Review of the moratorium on genetically modified organisms (GMOs) in Tasmania

Final Report

16 December 2013

Department of Primary Industries, Parks, Water and Environment

Tasmania
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Executive Summary

The Tasmanian Government has maintained a moratorium since 2001 on the commercial release of genetically modified organisms (GMOs) to the environment. This policy is intended to position the State in the global marketplace as a producer of food that is genuinely GMO-free. In June 2013, to allow due consideration prior to the legislation expiring in November 2014, the Department was directed by the Minister for Primary Industries and Water to conduct a review of the moratorium on GMOs in Tasmania and to provide a report by the end of the year.

The terms of reference for the Review were to report on:

1. Domestic and international gene technology policy relevant to primary industries;
2. Research and development relevant to the use of gene technology in primary industries;
3. 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; and
4. Any other relevant matters raised during the review.

The Department released a comprehensive Issues Paper to help inform public submissions. Following a six week advertised consultation period, 160 submissions were received. In addition the Project Team for the review conducted its own investigations, including engaging two consultancies to undertake market research into the perceptions of GMOs, in two key international markets for Tasmanian produce, and in the domestic Australian market.

Importantly, the Department's role was not to write or decide the State's future policy on GMOs. That is for the Government of the day to determine.

Summary of submissions: overall themes

There were divergent views on many of the issues associated with the moratorium on GMOs. Similar issues were also often raised under different terms of reference. However a number of consistent themes emerged across the four terms of reference.

Markets, marketing and branding

Many submissions focussed on the importance of being GMO-free to Tasmania's image, stating that the "clean and green" attribute is critical to the State's brand, without which both markets and individual businesses would be damaged and future opportunities lost. Point of difference was a recurring theme: that is, removing the moratorium and allowing GMOs would mean Tasmania loses a significant point of difference in current and potential future markets for our produce.

Other submissions took the alternative view that GMO-free market benefits are not proven and that some sectors are unfairly wearing the costs of the moratorium, from lost opportunity, and these costs outweigh any potential GMO-free marketing benefits.

Some agricultural sectors strongly support the option of GM technology to maintain industry competitiveness, because new GM crops and pastures are in the pipeline. Some other Tasmanian industries – like beef, fruit, honey, organics and food tourism – argue that they rely on Tasmania's GMO-free status as a key component of their marketing and branding and for market access generally.

There is also a perception that the State has not taken full advantage from the moratorium in terms of GMO-free market development, including comments that the Tasmanian Government has not put enough resources into marketing strategies.

Research and development

Some submissions stated that the moratorium creates uncertainty for research and development (R&D) which is limiting biotechnology advancement in Tasmanian agriculture. The absence of a clear path to market for GM-related research is said to create uncertainty and to have reduced private and public sector capital investment in R&D in Tasmania. Other submissions noted that there should be more investment in non-GM R&D.

The moratorium

Many submissions stated that allowing GMOs is irreversible, costly, and would have negative consequences for Tasmania's brand, marketing and markets, as well as for the environment or consumer health.

Some advocated keeping the moratorium for long enough to allow GMO-free markets to develop and realise the benefits of being GMO-free. Others argued to retain it for as long as required to allow GM R&D to develop in other jurisdictions and at other people's risk, so that Tasmania can observe and weigh up any opportunities.

Others argued that the moratorium should be lifted immediately to provide a positive statement and social licence for industry to have the option of using gene technology.

Co-existence

Co-existence was a significant theme, with many submissions stating that it is simply not possible for GMOs to be present in the State without negative consequences for non-GMO (including organic) producers. Other submissions asserted that co-existence of GMO and non-GMO crops and supply chains is possible, is already occurring in mainland States and can be managed safely.

Some submissions asserted that GMOs are a proven and safe technology, are essential to "feed the world", have benefits for on-farm crop production and reduce environmental impacts (for example, through reduced chemical usage). These same submissions emphasised that the production of GMOs in other jurisdictions has had no negative effect on their supply chains or trade, and that Tasmanian growers are disadvantaged by the moratorium through losing market share.

Conversely, other submissions were sceptical about the yield benefits and environmental claims associated with GMO crops and expressed concern about intellectual property rights over seeds and corporate control over food chains.

Summary of the findings

The issues associated with the use of gene technology in primary industries are varied and complex. This review necessarily focussed on major questions 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 dealings with GMOs, States can only regulate dealings with GMOs for marketing purposes.

It is 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, beyond possibly small discrete markets it is not possible to provide a definitive answer either way. Future policy responses need to take this uncertainty into account.

In relation to co-existence, a fundamental and practical issue at this time is whether Tasmania could continue to market itself as GMO-free under the banner of a moratorium, while also potentially allowing dealings with selected non-food GMO crops in a manner that does not cause economic harm to the Tasmanian brand or markets for our products.

Accordingly, findings are made on six key issues that are most relevant to determining the future policy position on the GMO moratorium at this time:

1) Market advantages and disadvantages

There is no collective viewpoint across industry sectors as to whether there is an imperative to change the current policy position on the GMO moratorium from a marketing perspective. If the aim is to quantify the benefits and costs of the moratorium, the answer is inconclusive. It depends on the view of each discrete market or product offering as to whether there is a benefit or cost.

