesses stated that they would continue to import GMO-free food products from Tasmania if the commercial production of non-food GMOs were allowed in Tasmania.

Respondents said that Chinese consumers generally have very limited understanding of GMOs and are wary of GMO food products.

One respondent stated that if consumers were aware that products contain GMOs, they would not choose to purchase them. This would include those products produced using animal feeds that contain GMOs.

All companies stated that media is influential on consumer attitudes towards GM products.

Japan

In April 2019, Austrade provided a report wherein they interviewed six major Japanese retailers and importers regarding GMO perceptions in Japan.

The research methodology involved identifying businesses which varied in size and consumer demographics. Two of these businesses are currently importing Tasmanian food products.

The summary of that report is that Tasmania's GMO-free status is an invaluable asset, ensuring premium and unique market positioning of Tasmanian made products, and providing a competitive advantage over countries and regions who do not have this status.

Japanese retailers and importers stated that Australian food products are produced in a clean environment, with three rating Tasmania even 'cleaner' and more 'natural'.

All interviewed companies are importing food from countries that are commercially producing GMOs. However, two stated that they have a preference for sourcing food from countries that ban the production of GM food, and a third business said that they confirm with the supplier that the imported goods do not contain GMOs.

The respondents stated that GMOs or GMO-free status was not selected as top priority, but during the interview, respondents said that it is very difficult to rank factors that influence purchasing decisions as they are collectively considered.

The respondents said that consumers recognise the value of non-GMO food products, with five out of six companies stating that GMO-free products have a market advantage.

Both companies that import Tasmanian products stated that they would only source non-GMO products, with one company going further, saying that maintaining the GMO moratorium was critical and that it would significantly impact their sales if it were lifted.

While GMO-free labelling or promotion is not a big part of the interviewed businesses' marketing strategy, two businesses stated that some dairy and meat products have voluntary labelling of 'non-genetically modified'.

Japan's labelling system for genetically modified foods has remained unchanged since its introduction 17 years ago. Japan recently reviewed these and published key findings and recommendations in 2018. The review highlighted that Japanese consumers' awareness and understanding of labelling regulations and GMO in general was low, which may be a contributing factor in consumer concern and negative attitude towards GM foods. Four out of the six businesses stated that consumers are more likely to be accepting of non-food GMOs. Three respondents said that they believed that most consumers were ultimately buying genetically modified foods without being aware they are doing it.

South Korea

In April 2019 Austrade provided a report wherein they interviewed eight Korean businesses regarding current attitudes and preferences on GMO in Korea. The businesses interviewed included two importers and six retailers/manufacturers which represent large firms managing subsidiaries and which maintain dominance across retail, trade and manufacturing within the sector. Two of the businesses have imported Tasmanian products within the past few years.

All respondents said that Australia conjures images of safe, clean, natural, eco-friendly, fresh and organic food, with three of the respondents viewing Tasmania as a 'spotless, cleaner destination than elsewhere in Australia'.

Half of the respondents stated that they import products from countries that grow GM crops, with others unsure due to managerial responsibility segregation.

All businesses stated that price was the most important element in making food purchasing decisions, with country of origin and reliability being ranked equally as the next important factors owing to the current mandatory labelling system being based on the 'country of origin'.

All businesses stated GMO status was not seen as critical due to current labelling standards prohibiting the use of non-GMO labelling. If this were to change, respondents said that the promotion of the country of origin and GMO status may become as important as the marketing of organic, clean, safe and eco-friendly.

Korea's GMO imports are governed by multiple ministries and central administrative agencies, which require mandatory labelling of certain GM agricultural products. There are a number of exemptions including where the genetically modified DNA/protein is not detected post refinery process. Reportedly owing to the large range of products that are exempted from labelling, consumers are calling for mandatory GMO labelling on all imported food and ingredients. However, with Korea described as a price sensitive market, Korean food companies and industry associations are strongly against it as it is likely to affect revenue and may result in higher prices.

Despite this, the majority of respondents state a perception that a non-GMO producing country of origin has a market advantage over those countries that do produce GM crops and one went further saying that lifting the GMO moratorium could damage the current image of Tasmanian food.

The report stated that both retailers and government regulators believe that Australia has an enviable position in the Korean market with a strong clean, safe, eco-friendly and premium image, with Australian food products being highly trusted by Korean consumers. However it also stated that people interviewed thought that Australia did not cultivate or produce GMO food.

APPENDIX C - SUMMARY OF DOMESTIC MARKET RESEARCH

The Department of State Growth engaged Freshlogic Pty Ltd to survey and report the perceptions of food sourced from Tasmania, including GMO policy. A summary of the findings is contained here.

Prevailing consumer views

Consumer interest in the origin and production systems of food products has increased; however, there has also been an increase in the associated marketing claims of attributes which is resulting in a dilution of the messaging.

Freshlogic's Mealpulse⁷⁶ consumer panel research conducted on household shopping behaviour states that attributes perceived as 'ethical' such as ingredients on non-GMO origin and GM-free products, are secondary purchasing considerations behind the primary considerations of price or value for money and reducing home waste. GM-free ranked behind other perceived ethical attributes such as 'free from additives', 'locally produced', 'free range', and 'organic' products.

Freshlogic's Mealpulse survey states that 69 per cent of respondents felt "buying smaller portions", despite a higher per unit price, was the most important purchasing consideration. Fifty eight per cent of surveyed respondents indicated they are "watching their food budget carefully". According to the survey, only 14 per cent of responses indicated a willingness to "pay more for GM-free products". The Freshlogic analysis indicates this could largely be a reflection of the few products in the Australian market that offer GM-free or are labelled as containing GE ingredients; in comparison to other more commonly marketed ethical attributes such as certified organic⁷⁷.

According to Freshlogic, when assessing consumer purchasing considerations, it is relevant to reflect on the general changes in attitude towards origin and production method. A greater focus or importance on provenance, has caused a lift in value associated with positive regional attributes such as King Island, Margaret River, Barossa Valley and Tasmania.

Primary producers and peak industry bodies

Attitudes toward the GMO moratorium are driven by industry-specific interests and exposure to export markets where the Tasmanian origin is perceived to be delivering advantages.

Freshlogic states that primary producers across Australia, particularly those in Tasmania, see the State as having a reputation as a 'clean and green' source of food. This reputation is perceived as providing an edge in the export markets, although there is acceptance that the GMO moratorium is a contributing factor only and at times a lesser consideration than seasonal supply and market access advantages.