Some industry sectors such as beef, honey, fruit, organics, food tourism and wine all perceive negative market impacts or challenges if the current policy were to be altered. On the other hand, dairy and poppy growers perceive negative impacts if the current policy does not change. Only a small proportion of the State's food and agricultural output is currently marketed as Tasmanian and within that only a small number of producers are using the specific attribute of GMO-free as part of their branding and marketing.

The Tasmanian place-based brand is built upon a range of attributes including premium quality, clean and green, cool climate and biosecurity. The ability to grow food and other agricultural products in a GMO-free environment is not a core attribute to the brand, but supports the overall food brand position.

Freedom from GMOs is one of a range of second-tier attributes consumers consider when purchasing, but they rank it behind better known ethical attributes such as Australian grown and organic. The market research conducted specifically for this Review points out that Tasmania's markets for food and beverage products are on the whole ambivalent about the State's GMO-free status. Within the two Asian markets considered, there is not a high level of recognition or understanding by consumers about GM foods. The underlying perception of GM foods in these markets is that they are not good for human health, but consumers are not prepared to pay a price premium for GMO-free.

GMO-freedom may, however, serve as a hedge against potential future shifts in consumer sentiment and buying behaviour. The heightened interest and marketing effort around food provenance indicates there is a level of opportunity cost in removing the Tasmanian GMO-free status.

To develop GMO-free markets (and potential price premiums) in future, Tasmania will need to continue to build a better understanding of consumer preferences and behaviour in relation to GM foods generally. In addition, any strategy to promote the moratorium would require a far greater understanding of the supply chain dynamics, and support from the gate keepers (retail and wholesale markets), to ensure that optimal brand advantage is captured.

2) Monitoring future developments in gene technology

Irrespective of the policy position taken on the moratorium, a formal mechanism is required for monitoring future developments in gene technology that involves Government, industry and other stakeholders. With the likely increase in either 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 the technology.

Of the current commercially approved GM crops in Australia, only GM canola is suited to Tasmanian conditions. GM pharmaceutical poppies, GM wheat and GM pasture cultivars are the most likely gene technology applications that the State Government may need to consider for commercial release in 2015-2020. Other crops, such as GM canola with high omega-3 oil for use in animal feeds, could also potentially be available for use before 2018. Any potential release of GM crops is first dependent on the outcome of research results and Commonwealth regulatory approval processes.

3) The Tasmanian GMO regulatory framework

States can regulate GMOs for marketing purposes. The *Genetically Modified Organisms Control Act 2004* ("the Tasmanian Act") that provides for the moratorium in Tasmania operates concurrently with the Commonwealth *Gene Technology Act 2000* and *Gene Technology (Tasmania) Act 2012*.

The Tasmanian Government, in considering the future policy on GMOs, may want to reinforce its support for agricultural R&D and address concerns that the moratorium is costing Tasmania through discouraging biotechnology research, by clarifying the position on tightly controlled GM trials and contained research.

4) Legal definitions and emerging technologies

Gene technology is evolving rapidly. An issue raised in submissions was whether the definitions of GMO and gene technology generally, were properly understood. This prompted a further question of whether the legal definition of what constitutes a GMO can keep pace with emerging technologies. Upon review, it is considered that the national regulatory regime for gene technology contains adequate definitions and mechanisms to incorporate new organisms and technologies. This is also a matter for the Office of the Gene Technology Regulator (OGTR) to monitor.

5) The form of the moratorium

Unless the Act is amended, the current moratorium on GMOs in Tasmania will automatically expire on 16 November 2014. Therefore, the first decision-point is whether to lift or maintain the moratorium.

Lifting the moratorium (or otherwise letting the moratorium lapse) would effectively create "open co-existence" under the national regulatory regime, with a "market choice" model of industry self-regulation.

If a decision is made to extend the moratorium the three options the form of the moratorium could take include:

1. Maintaining the status quo where the whole of Tasmania is declared GMO-free with the potential to permit GMOs on a case-by-case basis;
2. A blanket moratorium on GMOs which winds-back the ability to apply for a permit to deal with GMOs in Tasmania. Under this option, issues to consider would include the approach taken to R&D

into GMOs, and the need to recognise pre-existing permits and management arrangements of historical canola trial sites; or

3. Amending the current approach to one of "co-existence by regulation", with clearer exemptions for specific non-food crops and Government controls on how such crops are grown and managed via mandatory standards and protocols.

Irrespective of what form a moratorium takes, any policy other than a blanket moratorium means that at some point Tasmania will likely confront a "watershed" event with the first commercial release of a GMO crop, either a food or non-food crop. This could mean that Tasmania can no longer market itself as GMO-free. If this occurs, it also then becomes a question of managing for the co-existence of GM and non-GM crops.

6) Managing co-existence of GM and non-GM crops

Government would need to engage intensively with industry and other stakeholders, prior to any decisions being made on the commercial release of any GM crop, to develop an appropriate co-existence framework.

Management of co-existence between GM and non-GM crops raises issues at two levels. The first is practical: the segregation of GM from non-GM crops to manage the risk of contamination. The other is market based: whether GM and non-GM products can co-exist in the marketplace without causing harm to particular products, markets or the Tasmanian brand as a whole.

Co-existence already occurs across non-GM production systems in Tasmania, including between organic and conventional producers, but it would be complicated by the introduction of a GM crop. Managing co-existence would seem more straightforward should an absolute position be taken on the moratorium – that is, either to have a blanket ban on GMOs or to lift the moratorium. However, pharmaceutical poppies are already highly regulated and, as a non-food crop, GM poppy varieties are possibly more suited to managing for co-existence than other likely examples of GMOs relevant to Tasmania. But the risk of contamination cannot be eliminated entirely. Options for managing for co-existence include either regulatory standards or industry certification schemes.

If a specific GM crop was permitted for commercial release, a co-existence framework would also need to include marketing strategies to maintain the values (non-GM markets, future opportunities and Tasmanian brand position) that the moratorium is currently designed to protect. An issue that will also require further consideration is who pays the additional costs associated with managing for co-existence.

Regardless of the policy on the moratorium, it will become increasingly difficult for Tasmania to sustain a zero tolerance position on thresholds for adventitious (unintended) presence and low level presence of GMOs, as more GMOs are commercialised and produced interstate. This issue of acceptable thresholds therefore also warrants further consideration by Government with industry and stakeholders.

Contents

ACKNOWLEDGEMENT

DPIPWE acknowledges the assistance of the Department of Economic Development, Tourism and the Arts (DEDTA) in preparing this Final Report.

Introduction

BACKGROUND

Genetically Modified Organisms (GMOs) are organisms that have been modified by using gene technology to produce certain desirable characteristics. Gene technology involves the modification of organisms by the direct incorporation (or deletion) of one or more genes to introduce or alter characteristics of organisms (Australian Government, 2001).[1]

Due to concerns over the potential impacts on markets from the introduction of GMOs into the Tasmanian environment, the Tasmanian Government has adopted a cautious approach towards GMOs. A moratorium on the commercial release of GMOs into the Tasmanian environment has been in place since the year 2001. Importantly, under Commonwealth laws, States and Territories can only regulate dealings with GMOs for marketing purposes. The national scheme for regulating dealings with GMOs, in which Tasmania participates, is responsible for assessing the environmental and human health risks, and regulating the use of gene technology in Australia.[2]

Prior to the release of this Report, GMOs in Tasmania have been the subject of public consultation in 2000, two departmental reviews (in 2000 and 2003), two Tasmanian Parliamentary Joint Select Committees (in 2001 and 2007) and two regulatory impact analyses on the legislation that underpins the moratorium, the *Genetically Modified Organism Control Act 2004* (Tas) (the Act). These measures are in addition to numerous Australian Government consultations and reviews.

The current *Policy Statement: Gene Technology and Tasmanian Primary Industries 2009-2014* committed the Government to commencing a review by November 2013 by a process determined by the Government of the day. The Act, and hence the moratorium, automatically expires on 16 November 2014. On 25 June 2013 the Minister for Primary Industries and Water directed the Department of Primary Industries, Parks, Water and Environment (the Department) to undertake a review of the moratorium on GMOs in Tasmania and to provide him with a report on that review by the end of 2013.

This Report contains the results of the Review and presents six findings. The findings of the review will help inform future Government policy on the moratorium.

TERMS OF REFERENCE

The Minister for Primary Industries and Water requested the Department to report against the following terms of reference (ToR):

1. Domestic and international gene technology policy relevant to primary industries;
2. Research and development relevant to the use of gene technology in primary industries;
3. 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; and

[1] For further information on definitions and terminology associate with biotechnology and gene technology refer to the background section in the Issues Paper for this Review at Appendix 2.
[2] The Issues Paper for this review also provides a comprehensive outline of the Commonwealth and State regulatory framework for GMOs.

4. Any other relevant matters raised during the review.

REVIEW GOVERNANCE ARRANGEMENTS

Reporting directly to the Secretary of the Department a Steering Committee provided oversight of the review. The Steering Committee comprised:

- Deputy Secretary, Agriculture, Corporate and Heritage, DPIPWE;
- General Manager, Biosecurity and Product Integrity, DPIPWE;
- Director Policy, DPIPWE;
- General Manager, Sector and Trade Development, DEDTA; and the
- Assistant General Manager, Food and Agribusiness Sectors, Sector and Trade Development, DEDTA.

The review was undertaken by a Project Team that reported to the Steering Committee. The Project Team comprised senior officers from the DPIPWE Policy Division and Biosecurity and Product Integrity Division, and from the DEDTA Food and Agribusiness Sectors, Sector and Trade Development Division.

PUBLIC SUBMISSION PROCESS

The Department produced a comprehensive Issues Paper and an online form to assist in the preparation of submissions. The Issues Paper for this Review is appended to this Report (Appendix 2). At the time of publishing the Issues Paper, on 31 August 2013, the Department called for public submissions in advertisements placed in the three Tasmanian daily newspapers. On Friday 6 September the Department also advertised the call for public submissions in *Tasmanian Country*. Further information, including questions and answers and background information on the Review, was also placed on the website: http://www.dpipwe.tas.gov.au. Two weeks prior to the closing date for public submissions there were further advertisements placed in the Tasmanian daily newspapers and *Tasmanian Country*. Submissions closed at 5pm, Friday 11 October 2013 following a six-week consultation period.