Freshlogic reported that a view amongst those who were interviewed that a full or partial removal of the moratorium presents some risk to the Tasmanian Brand, due to its potential to

⁷⁶ Freshlogic Mealpulse consumer panel is a continuous monitor of the food market in Australia, gathering 15,000 complete weeks of house food shopping per annum. Respondents are asked their level of agreement with certain statements and their propensity to purchase products according to certain attributes.

⁷⁷ Further detail on Mealpulse survey is available in the full report prepared by Freshlogic.

fuel new media exposure and create a negative consumer perception. The view is anchored on consumer perceptions and knowledge of GM usage.

Retail channel

The current moratorium is not a key driver in the buying ranges of respondents, although they are responsive to consumer sentiment and are seeking to capitalise on competitive advantages. This has led to higher marketing visibility of food attributes.

The report defines the retail channel as the primary interface between producers and consumers and, as most food sold through this channel retains its original product form, it gives producers an opportunity for product attributes to be conveyed.

Retailers surveyed have sought to embrace and capture an advantage by associating their products with perceived ethical food benefits.

The retailers surveyed all reported a positive perception of the quality of food on offer from Tasmania. The report states Tasmanian food enjoys an image anchored in pure, natural and clean attributes, however when this perception was tested against comparable quality products from a mainland source, these retailers indicated that Tasmanian origin is not currently enough to earn a price premium.

The retailers surveyed do not have policies regarding preferential purchasing from regions that are GM-free. All major retailers have detailed policies on corporate responsibility and governance procedures which include ethical and sustainable sourcing. One major supermarket chain does have a policy to ensure that its own branded products do not contain any GM ingredients.

Australian retailers surveyed are aware of the current Tasmanian GMO moratorium, but the level of awareness varies. Retail managers who are responsible for managing retailer brands indicated a higher level of awareness, with Freshlogic analysis indicating the likelihood of this being due to their involvement in the scope of discussions on food ingredients. However, those who are purchasing the bulk of the retail merchandise are not all aware that the Tasmanian GMO moratorium is in place.

The common response described in the report was that any lapse in the moratorium would have an opportunity cost as this is a unique part of the Tasmanian Brand, which once gone, cannot be reinstated. Additionally the Report identified the risk that ending the moratorium may impact the overall perception of Tasmanian food.

Food wholesalers and distributors

This section of the industry does not place specific emphasis on the GM status, and is more focused on overall trading outcomes.

The report defines wholesalers and distributors as both traders and vertically integrated businesses which have exposure to both ends of the supply chain – primary production and consumer demand. As the supply chain has become more informed, wholesalers and distributors have become more aware of finding supply solutions which can satisfy consumer demands and also meet the requirements of retailers and food service channels.

All wholesalers and distributors interviewed have positive perceptions about the quality of food on offer from Tasmania. Freshlogic's analysis is that this positive perception is largely influenced by the State's seasonal availability and product specification advantages.

The Report states that GM product attributes are not a significant factor in wholesaler and distributor commercial decisions and of a lesser importance than other perceived ethical attributes.

Beverage producers and distributors

The low penetration of the GM-free trait into the sector's overall sophisticated marketing and brand management can be perceived as a reflection of the industry's view of the commercial value of this attribute.

The Report states the beverage sector has a higher exposure to consumer attitudes due to the products being branded from an early stage in their distribution. With strong consumer brands in beverages, and the resulting connection between producers and final consumers, there is a higher sensitivity to brand management and an awareness of the marketing issues around attributes such as GM-free. Freshlogic states that the sector is facing sharp pressure in relation to sugar-based drinks and for better packaging recycling solutions. The Report states there is low penetration of the GM-free trait in the industry's marketing which is a direct reflection of the industry's view of the attribute's commercial value. Furthermore, innovation in this sector is largely centred on delivering natural beverages, which is not necessarily what GM represents.

Food service suppliers and operators

The main driver is product cost and regulatory compliance, however in growth conditions, some businesses will seek a competitive advantage in line with consumer sentiment.

The Report defines the food service channels as being made up of a small number of wholesalers, which service more than 65,000 outlets and venues including restaurants, cafes, fast food outlets, travel providers such as airlines, workplaces, aged care facilities, rest homes and institutional facilities. In most instances in food service, food ingredients are assembled with other products into meals or snacks for consumers to eat. According to Freshlogic it is a growing sector which provides some opportunity for food suppliers to have product attributes acknowledged including 'free range' or 'responsibly sourced' and providential features such as Barossa wine or Lilydale chicken. However, it does not appear to extend to widespread GM-free claims at a meal ingredient level. Food service stakeholders indicated that product cost and compliance with regulation are the major drivers of their buying behaviour.

The Report states that the food service channel generally has a positive view of the quality of food on offer from Tasmania, but it is not as widespread as it is in the retail channel. Food service channel respondents indicated that Tasmanian tourism and beverage sector marketing messages largely frame how Tasmanian food is identified.

Freshlogic states that the food service sector does not have policies regarding preferential purchasing from regions that are GM-free. However, it does have policies that commit it to complying with prevailing labelling regulations including GMO labelling. Some operators also have policies on environmental responsibility and a commitment to acting in the best interests

of their business partners and customers.

Freshlogic states that Australian food service enterprises are mostly unaware of Tasmania's moratorium on GMOs. Those that were aware were those that specialise in Tasmanian foods, select buyers of specialty foods for distributors and informed chefs in top tier restaurants and corporate catering.

Non-government organisations

Non-government organisations are actively involved and influential in the GM debate, with the ability to rapidly generate high levels of media exposure.

There are numerous non-government organisations (NGOs) that actively campaign against GM foods in Australia, the most prominent of these are Greenpeace and Fair Trade. Fair Trade standards prohibit the use of GMOs by all producers including small farmer organisations and worker organisations. Both Greenpeace and Fair Trade hold positions that the risk GMOs pose is still unknown and that there may be unforeseen social, health, and environmental impacts. Much of the focus of their campaigning is at enterprises within the food supply chain, principally corporates rather than consumers.

According to Freshlogic, Greenpeace believes that the promotion of GM crops represents a corporate takeover of the food system with six corporations poised to control 65-70 per cent of the world's pesticides and commercial seed market (as well as private sector research and development into seeds and pest management). Farmers are required to buy the GM seed and the associated pesticides in order to ensure that their crops perform, thus losing control of decision making in seed variety and ecological pest management.

The Report states that both organisations believe more can be done to improve agricultural processes, ecological agriculture and equitable access to food crops. They do not consider GMOs to be the answer to the food security issues for the world.

According to the Report Greenpeace is not opposed to the use of biotechnology in confined environments including the medical sector for the development of drugs and pharmaceuticals.

Freshlogic found that the ease and speed of social media means that all NGOs have the potential to quickly mobilise support and create significant public discussion and media coverage. The 24 hour news cycle leaves media organisations in a constant search for news and has accentuated the propensity to elevate negative messages due to their potential as 'click bait'. The impact of NGO activity is difficult to quantify. The many factors and stakeholders involved make it hard to isolate but this analysis concludes they are a significant factor in impacting consumer views.

Freshlogic research found that the four major providers of GMO inputs, BASF, Bayer, Corteva and Syngenta, have engaged in a more active roles in the community regarding GMOs. They have invested in engaging with consumers seeking to influence their attitudes. These efforts have shifted from delivering the depth of scientific detail to the merit of GMOs as a solution to food shortages, better economic outcomes for grower communities and a solution to climate change pressures on food production. In addition, the information is communicated as headline content to consumers that is easier to comprehend and aligned with the changed media landscape.

APPENDIX D - GENE TECHNOLOGY DEVELOPMENTS BY INDUSTRY

GM canola

GM canola is currently the only GM food crop approved for commercial release in Australia, and the only approved GM crop that is suitable for commercial cultivation in Tasmania. As such, the direct costs of Tasmania's GMO moratorium are mostly confined to this sector.

To date the Regulator has issued seven licences for the commercial cultivation of GM canola varieties with modified traits mostly conferring herbicide resistance. Currently the only GM canola being commercially grown in Australia is glyphosate-tolerant canola, including Roundup Ready (RR) varieties owned by the multinational pharmaceutical and life sciences company Bayer (formerly Monsanto)⁷⁸.

In February 2018, the Regulator issued a licence to Nuseed Pty Ltd authorising the commercial cultivation of a new GM canola variety, known as DHA canola, which is one of a new generation of GM crops being developed with improved nutritional profiles rather than just resistance to herbicides, pests and diseases. The new variety has been genetically modified to accumulate a high proportion of docosahexaenoic acid (DHA), a long-chain omega-3 fatty acid usually sourced from oils found in fish and algae⁷⁹. Food Standards Australia New Zealand (FSANZ) has separately approved the use of material derived from the GM canola, meaning that the DHA canola and its products can be used in human food or animal feed, including aquaculture.

Australia's first unrestricted commercial GM canola crops were grown in Victoria and New South Wales in 2009, followed by Western Australia in 2010. Queensland also produces small quantities of GM canola. Statistics published by the Agricultural Biotechnology Council of Australia (ABCA) confirm that in 2017 GM canola accounted for 24 per cent of the combined canola production of Victoria, New South Wales and Western Australia, although though there is significant variation between Western Australia and the eastern states⁸⁰.

In Western Australia, which contributed three quarters of Australia's total GM canola production, GM canola comprised 34 per cent of the State's canola output. In comparison, GM canola production in New South Wales and Victoria appears to have plateaued at 11 per cent and 14 per cent of the State's total canola production, respectively.

According to the Australian Bureau of Statistics (ABS), Tasmania produced 3,519 tonnes of canola valued at \$2,017,951 in 2017-18, or less than 0.1 per cent of Australia's total production⁸¹. The next largest canola producing state, South Australia, produced almost one hundred times as much canola in the same year⁸². Due to the operation of GMO moratoria, the canola produced in both States is exclusively non-GM canola.

The recently concluded *Independent Review of the South Australian GM Food Crop Moratorium*

⁷⁸ <http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/cr-1>

⁷⁹ <http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/DIR155>

⁸⁰ <http://www.abca.com.au/materials/statistics/>

⁸¹ Australian Bureau of Statistics, 7121.0 - Agricultural Commodities, Australia, 2017-18, available at <https://www.abs.gov.au/ausstats/abs@.nsf/mf/7121.0>

⁸² In 2017-18, South Australia reportedly produced 335,052 tonnes of canola with a gross value of \$168,167,281 from 236,511 hectares of land. Source: Australian Bureau of Statistics

undertook a detailed analysis of the economic costs and benefits of South Australia's GMO moratorium for the State's canola production, both retrospectively (covering the period from the introduction of the moratorium in 2004 until 2018) and from the present day until the moratorium is due to expire in 2025⁸³. The review estimated the difference in gross margins between GM (RR) and non-GM triazine-tolerant (TT) canola to be \$38 per hectare, assuming an adoption rate of 10 per cent for GM canola, a yield gap of 10 per cent in favour of GM canola compared to non-GM canola, and a 5.2 per cent price premium in favour of non-GM canola. Furthermore, it estimated the cumulative cost of the moratorium to South Australia's canola farmers to be up to \$33 million over the period 2004-2018, and at least another \$5 million if the moratorium were to be kept until 2025.

It should be noted that the retrospective period examined by the review included five years prior to the first commercial production of GM canola anywhere in Australia. The estimate of the cumulative cost over this period also relied on an assumed yield gap of 20 per cent between GM canola and non-GM canola that was based on a comparison of average non-GM canola yields in South Australia with GM canola yields from field trials conducted in Victoria's Wimmera region. A more conservative yield gap of 10 per cent, based on the results of field trials of GM and non-GM canola in the Wimmera, reduces the retrospective estimate to \$11 million, highlighting the sensitivity of the analysis to key assumptions.

In addition to the higher gross margins for GM canola, the report estimates that gross revenue for the companies supplying canola seed would have been \$5.4 million higher for the period 2004-2018 without the moratorium, and would be \$3 million higher during the period 2019-25 if the current technology access fee producers pay to access GM canola seed were to remain unchanged.

The report also points to evidence of reduced weed control costs and increased cereal yields in crop rotations following a GM canola crop and estimates these benefits to be worth \$0.3-0.9 million per annum. Set against these benefits is the additional cost of segregating GM and non-GM production if the moratorium is ended, which it estimated at up to \$0.3 million per annum.

Lastly, the report highlighted several other possible benefits to farmers from being able to grow GM canola, including:

- having more varieties to choose from to best suit specific environments and weather anomalies;
- environmental and health benefits from reported reductions in farm chemical applications; and
- a likely boost to the value of farm land resulting from the increased productivity and profitability of GM canola compared to non-GM canola.

While canola production in South Australia and Tasmania is not directly comparable due to differences in yields, the analysis of South Australia's moratorium suggests that the retrospective cumulative cost of Tasmania's moratorium to the State's canola producers is likely to be relatively modest if similar assumptions to those used in the South Australian analysis were to be applied to Tasmania's much smaller canola industry. Furthermore, the GM canola production data

⁸³ Independent Review of the South Australian Food Crop Moratorium prepared by Kym Anderson, Report to the SA Minister for Primary Industries and Regional Development, March 2019

from Victoria and New South Wales suggests that, at an aggregate level, the advantages of GM canola over non-GM varieties have been insufficient to encourage widespread adoption of the technology in eastern Australia. The review report suggests that the faster rate of adoption in Western Australia may be partly attributable to GM canola providing better weed management outcomes in that setting than in the eastern states where weed problems are not as severe.