The Issues Paper, on-line form and the website all alerted those providing submissions that their submissions would be treated as public documents unless they indicated otherwise. Submissions could be provided in writing, via the on-line form, or by e-mail to the following purpose-built address for the review: gmo.review@dpipwe.tas.gov.au.

In total 160 submissions were received. Of these submissions, five were identically-worded letters and two were the same submission but received separately from the Federal and State organisations of the same political party. One other submission was on behalf of 169 signatories.

All submissions are published on-line via the Department's website www.dpipwe.tas.gov.au except for those submissions where a request in writing was received to keep them confidential, either in whole or in part. A list of submissions is provided in Appendix 1.

Outside the formal submissions process, four petitions supporting the moratorium were received by the Government, including from Senator the Hon Lin Thorp on behalf of the "supporters of an ongoing GMO moratorium", the Tasmanian Industries for GMO-free, Gene Ethics on behalf of "local electors", and from "the residents of Tasmania".

The Department and the Project Team would like to sincerely thank and acknowledge all those who took the time to provide submissions to this review.

Summary of Submissions

OBSERVATIONS

The following section sets out the context in which the summary of submissions should be considered.

The Review provided the opportunity for many members of the public and organisations to provide their views. This in itself is an important outcome.

The Issues Paper included a series of questions, under each Term of Reference, on which the Project Team were particularly seeking new evidence. Unless submitters used the on-line response form, in most cases the submissions did not address the specific questions in the Issues Paper, or if they did, not all of the questions.

The majority of submissions provided perceptions or were based on assertions. Very few verifiable facts (or objective evidence) were provided to support statements in submissions.

The following table provides a summary of the spread of submissions across stakeholder groups. While some submitters may fall into more than one stakeholder group, they have been assigned as best fits. The stakeholder groupings in no way infer a particular position on the moratorium.

Stakeholder Group	No. submissions
Member of the public (and small business)	85
Conventional and organic farmers, producers and suppliers (incl. wineries, and commercial beekeeping businesses)	31
Food tourism, including restaurateurs	7
Agri-business, including companies and environmental consultants	9
Industry representative bodies	13
Government / regulators	1
Non-government organisations (NGOs) and community groups	8
Political	3
Research organisations	3
Total	160

On the question of whether having a moratorium is appropriate for Tasmania, 145 submissions supported a continued moratorium, 11 were against and four were neutral towards the moratorium.

There was a wide diversity of views on the question of an appropriate length of the moratorium ranging from that it should be lifted completely or allowed to expire in November 2014, through to that it should be retained permanently. Seventy-three submissions responded to the question: if a decision was made to extend the moratorium what would be an appropriate length of time for the new moratorium? The distribution of the responses is as follows:

Length of time	No.
Indefinite	21
20 plus years	5
10 to 20 years	9
10 years	12
5 to 10 years	10
5 years	12
Less than 5 years	4

It is not possible to represent all the comments made in submissions in this summary Report. In the following section the Department's intent is to present a fair representation of "what the submissions said". A comment or response is only provided where necessary to address a particular issue raised or to correct any substantial factual misconceptions.

TOR 1) DOMESTIC AND INTERNATIONAL GENE TECHNOLOGY POLICY RELEVANT TO PRIMARY INDUSTRIES

Fewer than half of all submissions received responded directly to TOR 1. Of those that did, some submissions simply listed countries with bans on GMOs while others referred to specific countries or regions as examples of innovative gene technology policy.

Most countries with bans on GMOs listed were from the European Union (Submission 10 being a typical example). Some also referred to regions within different countries declared to be GMO-free. Paul Watson provided a number of examples such as some states in the USA banning different types of GMOs as well as parts of Austria pushing for GMO-free zones.[3]

A number of submissions referred to Tasmania's moratorium on GMOs in primary industries as the best policy on GMOs while some also listed South Australia's moratorium and legislation as innovative gene technology policy.

Bhutan as a nation has committed to 100 per cent organic farming and was referred to by a few submissions as good gene technology policy. Nathan Sidney[4] stated: "Bhutan demonstrates that traditional food production methods are still a legitimate way to produce food, care for soils and preserve bio-diversity."

A few submissions referred to GMO policy in Ireland and drew similarities to Tasmania in terms of market access. Organic farmer Joshua Morris[5] asserted that like Tasmania, Ireland's market access relies on niche products rather than broad acre crops and that being a GMO-free island has gained Ireland a market advantage. Conversely, David Armstrong[6] suggested that Ireland, having previously planted experimental GM crops, is a good example of innovative policy based on reviewing GMO status on a case-by-case basis when

[3] Submission 010
[4] Submission 053
[5] Submission 058
[6] Submission 022

gene technology opportunities arise. Mr Armstrong inferred that Ireland's use of GMOs on such a basis would not interfere with the marketing of other GMO-free products.

In favour of deregulating GMOs, a few submissions noted Victoria as an example of innovative gene technology policy. GM canola is grown throughout Victoria.

A number of submissions referred to the use of safeguard clauses within legislation utilised by some countries to prohibit GMOs if it can be shown that there is a risk to human health and the environment. The submissions[7] indicate six member countries of the European Union (EU) have invoked such clauses.