At this stage it is only possible to speculate on the difference in gross margins between the DHA canola and non-GM (TT) canola varieties as the first commercial crop of DHA canola is yet to be produced. However, a preliminary analysis conducted as part of the review of South Australia's moratorium suggest that it could be much higher than for Roundup Ready canola, depending on the assumed price premium and adoption rate for DHA canola.

GM poppies

In addition to canola, several submissions highlighted the potential contribution that GM poppies could make to the competitiveness of Tasmania's poppy industry, which in 2016-17 had a gross value of production of \$47 million. One of the submissions warned of the risk of a global competitor introducing GM poppies and the impact this could have on Tasmania's poppy industry.

The TAPG's submission noted the critical importance of poppies to irrigation development in the State and differences in the public's perception of manufactured pharmaceutical pain relief products compared to food products. The Group observed that the current exemption to the moratorium for pharmaceutical poppies that are not intended for use in food or feed is ambiguous. It suggested that any future moratorium should include a more explicit exemption for pharmaceutical crops to cement Tasmania's position as the preferred poppy growing location in Australia and New Zealand.

The submission from Tasmanian Alkaloids Pty Ltd, one of Tasmania's largest poppy processors, noted that the company can continue to operate without any adverse effect on its current Tasmanian operations if the moratorium were to be extended in its current form, including the exemption for pharmaceutical poppies. The submission noted that GM technologies represent an effective tool for the study of gene function in plants leading to potential efficiencies in conventional plant breeding and other research. The company is continuing to conduct research and development exploring the opportunities presented by these technologies but currently has no intention of commercialising any GMOs.

Tasmanian Alkaloids estimated that GM technologies could be used to increase alkaloid production in poppies by 20 per cent or more, compared to the three to five per cent average increase in yield that can be achieved through conventional plant breeding over a one to three year period. Other potential benefits including reductions in pesticide usage, specific disease resistance and additional traits that could assist the industry's competitiveness.

While noting the potential of GM technologies, Tasmanian Alkaloids believes there is widespread mistrust and misinformation in the community surrounding GM technology and GMOs, including their risks, commercial applications, and the potential for GM and non-GMO production systems to coexist. Its submission observed that objections tend to be based on emotion rather than evidence, including the perception that Tasmania's 'clean, green' status will cease to exist if GMOs

are allowed into the State.

The company further noted that the Tasmanian Government could play a lead role in raising awareness of the benefits offered by GMOs when they are subject to development in a well-regulated and controlled environment, and distinguishing less intrusive gene editing technologies from older transgenic technologies. It noted that only government can facilitate open discussion amongst stakeholders, implement educational opportunities, and increase awareness of options for co-existence between GM and non-GM crops. This sentiment was echoed in the TAPG's submission, which suggests that evidence needs to be presented to the public to encourage more informed debate on the merits and impacts of gene technology.

Any actions at the State level could build on initiatives resulting from the Scheme Review, which recommended the development of targeted communications to aid public understanding and confidence in the national Gene Technology Scheme (Recommendation 23), and that the Gene Technology Regulator continues to lead communication activities on topics related to the assessment of risk associated with gene technology (Recommendation 24).

GM pasture and livestock

The DairyTas submission and several other submissions noted ongoing research and development into new GM perennial ryegrass varieties that offer significant potential benefits to Tasmania's pasture-based industries, especially the dairy sector.

CropLife Australia's submission noted field trials of GM ryegrass in Victoria that are scheduled to conclude in June 2020. The TAPG's submission expressed concern that dairy industry competitiveness and future milk production will suffer if farmers are unable to grow improved GM pasture species or grains, noting that very little milk is branded as Tasmanian in its final market form. Another Tasmanian submission claimed that the potential productivity benefits of GM perennial ryegrass would more than offset the unproven benefits of the moratorium, noting that use of the ryegrass would preclude the branding of Tasmania as GMO-free.

The submission from DairyTas highlighted world-leading research and development into GM pasture varieties and animal traits being undertaken by DairyBio and US company Recombinetics, respectively, to underline its claim that gene technology is expected to be the foundation of future productivity gains in the dairy sector. The submission noted that with pasture comprising 85 per cent of the feed base for dairy farms in Tasmania, improvements in pasture varieties have the potential to significantly increase on-farm productivity and profitability in the sector. This is especially the case for perennial ryegrass, which is used in combination with other pasture species for dairy production in the temperate regions of Australia, including Tasmania.

DairyBio is a \$60 million, five-year research and development collaboration between Agriculture Victoria, Dairy Australia and the Gardiner Dairy Foundation focusing on improved yield, persistence and quality in pasture species including perennial ryegrass, short-term ryegrass and tall fescue⁸⁴. DairyTas' submission described DairyBio's work to develop a more palatable perennial ryegrass variety by using a proprietary SDN-I gene editing technique (Exact™) to inactivate two genes involved in lignin production and two genes involved in pollen allergen formation. The resulting ryegrass is reportedly more digestible to cattle, resulting in more

⁸⁴ <http://dairybio.com.au/>

metabolisable energy, and less allergenic to humans.

The same submission also highlighted a transgenic, high lipid perennial ryegrass under development in New Zealand that reportedly has significantly higher energy and yield than comparable non-GM varieties, as well as the potential to reduce methane emissions from dairy cattle. Dairy Australia and Dairy New Zealand modelling of the value of the two varieties to the Tasmanian dairy industry reportedly indicates a potential increase in revenue of \$600 per hectare for the Exzact™ ryegrass and \$1,445 per hectare for the transgenic variety, assuming an increase in metabolisable energy of 1.0MJ per kilogram of dry matter and an adoption rate of 70 per cent.

The estimated commercial release dates for the high lipid transgenic and Exzact™ perennial ryegrass varieties are 2027 and 2028, respectively. However, when the amendments to the Gene Technology Regulations take effect in October 2019, there would be no legal obstacle to growing Exzact™ perennial ryegrass in Tasmania (including field trials prior to commercial release) provided the variety contains no genetic modifications resulting from techniques that will continue to be regulated. DairyTas' submission suggests that the decision to deregulate the SDN-1 technique could result in the commercial release date of the Exzact™ variety being brought forward.

According to DairyTas, the research and development undertaken by Recombinetics is focusing on a range of traits in dairy cattle, including heat tolerance and the development of polled (hornless) breeds using gene editing. Nationally, climate change is expected to lead to an increase in the frequency and intensity of heatwaves, resulting in heat stress and lost productivity among dairy cattle particularly in mainland states. On the other hand, polled genetics has the potential to provide animal welfare benefits and benefits to producers by avoiding the need for dehorning and disbudding, which involves cauterizing the horn buds of juvenile animals to prevent them from developing horns.

DairyTas' submission suggests that gene-edited polled cattle are only two years away from commercialisation in Australia. As with pasture species, the type of gene editing technique used to develop a breed will likely determine whether it is regulated in Australia as a GMO or unregulated.

Disease resistance is another focus of animal breeding using new gene technologies, including gene editing. Gene editing has already been used experimentally to produce pigs resistant to Porcine Reproductive and Respiratory Syndrome (PRRS). Recently the UK genetics company Genus announced plans to work with Beijing Capital Agribusiness Co Ltd to research and market PRRS-resistant pigs in China⁸⁵. The recent spread of a virulent strain of African swine fever (ASF) to more than 55 countries on three continents, accounting for more than 77 per cent of the world swine population⁸⁶, may also stimulate increased interest in the use of gene editing to confer disease resistance in livestock.

While the submission from DairyTas highlighted the potential opportunities for dairy farmers through the use of GM pasture, fodder and cattle, the submission from Fonterra Australia, Tasmania's largest milk processor, noted that the company remains concerned about consumer

⁸⁵ https://www.farminguk.com/News/UK-genetics-company-Genus-to-develop-virus-resistant-pigs_52034.html

⁸⁶ <https://www.frontiersin.org/articles/10.3389/fvets.2019.00137/full>

preference against foods made from GMOs. Fonterra supplies branded dairy products and unbranded dairy ingredients to customers in Australia and overseas and would like to see more conclusive consumer insights before there is any reduction in controls on the use of GMOs. The submission noted that Tasmania remains a potential location for sourcing non-GMO milk products certified through the Non-GMO Project⁸⁷. In New Zealand, Fonterra Australia's parent company recently developed a segregated milk pool for certified non-GMO milk products, which are reportedly achieving greater market share and/or a price premium in some export markets.

GM salmon

Although not directly addressed in any submissions, gene technology applications also have potential implications for Tasmania's growing aquaculture industry. US company AquaBounty Technologies recently received approval in the US and Canada to commercialise the first GM food animal, a transgenic Atlantic salmon known as AquaAdvantage Salmon capable of growing at double the rate of conventional Atlantic salmon. The first US and Canadian harvests of the GM salmon are expected in 2020⁸⁸.

GM canola, including the new DHA canola variety, also has the potential to be used as an ingredient in aquaculture feed formulations. However, Huon Aquaculture's submission to the review supported an extension of the existing moratorium. In an open letter to its customers and wholesalers the company notes that it does not use GM salmon stock or GM ingredients its feed⁸⁹.

GM trees

The TAPG's submission suggested that gene technology could offer significant opportunities to increase plantation productivity through reduced susceptibility to vertebrate and invertebrate browsing, improved water and fertiliser use efficiency, the incorporation of herbicide resistance and sterility traits, and hybrid vigour. However, it notes that leading global environmental certification schemes prohibit the use of GMOs in forestry, creating a disincentive to explore the technology. For at least one company, the perceived benefits of accreditation and maintaining a 'social licence to operate' significantly outweigh the potential benefits from GMOs.

⁸⁷ <https://www.nongmoproject.org/>

⁸⁸ <https://aquabounty.com/aquabounty-technologies-investor-presentation-march-2019/>

⁸⁹ <https://www.huonaqua.com.au/wp-content/uploads/2017/10/Open-letter-to-Huon-customers-and-wholesalers.pdf>

APPENDIX E - ISSUES PAPER

REVIEW OF

Tasmania's genetically modified organisms (GMO) Moratorium

ISSUES PAPER

MARCH 2019

The Tasmanian Government has released this issues paper to frame the Review of Tasmania's GMO Moratorium.

FOREWORD

The Hodgman Liberal Government has a strong vision to grow the Tasmanian agriculture sector to \$10 billion per year by 2050. We've committed significant funding through successive budgets to partner with the private sector on a range of strategic initiatives to support Tasmanian primary producers and agribusinesses to grow and prosper. The Tasmanian Government is committed to positioning our local industries to be globally competitive, helping our businesses expand their presence in markets around the world, and attract more investment to create more local jobs. International and national markets value Tasmania's premium food products because of the provenance underpinning the Tasmanian brand. Our GMO Moratorium has been a key component of Brand Tasmania in relation to food since 2001. It has served us very well, enabling market access and advantages that are the envy of other jurisdictions. As a smaller scale and often premium producer, positioning in key markets is particularly important for the Tasmanian agri-food sector. This review is being undertaken so that a decision can be made regarding the future of Tasmania's GMO Moratorium before the expiry date of the current term in November 2019. I encourage you to have your say on this important issue for our State. Please make your submission by the closing date of 26 April 2019.



Guy Barnett MP
Minister for Primary Industries and Water

INTRODUCTION

Tasmania has since 2001 maintained a moratorium on the commercial release of genetically modified organisms (GMOs) into the Tasmanian environment. The moratorium exists to distinguish Tasmanian products in the market place and deliver an economic premium to the State's agricultural and food production industries.

The *Genetically Modified Organisms Control Act 2004*, which provides for Tasmania's moratorium, expires on 16 November 2019.

The Minister for Primary Industries and Water has directed the Department of Primary Industries, Parks, Water and Environment to undertake a review of the moratorium, in consultation with the Tasmanian community, before it expires. The Tasmanian Government will determine whether to extend or amend the moratorium, or allow it to expire, taking into account the findings of the Review.

This paper outlines the scope of the review and the issues on which the Department is seeking comment and information.

CONTEXT

A GMO is an organism that has been modified by gene technology, which includes any technique for the modification of genes or other genetic material. Gene technology is used in a number of fields, including scientific research, medicine, therapeutic goods, veterinary medicine, agriculture and other industries.

The use of GMOs in Australia is regulated through a national Gene Technology Scheme administered by an independent Gene Technology Regulator.

Box 1: Overview of GMO regulation

National Gene Technology Scheme

The Gene Technology Scheme was established in 2000 and is founded on a Gene Technology Agreement signed by all Australian governments. The Scheme consists of the *Commonwealth Gene Technology Act 2000* and *Gene Technology Regulations 2001*, and corresponding state and territory laws. Together the legislation provides a nationally consistent system to regulate the development and use of gene technology in Australia.