Anita Wild[8], an environmental consultant, suggested that Tasmania should base gene technology policy on a triple bottom line to cover not only market aspects but also health and environmental concerns. However, the Project Team notes that such an approach could be inconsistent with the national scheme of gene technology regulation where responsibility for considering human health and environmental risks lies with the Office of the Gene Technology Regulator (OGTR).

Aside from those submissions that provided examples of various countries or regions, some submissions made some general comments about the content of gene technology policy while some submissions asserted there to be no evidence of innovative policy for gene technology.

Support for use of the precautionary principle in developing gene technology policy was voiced in a few submissions. The Organic Coalition of Tasmania Inc (OCT) [9] stated: "There is ample evidence in scientific media and from consumer/ community documentation, to support the view that GMO policy should be based on the principle of caution …" The Environment Association Inc[10] expressed similar sentiments about taking a precautionary approach to GMOs until the long-term effect on organic certification and opportunities is determined.

Conversely, Dairy Tasmania (DairyTas)[11] and the Australian Dairy Industry Council Incorporated (ADIC)[12] argued that there is no need for Tasmania to maintain policy and regulation on GMOs over and above that already regulated by the OGTR. Both went on to say: "market and trade aspects of crops have been managed by the agriculture sector for years. This raises the question as to why should GM crops – which are now 17 years old and grown extensively around the world – be treated differently to other crops and agriculture products?"

Poppy Growers Tasmania Inc.[13] (PGT) called "for open minds, a fresh approach and an evidence-based, factual analysis to the current policy settings." PGT suggested that GM poppies could be managed and grown to co-exist with other non-GM crops under an already established strict regulatory regime. GlaxoSmithKline Australia (GSK)[14] also stated similar sentiments regarding a rigorous science-based approach and called for maximum flexibility in scientific options for improved poppy productivity.

[7] Submission 076, 107, 112 and 133
[8] Submission 076
[9] Submission 039
[10] Submission 106
[11] Submission 085
[12] Submission 111
[13] Submission 082
[14] Submission 158

Dairy Futures Cooperative Research Centre (CRC)[15] stated in their submission that the current moratorium on GMOs in Tasmania is inconsistent with a vision to improve the State's agricultural productivity. The submission suggested that GMO policy should be founded on management of low level presence of GMOs in seed and grains commodities.

Tolerance levels were advocated by a number of submissions in response to TOR 1. The Tasmanian Institute of Agriculture (TIA)[16] stated that a zero tolerance approach to GMO presence imposes an unnecessary level of stringency. However, the Tasmanian Farmers and Graziers Association (TFGA)[17], while supporting a continued moratorium on GMOs for a short time, supports the adoption of a 0.9 per cent threshold standard for GMO presence. In contrast, many submissions supported Tasmania's current policy of zero tolerance to support organic certification and ease of GMO-freedom.

Linked to tolerance levels, the matter of co-existence was mentioned by some submissions under TOR 1. These issues are explored further under TOR 3 and the findings of this Report.

AusBiotech Ltd[18] insisted Tasmania's current policy and moratorium should be removed immediately as it is inconsistent with the national scheme for gene technology regulation. However, as outlined in the Issues Paper for this Review, States can regulate GMOs for marketing purposes.

Two other issues that were raised under TOR 1 were questions of legal liability and labelling requirements for food products. Generally, there was opinion that legal liability issues are a real threat and remain largely untested. Further detail on legal liability and GMO labelling requirements is provided under TOR 4 and the findings sections of this Report.

With regard to food labelling, there were comments that the current requirements are not strict enough. Michelle Dyer[19], an organic supplier, suggested Food Standards Australia New Zealand (FSANZ) does not conduct adequate research and testing on GMO presence and relies upon results of GMO producing companies. FSANZ, in its own submission[20], stated that the statutory body regularly reviews scientific literature on GMO presence in foods and places evaluations on its website. Further, FSANZ stated that the current mandatory labelling requirements for GM content in foods were determined to be appropriate after review in 2011.

[15] Submission 045
[16] Submission 038
[17] Submission 109
[18] Submission 095
[19] Submission 075
[20] Submission 118

TOR 2) RESEARCH AND DEVELOPMENT RELEVANT TO THE USE OF GENE TECHNOLOGY IN PRIMARY INDUSTRIES

Approximately half of all submissions received responded to TOR 2. Most responses focussed primarily on the question of emerging R&D opportunities in gene technology.

Research and development opportunities in gene technology

A number of submissions asserted that there are no opportunities or no benefits to be gained in gene technology R&D for primary industries. Gene Ethics[21] stated gene technology to be a dead end and argued that public resources should not be spent on such research and development. Another submission[22] stated that gene technology opportunities in R&D would put the State's GMO-freedom at risk.

Conversely, many submissions suggested that there are, and could be further opportunities available in gene technology R&D. Some submissions made general comments on opportunities such as using gene technology to develop adaptations to climate change[23], functional foods[24] and benefits to the canola industry[25]. The TFGA[26] commented that "whilst there is currently only a small number of GM products available, research is developing rapidly and the State needs to be able to respond quickly should new opportunities in gene technology arise."

TIA[27] stated in their submission that there are many opportunities, particularly in agricultural commodity production. TIA also suggested that the organics industry could benefit from increased demand should more gene technology be utilised.