The objective of the *Gene Technology Act 2000* is to protect the health and safety of people, and to protect the environment, by identifying risks posed by, or as a result of gene technology, and by managing those risks through regulating certain dealings with GMOs. This is achieved through a licensing and prohibition scheme administered through the Office of the Gene Technology Regulator.

The Gene Technology Scheme was designed to fill the gaps between existing product-based regulatory schemes for human food, human therapeutics, agricultural and veterinary chemicals, and industrial chemicals. It focuses on live and viable GMOs and manages any risks they pose as a result of gene technology.

There is no provision for a state or territory to opt out of the Scheme on environmental or human health and safety grounds. However, each state or territory has the power under its own laws, known as 'moratoria legislation', to designate areas as 'GM crop areas' or 'non-GM crop areas' for marketing purposes.

Tasmania's GMO moratorium

The *Genetically Modified Organisms Control Act 2004* provides the current basis for Tasmania's GMO moratorium. The objective of the Act is to allow the State Government to designate areas of the State, or the whole of the State, as a GMO-free area for the purpose of preserving the identity of non-genetically modified crops and animals for marketing purposes. Through an order made under the Act, the whole of Tasmania was declared a GMO-free area, effective from 15 November 2005.

Tasmanian Gene Technology Policy

Following a review in 2013, the Government published the *Tasmanian Gene Technology Policy (2014-19)* and *Tasmanian Gene Technology Guidelines*. The Policy supported extending the moratorium until 16 November 2019, which Parliament legislated through an amendment to the GMO Control Act.

It also requires the Department to undertake Annual Environmental Scans of the gene technology environment to see if there have been any developments that may warrant an early review of the moratorium.

Copies of the Tasmanian Gene Technology Policy and Guidelines, and the GMO Annual Environmental Scans are contained in Attachments 2 and 3 and/or available on the Department's website at <https://dpiwwe.tas.gov.au/agriculture/tasmanian-gene-technology-policy-2014-2019#environmentalscans>

Other jurisdictions

All states and territories except for Queensland and the Northern Territory have passed moratoria legislation. However, some states have repealed their legislation or no longer have moratoria. Only Tasmania, South Australia and the Australian Capital Territory have active moratoria legislation. South Australia's moratorium is currently subject to a separate review and parliamentary inquiry.

GMO MORATORIUM REVIEW

Purpose of the Review

The Review of Tasmania's GMO moratorium will inform the Government's decision on the future of the moratorium by assessing market advantages or disadvantages for the State's agricultural and food industries.

The consultation being undertaken as part of the Review provides an opportunity for stakeholders to have their say regarding the benefits and costs of the moratorium on market access and trade.

Scope of the Review

The Review will examine the impacts on production, marketing, trade and investment of extending or amending the moratorium, or allowing it to expire.

The Review will consider information from Tasmanian businesses and industry, market and trade data, the experience in other jurisdictions, and other relevant evidence to inform the analysis. It will also examine whether there have been gene technology developments that may warrant a reconsideration of the moratorium now or in the future.

The Review will draw on public submissions, consultation with key stakeholders, and a market analysis of Tasmania's key domestic and international trading partners commissioned by the Department of State Growth.

The implications of GMOs for human health and safety or the environment are out of scope and regulated nationally through the Gene Technology Scheme. Similarly, food produced using gene technology and the labelling of genetically modified foods are regulated nationally through the Australia New Zealand Food Standards Code and are outside the scope of this review.

Terms of Reference

The Minister for Primary Industries and Water announced the Terms of Reference for the Review on 13 December 2018. The Review will consider:

- a. The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors;
- b. Domestic and international gene technology policy relevant to primary industries;
- c. Research and development relevant to the use of gene technology in primary industries;
- d. Any other relevant matters raised during the review.

Issues

The Terms of Reference are discussed in order below to inform consultation on the GMO Moratorium Review.

a. The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors

Tasmania's GMO moratorium has been maintained on the basis that it differentiates Tasmanian agricultural and food products in the marketplace.

Three previous reviews of the moratorium conducted in 2003, 2007 and 2013, and three consecutive GMO Annual Environmental Scans conducted in 2015, 2016 and 2017 in compliance with the Tasmanian Gene Technology Policy found no compelling reason to lift the moratorium. However, gene technology is advancing rapidly. A new generation of techniques, including gene editing, is enabling more precise and efficient genetic modification of plants, animals and microorganisms. Furthermore, field trials of several new GM crop and pasture varieties with relevance to Tasmanian agriculture, including GM perennial ryegrass, wheat, barley and canola, are in progress interstate.

Since the last review of Tasmania's moratorium in 2013¹, several reviews have observed difficulties with quantifying the marketing advantages of state and territory moratoria. Most recently, the Third Review of the National Gene Technology Scheme, which concluded in 2018 (See Box 3), noted contrasting views regarding GMO moratoria. It recommended that states and territories give ongoing consideration to the economic effects, value and scope of moratoria, highlighting that moratoria legislation is the responsibility of the individual jurisdictions not the national scheme. This followed the Productivity Commission's Inquiry Report: *Regulation of Australian Agriculture (2017)*² and the House of Representatives Standing Committee on Agriculture and Industry's *Smart Farming – Inquiry into Agricultural Innovation Report (2016)*³, both of which identified the removal of state and territory moratoria on genetically modified crops as an issue to be given Government consideration.

¹ The Final Report of the 2013 Review of the moratorium on genetically modified organisms (GMOs) in Tasmania is contained in Attachment 4 or available on the Department's website at <https://dpiwwe.tas.gov.au/agriculture/2018-review-of-tasmanias-gmo-moratorium>

² Productivity Commission. (2016). *Regulation of Agriculture*. Retrieved 29 January, 2018.

³ House of Representatives Standing Committee on Agriculture and Industry. (2016). *Smart farming – inquiry into agricultural innovation*. Retrieved 29 January, 2019.

Acknowledging these issues, the Government is undertaking research and consultation to understand the economic costs and benefits of maintaining, modifying or ending the moratorium. This will include consideration of on-farm impacts, manufacturing and supply chain costs. The Government particularly wants to hear from producers, retailers, wholesalers and exporters on matters, including:

Questions:

1. What products do you sell in domestic or international markets as 'Tasmanian' and/or 'GMO-free'?
2. What market opportunities have you gained or lost as a result of Tasmania's GMO moratorium?
3. If Tasmania's GMO moratorium was to expire what would be the impact on your business?
4. If genetically modified crops were grown commercially in Tasmania would this impact on your business and markets? If so, in what way?
5. Can you provide evidence of the financial benefits or costs to your business as a result of the current moratorium? For example: effects on yield, price premiums or input costs.

b. Domestic and international gene technology policy relevant to primary industries

A variety of policy and regulatory approaches are adopted by our key trading partners to manage gene technology and GMOs. This is important for Tasmania as around three quarters of the State's food and beverage production by value is sold interstate or overseas.

In 2016-17, Tasmania's net interstate food sales were worth \$2.44 billion and international food exports were worth \$0.60 billion. Japan, China and the USA continue to be Tasmania's largest food export markets.⁴

South-East Asia also presents opportunities for Tasmanian producers and processors to expand markets due to rising income and demographic changes.

As part of this Review the Department of State Growth has commissioned an analysis of key interstate and overseas markets for Tasmanian agricultural and food products to inform the review. The analysis will assess the level of awareness in these markets of Tasmania's moratorium, the importance placed on Tasmania's GMO-free brand attribute relative to other attributes, and any impact of amending the moratorium on the purchasing behaviour of customers and consumers in these markets.

The Review will also consider the experience in other Australian and international jurisdictions to see what Tasmania could adopt or learn from, including systems for genetically modified and conventional crops to co-exist, supply chain management and liability from cross-contamination.

Question:

1. Are there any examples of innovative GMO policy and regulation from other jurisdictions that Tasmania could adopt or learn from?

⁴ Tasmanian Agri-Food ScoreCard 2016-17,

<https://dpiwwe.tas.gov.au/agriculture/facts-figures/industry-scorecards>

c. Research and development relevant to the use of gene technology in primary industries

Gene technology is quickly evolving and the Government is interested in understanding the potential of new GMOs for commercial adoption by the Tasmanian primary industries sector. The Government is also keen to look at what research and development opportunities have been lost or gained as a result of the GMO moratorium.

Box 2: Commercial release of GMOs

The only genetically modified (GM) field crops grown in Australia are canola, cotton and safflower, of which only canola is suitable for commercial cultivation in Tasmania. In addition to field crops, GM carnations have also been approved for growing or importing into Australia.

In mainland Australia a number of experimental field trials are underway or subject to post harvest monitoring involving GM banana, barley, canola, cotton, Indian mustard, perennial ryegrass, sorghum, sugarcane and wheat. Past trials have involved GM rice, clover, maize, poppy, papaya, pineapple and grapevines.⁵

In the late 1990s and early 2000, GM canola was grown on 57 field trial sites around Tasmania. Since the commencement of the State's GMO moratorium, these sites have been managed under permit to eliminate any GM canola seedlings that germinate on the trial sites.

No genetically modified animals have been approved for commercial release in Australia.

Questions:

1. Are there new GMOs that would provide positive benefits to your business or the State as whole? What are they and what would the benefits be?
2. What impact has the moratorium had on the research and development in Tasmania? If possible please provide examples.

d. Any other relevant matters raised during the review

The Government acknowledges the broad and complex nature of gene technology regulation and is keen to consider any other information relevant to Tasmania's GMO moratorium, noting that the Review will not consider issues relevant to human, health and safety, the environment or the regulation of GM food, including labelling.

A summary of the questions posed in this paper is contained in Attachment I.

Box 3: Other recent national and state gene technology reviews

Scheme Review

- The Third Review of the National Gene Technology Scheme (Scheme Review) was initiated by the Legislative and Governance Forum on Gene Technology (the Forum), which comprises of one Commonwealth, state and territory Minister with responsibility for gene technology from each jurisdiction.

⁵ A map of GM crop field trial sites is available at <http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/map>

- The Review examined the Scheme in depth to ensure that it continues to deliver on the objective of the Commonwealth *Gene Technology Act 2000* in an environment of rapid technological change.
- On 11 October 2018, Forum Ministers endorsed the 27 recommendations of the Review and a five-year Action Plan to implement the recommendations.
- The Review found that the Scheme is generally working well. Most recommendations are aimed at fine-tuning and “future-proofing” the Scheme with respect to rapidly advancing gene technologies.
- Further Information can be found at www.health.gov.au (Home > For Health Professionals > Gene Technology).

Technical Review

- In 2016 the independent Gene Technology Regulator initiated the Technical Review of the *Gene Technology Regulations 2001* to provide clarity about whether organisms developed using a range of new technologies are subject to regulation as GMOs, and ensure that new technologies are regulated in a manner commensurate with the risks they pose.
- The Regulator’s recommendations include a proposal not to regulate a gene-editing technique known as SDN-1.
- The proposal has significant implications for Tasmania because the State’s moratorium would not apply to plants, animals or microorganism developed using the technique. They could be grown or produced anywhere in Australia and are likely to be untraceable, potentially creating a risk to markets that depend on Tasmania’s GMO-free brand attribute.
- The implications of the proposal for markets for Tasmanian food products are of particular concern because the agriculture, forestry and fisheries sector is proportionately very important to the Tasmanian economy. In 2017-18 the sector contributed 9.0% of Gross State Product (GSP), compared to 2.8% of Australia’s Gross Domestic Product.
- Forum Ministers are yet to make a decision on the Regulator’s recommended amendments. Through this process the Tasmanian Government has continued to advocate on behalf of Tasmanian industry, reinforcing the importance of our moratorium to the Tasmanian Brand.
- Further information can be found at www.ogtr.gov.au (Home > About the OGTR > Regulations Review).

Food Standard

- Food Standards Australia New Zealand (FSANZ) is reviewing Food Standard 1.5.2 of the Australia New Zealand Food Standard Code, *Food produced using gene technology*.
- The Review is considering the definitions of ‘gene technology’ and ‘food produced using gene technology’ in the Code, and whether the food products of certain new gene technologies require pre-assessment for safety before they can be sold as food or used as ingredients in food.
- The FSANZ Review is independent of the Scheme Review and Technical Review but is considering the alignment between the Code and the Gene Technology Scheme.
- The final report on the FSANZ Review is due to be released in 2019.

- The outcomes of the Technical Review could have implications for the FSANZ Review.
- Further information can be found at www.foodstandards.gov.au (Home > Consumer > Genetically modified foods).

South Australia's moratorium

- The South Australian Government appointed Emeritus Professor Kym Anderson AC to conduct an independent review of South Australia's moratorium on the cultivation of GM food crops.
- On 1 August 2018 the State's Legislative Council appointed a Select Committee to conduct its own inquiry into the moratorium.
- Further information on the independent review can be found at www.pirsa.gov.au (Home > Primary Industries > Genetically Modified (GM) Crops > GM Review).
- Further information on the Select Committee inquiry can be found at www.parliament.sa.gov.au (Home > Committees > Committees).

HOW TO MAKE A SUBMISSION

All submissions must be in writing and received by 5pm on Friday 26 April 2019.