Some submissions were more specific in giving examples of opportunities in gene technology. Dairy Futures CRC[28], DairyTas[29] and PGG Wrightson Seeds Limited[30] all referred to developments in GM ryegrass and white clover with a high nutritive value and improved productivity, potentially ready for 2015–2020 commercialisations. Dairy Futures CRC stated that Tasmania could benefit from these GM crops directly as highly productive livestock feed as well as through being a major supplier of pasture seed.

Those involved in Tasmania's poppy industry referred to historical developments in gene technology for the pharmaceutical plant, and indicated that "some trials that did exist were interstate, in areas where poppy growing itself has not been supported politically"[31]. Tasmanian Alkaloids Pty Ltd[32] stated in their submission: "Our view is that the biggest opportunity that GM technology offers to the poppy industry is an increase in the alkaloid content of poppy straw and the alkaloid yield per hectare."

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[21] Submission 124
[22] Submission 028
[23] Submission 043
[24] Submission 014
[25] Submission 054
[26] Submission 109
[27] Submission 038
[28] Submission 045
[29] Submission 085
[30] Submission 094
[31] Submission 082
[32] Submission 096

Tasmanian Alkaloids previously undertook controlled trials of GM poppies in collaboration with CSIRO in Tasmania. All permits to conduct that research were surrendered in 2009. GSK[33] also referred to potential developments in disease and herbicide resistance in poppies.

Another opportunity in gene technology under development was highlighted by Skretting Australia in their submission[34]. They referred to canola plants genetically modified to synthesise long-chain omega-3 fatty acids: EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). These acids are important for human health as well as the health of farmed fish species and are currently sourced from fish oil. Skretting Australia stated that the GM canola, potentially available for commercial use by 2018, "will create another sustainable source of these important EPA and DHA nutrients for the use in fish feed, animal feed and food."

Wine Tasmania[35] referred to potential future developments in gene technology for powdery mildew resistance as well as using the technology to mark desired traits to then breed by conventional means. Forestry Tasmania[36] also suggested that there could be opportunities for wood yield improvements in plantation species, as well as for utilising previously unsuitable land for plantation forest. However, Forestry Tasmania stated no current intention of utilising GM plants in contravention of the Australian Forestry Standard and the principles of the Forest Stewardship Council.

Finally, a number of submissions were cautious of new R&D opportunities in gene technology. For example, the Environment Association Inc[37] commented: "we advocate that there be no expansion of research and development relevant to the use of gene technology in primary industries until unreserved benefits and no harmful consequences are established to a without doubt standard." Terrence Rattray[38], an organic supplier, expressed similar sentiments. OCT[39] suggested that all R&D using gene technology should be restricted to "in vitro situation" and treated as hazardous material. It was also suggested that to permit use of gene technology in R&D would be predominantly for the benefit of two major industries, poppies and dairy, and to do so would be "putting too many eggs into one basket"[40].

Research and development opportunities in non-GM biotechnology

Most submissions who responded to this question were supportive of R&D in non-GM biotechnology for primary industries. Many submissions stated a preference for non-GM conventional breeding techniques. Callum McEachern[41] gave a typical response: "Conventional selective breeding has proven itself as a robust foundation for our primary industries."

Gene Ethics[42] also stated similar sentiments: "other areas of biotechnology, such as gene-marker-assisted conventional plant breeding, appear to offer much more promise than genetic manipulation." Additionally, a number of submissions saw opportunities in organics as well as being a source of heirloom or heritage seeds.

[33] Submission 158
[34] Submission 065
[35] Submission 080
[36] Submission 057
[37] Submission 106
[38] Submission 008
[39] Submission 039
[40] For example, submission 086
[41] Submission 102
[42] Submission 124

George Vorillas[43] stated as much in his submission: "Tasmania has a valuable potential and ongoing role in being one of the locations for the safeguarding of genetic variation in food species." A few submissions also supported opportunities in permaculture but no further detail was given.

On the other hand, GSK[44] stated the following in their submission: "whilst traditional breeding techniques have been very successful in increasing poppy alkaloid concentration, the generation of hybrids with increased disease and herbicide resistance is a much slower and "hit and miss" process."

Very few specific examples of opportunities in non-GM biotechnology were given in submissions. Forestry Tasmania[45] indicated that they have used conventional breeding techniques in plantation species for decades while Fruit Growers Tasmania (FGT)[46] referred to use of non-GM biotechnology in the berry industry. The Safe Food Foundation[47] also mentioned the development of non-GM drought tolerant canola in Victoria.

While very few specific examples were supplied, it can be assumed that a number of agricultural industries have used non-GM biotechnology methods in R&D.

Impact of the moratorium on research and development of new products or markets

A number of submissions asserted there to have been no impact on R&D of new products and markets due to the moratorium but provided no evidence to support that assertion. However, Essential Oils of Tasmania Pty Ltd stated in their submission: "Essential Oils of Tasmania (EOT) has not experienced any restrictions with regard to R&D of new products or markets as a result of the GMO moratorium."

Dairy Futures CRC[48] and DairyTas[49] observed that "the moratorium has had no impact on early stages of research and development, but clearly reduces the efficiency and cost-effectiveness of the latter stages of research and development as well as commercial release."