Submissions can be forwarded to:

Email: GMOMoratoriumReview@dipwe.tas.gov.au

Mail: GMO Moratorium Review, GPO Box 44, Hobart Tasmania 7001

Other than indicated below, submissions will be treated as public information and will be published on our website at <https://dipwe.tas.gov.au/gmoreview>

No personal information other than an individual's name or the organisation making a submission will be published.

For further information, please contact: GMOMoratoriumReview@dipwe.tas.gov.au

ACCESSIBILITY OF SUBMISSIONS

The Government recognises that not all individuals or groups are equally placed to access and understand information. We are committed to ensuring Government information is accessible and easily understood by people with diverse communication needs.

Where possible, please consider typing your submission in plain English and providing it in a Microsoft Word or equivalent format.

The Government cannot, however, take responsibility for the accessibility of documents provided by third parties.

IMPORTANT INFORMATION TO NOTE

Your name or the name of the organisation making the submission will be published unless you request otherwise.

If you would like your submission treated as confidential, whether in whole or in part, please indicate this in writing at the time of making your submission clearly identifying the parts of your submission you want to remain confidential and the reasons why. In this case, your submission will not be published to the extent of that request but will remain subject to the *Right to Information Act 2009*.

Copyright in submissions remains with the author(s), not with the Tasmanian Government.

The Department will not publish, in whole or in part, submissions containing defamatory or offensive material, or information that could enable the identification of other individuals.

Multiple identical submissions will not carry more weight than the merits of an argument in a single submission. As such, joint applications are supported.

The Right to Information Act 2009 and confidentiality

Information provided to the Department of Primary Industries, Parks, Water and Environment and Water is subject to the *Right to Information Act 2009*. If you have indicated that you wish for all or part of your submission to be treated as confidential, this will be taken into account by the Department in determining whether or not the information is exempt from disclosure in the event that it is subject to an application for assessed disclosure under the Right to Information Act. The Department may contact you during this process.

APPENDIX F - BRAND TASMANIA PARTNERS

1. Agrarian Kitchen
2. Ashgrove Farm
3. Avoland Avocados
4. Eat Well Tasmania
5. Esturine Oyster Company
6. Fruit Growers Tasmania
7. Gourmania
8. Greenham Tasmania Pty Ltd
9. Hill Farm
10. King Island Prime Meats
11. Lubiana Wines
12. Pennicott Wilderness Journeys
13. Redbank Farm
14. Reid Fruits
15. Shene Estate and Distillery
16. Stillwater and Black Cow
17. Sullivans Cove Distillery
18. Tasmanian Honey Products
19. Tas'Mania
20. Tasmanian Seafood Industry Council
21. Tetsuya Wakuda
22. Wine Tasmania

APPENDIX G - INDUSTRY CASE STUDIES

GMO Moratorium Benefits – Case Studies

The Tasmanian GMO moratorium offers marketing advantages to a range of different industries.

Tasmanian GMO-free beef

The \$337 million Tasmanian beef industry provides several notable examples of the marketing benefits provided by the moratorium. For instance, Greenham Tasmania relies on Tasmania's GMO-free status as a key part of its marketing program. All of the company's beef production is sold as 'Tasmanian' while three quarters is also specifically marketed as 'non-GMO'.

This provenance branding has enabled Greenham Tasmania to access valuable markets in the United States worth a combined total of \$60-\$80 million per annum. These customers actively seek to purchase beef certified as non-GMO, with these products commanding a price premium. This premium flows through to Tasmanian farmers, with Greenham's 1,800 suppliers estimated to receive an additional \$125 per animal over and above conventional animal prices.

Tasmania Feedlot, which finishes around 18,000 – 20,000 Angus steers per annum destined for Japanese markets, also relies heavily on Tasmania's GMO-free status and reputation as a clean, green and safe producer of premium beef. They have noted that removal of the moratorium would make it difficult to continue to guarantee that inputs to their beef are free from GM material, which would in turn make it difficult to retain access to Japanese markets.

Access to these valuable markets, made possible by the GMO moratorium, has helped to make beef Tasmania's most valuable international food export in 2017-18, representing \$210 million out of a total food export value of \$740 million.

Tasmanian GMO-free dairy

Dairy is Tasmania's highest value agricultural industry, with a farm gate value of \$429 million. While there are a range of views concerning the GMO moratorium within the industry, submissions from the Organic Dairy Farmers of Australia co-operative and Tasmania's largest milk processor Fonterra Australia both advocated extension of the moratorium for marketing reasons.

In New Zealand, Fonterra Australia's parent company recently developed a segregated milk pool for certified non-GMO milk products, which are reportedly achieving greater market share and price premiums in some export markets. Fonterra noted that the State's GMO moratorium makes it a potential location for sourcing non-GMO milk products certified through the Non-GMO project.

A number of dairy farms within Tasmania are already transitioning to organic certification, with several processors commencing production of branded Tasmanian organic dairy milk. Extension of the GMO moratorium will help to maintain and build Tasmania's clean and green reputation and provide an environment in which these high-value industries can expand and thrive.

Tasmanian GMO-free honey

Members of the \$8 million honey industry also actively promote the GMO-free provenance of Tasmanian honey in both domestic and international markets. Countries such as New Zealand,

which is the Tasmanian industry's main competitor, also markets its honey as GMO-free, meaning that loss of the Tasmania's GMO-free status could impact Tasmania's competitiveness in honey markets.

Removal of the moratorium would permit cultivation of GM crops, exposing beekeepers to the risk that GM pollen will contaminate honey products. This would have impacts on access to markets such as Japan, the EU, and the United Arab Emirates, which would in turn threaten the profitability and security of honey production in Tasmania. This would have serious implications for pollination service provision in the State at a time when the number of hives required for pollination crops such as berries, cherries and vegetable seed crops is growing.

Tasmanian GMO-free salmon

The \$838 million salmonid industry is Tasmania's largest single agri-food industry, and the GMO moratorium presents businesses within this industry to exploit Tasmania's brand advantage. A submission from Huon Aquaculture, a major stakeholder in this industry, supported an extension of the existing moratorium, and in an open letter to its customers and wholesalers, the company emphasises that it does not use GM salmon stock or GM ingredients its feed.

Tasmanian agri-tourism

The GMO moratorium provides marketing advantages, not only to Tasmanian primary producers and agribusinesses, but also to our growing food service and tourism industries. Submissions from significant Tasmanian agri-tourism operators such as Fat Pig Farm noted the importance of the Tasmanian Brand in attracting visitors to their enterprises, and highlighted that the State's GMO-free status is essential to their business models.

Contact

AgriGrowth Tasmania

Phone: 03 6165 3225

Email: GMOMoratoriumReview@dpiwwe.tas.gov.au