In their submission, the ADIC[50] went a little further to say "a ban on a product (i.e. GMOs) that has been proven safe – and grown globally for 17 years – does not create an environment of innovation, when a potential 'developer' is unable to commercialise their end product."

The lack of "pathway to market" was a recurring theme across a number of submissions. Tasmanian Alkaloids[51] commented that "without a path to market, it was difficult to justify investment in a research program". Ausbiotech[52] and Croplife[53] also made very similar comments.

TIA[54] also referred to the moratorium as hindering R&D as "attempts to do research on GM plants at the University of Tasmania (UTAS) has been made difficult due to the regulatory processes imposed by both the

[43] Submission 130
[44] Submission 158
[45] Submission 057
[46] Submission 122
[47] Submission 115
[48] Submission 045
[49] Submission 085
[50] Submission 111
[51] Submission 096
[52] Submission 095
[53] Submission 089
[54] Submission 038

Commonwealth and particularly State Agencies. While there are processes that theoretically allow such work to be done, the associated transaction costs have prohibited any serious research associated with GM technologies."

TIA[55] went further: "researchers with an interest in gene technology and other forms of strongly regulated biotechnology have largely given up on this line of research, or moved elsewhere. As momentum has grown elsewhere in the world for utilising biotechnology to address substantial global problems, Tasmanian research organisations have fallen well behind this growth sector, and have likely missed the opportunity to be substantial players in this R&D area to a large extent." TIA also stated that the lack of R&D has implications for the educational opportunities UTAS can offer in biotechnology. The Project Team sought and received further information from TIA about the claims made in their submission. Further comment on the regulatory environment for GM R&D is provided in the findings section of this Report.

A few submissions[56] stated that there was a gap in understanding as to how the moratorium has affected R&D in Tasmania for new products and markets. Hence this question demanded an independent study be undertaken to further quantify the impacts on R&D.

Other risks to R&D opportunities in primary industries

A number of submissions made some observations regarding other risks to R&D in Tasmania, particularly using gene technology. TIA[57] referred to "researchers in other parts of Australia having to deal with legal challenges to research trials as well as personal harassment and destruction of trial sites."

PGT[58] referred to "a need for social licence to conduct R&D". In the case of GMOs, they stated that "the moratorium does not support a movement towards social licence." GSK[59] made similar observations, stating that "though they understand the benefits of gene technology, they also have a deep commitment to corporate, social and ethical responsibility."

Finally, some submissions referred to R&D in gene technology as being entirely profit-driven by large multinational companies.

[55] ibid
[56] Submissions 107, 112, 133
[57] Submission 038
[58] Submission 082
[59] Submission 158

TOR 3) MARKET ADVANTAGES AND DISADVANTAGES

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.

GMO-free as a point of difference or market advantage

Many submissions reflected the view that GMO-free is part of Tasmania's clean and green image and/or branding. Many submissions then argued that if Tasmania can guarantee a clean and green environment it will mean that Tasmanian products will become increasingly more valuable in the market, with an increasing demand for our products and premium prices.

Mark Burling[60], a farmer, noted that there was a need to "keep our image clean and green and GM-free and chase the high premium international markets. These opportunities will only increase over time and we may never be able to access the GM-free opportunities (as) once allowed, GM cannot be removed." R & N Hyland[61], organic producers, noted that "market opportunities have not been lost as a result of the moratorium, but removing the moratorium would impact on any potential new markets on non-GM. We are at no competitive disadvantage whatsoever because of our GM-free status." Eatem Organic Foods[62] was typical of many other submissions from the organic industry who said that their "business is heavily reliant on the Tasmanian clean and green image and that the Tasmanian brand would be damaged if GMOs were permitted in the State."

Some submissions explored the concept of Tasmania's clean and green branding in more detail, with many noting how being GMO-free is a key brand attribute. R & N Nyland[63] provided a typical response: "the Tasmanian brand or "clean and green" image would be diluted should the moratorium expire or if non-food GM crops were to be permitted to be grown commercially."

The main messages from the Brand Tasmania Council[64], representing a range of local businesses, was that the moratorium provides a valuable point of differentiation, a unique marketing advantage, or a competitive advantage, and that allowing GM crops in Tasmania would variously compromise, damage or undermine the Tasmanian brand.

Wine Tasmania[65] stated that "once GMOs are introduced there is no returning to the pre-GMO situation from a biosecurity and brand perception view. It will impact on the image of the Tasmanian brand with consumers, particularly for high value luxury goods such as wine." Wine Tasmania[66] also commented on the perception of GMOs among consumers noting that although consumers are generally ignorant or indifferent towards GMOs, high value Tasmanian branded products "come with a 'clean and green' image that is not consistent with GMOs in the public view at this point in time."

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[60] Submission 004
[61] Submission 009
[62] Submission 063
[63] Submission 009
[64] Submission 067
[65] Submission 080
[66] ibid

The submission from FGT[67] conceded that the impact of the moratorium is difficult to assess as the GMO-free status is blended under Brand Tasmania, rather than being a direct marketing point on its own: "it is Brand Tasmania which is promoted at Asian trade shows, such as the recent Asia Fruit Logistica where there was strong interest in Tasmanian fruit, especially cherries."

With biosecurity being a variation on the concept of clean and green, FGT[68] also noted that "the number one priority for fruit growers will always be for Tasmania to remain an area of regional bio-security differentiation. Considerable effort has gone into developing (new Asian) markets over many years giving Tasmania access to international markets unable to be accessed by mainland States due to regional bio-security issues – lifting the moratorium could damage these markets."

Demonstrating the different views across agricultural industry sectors, some submissions countered the clean and green branding concept. For example PGT[69] observed that "a realistic appraisal of the Tasmanian situation is that we are not unique in making claims about 'clean and green' and the brand of a place can exist regardless of the presence of GM in local markets", citing Prince Edward Island, Canada as an example.

Submissions from industry groups and agribusiness, like PGG Wrightsons Seeds[70], referred to the issues raised in the Macquarie Franklin Report (2012a) and noted that of 28 stakeholders, GMO-freedom was not used as a point of difference in marketing. Ausbiotech[71] noted that "the moratorium significantly restricts market share to Tasmanian growers ... and that there is no evidence that GM-free provides the State any market advantage." The ADIC[72] went even further: "the moratorium is anathema because it effectively represents Government interference in the legitimate marketing activities of lawful business. Further it detracts from the ability of companies to differentiate and meet the needs and requirements of different market segments – a prerogative and essential element of sustainable businesses and artificially blocks market signals that enable both companies and dairy farmers responding to market signals which are essential for their on-going viability."

Another take on clean and green was provided by Toehold Farm[73] suggesting that "being clean and green is no longer a point of difference for Tasmania, but the Tasmanian brand could be enhanced due to the moratorium as an additional value". The same submission[74] concluded that "removal of the moratorium would damage the Tasmanian brand as it shows a willingness to compromise the clean and green status of the State."

This view was backed up by Slow Food Hobart[75] who said that "many countries now promote their primary products as 'clean & green'. The phrase has lost the meaning it once had. To have any substance it now needs to be backed up by hard evidence such as non-GM status and greater marketing efforts to support GM status, including tourism."

[67] Submission 122
[68] ibid
[69] Submission 082
[70] Submission 094
[71] Submission 094
[72] Submission 111
[73] Submission 105
[74] ibid
[75] Submission 093

Moving beyond clean and green branding to the notion of "quality products" being the preferred marketing distinction, Dr Tony McCall[76] noted that "the GMO moratorium supports differentiation of Tasmanian products which can be supported with branding backed by quality certification." Dr McCall[77] was one of only a few submissions that linked branding and marketing to consumer perceptions: "when food is concerned consumers are risk averse and their values put GMOs at odds with quality. This is a values debate, not a rational science based argument." Tasmania cannot "re-establish the 'quality' competitive advantage once the moratorium is withdrawn and Tasmania cannot expect to establish a competitive advantage if we are required to compete in an old 20th century production contest."

Yet another take on clean and green provided in some submissions is best illustrated by the view of Croplife[78]: "there is little value in the 'clean and green' brand as is and by adopting GMOs Tasmania can maintain and improve its 'Clean and Green' status and benefit from GM crop technology" (through, for example, farmers being able to produce more using less natural resources, improved environmental outcomes with reduced herbicide use, less tractor work and increased soil carbon from reduced tillage reducing greenhouse emissions).

The Project Team notes that many submissions included information disputing the environmental benefits arising from the use of GMO crops, and this is referred to more under Terms of Reference 4.

Benefits and costs of the moratorium

Some submissions raised the question of who is benefiting from using the GMO-free status, at the expense of others who are bearing the opportunity cost of not being able to use GMO crops. David Armstrong[79] noted that "it is easier to say Tasmania is GMO-free than for specific sectors or products to promote their own status as GMO-free rather than relying on the general moratorium. This position comes at the potential expense of other industries that would benefit from the use of GMOs and does not seem a fair arrangement." The same submitter suggested that "industry sectors should develop their own protocols to promote their own status. The real stakeholders who bear the financial consequences are the farmers, processors and marketers. Their view should have priority in the decision that the Government makes."

The Tasmanian Agricultural Productivity Group (TAPG)[80] in raising the issue of costs concluded that while Tasmanian industries suffer from high freight costs (logistics issues), "the State's moratorium on GMO can be regarded as another of the input costs crippling our competitive edge."

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 they would have to market the GMO-free status themselves. For example, Fat Pig Kitchen[81] noted that "in the absence of the moratorium, the (Tasmanian) brand that we and others like us rely on would be devalued substantially. Individual farmers would have to promote their own particular brand of clean, green, organic, spray free, produce. This would be expensive and take us away from our actual jobs of producing the kind of delicious food consumers expect from Tasmania."

[76] Submission 088
[77] ibid
[78] Submission 089
[79] Submission 022
[80] Submission 061
[81] Submission 097

Rowena McDougall[82] summarised a point made by various submitters: "why allow GM crops that may only benefit a few producers but jeopardise all GM-free Tasmanian products?"

Other submissions like the TFGA[83] believe that Government should be "delivering on its earlier commitments to invest in promotional campaigns that will assist in market development." The moratorium "must be supported by significant investment by State Government in promoting the state's GMO-free status and capturing tangible benefits for farmers."

The TFGA[84] also noted that "it expects Government to undertake as a matter of urgency a costs-benefit analysis that highlights the true costs and benefits in continuation of the GMO moratorium."

The Greens Party[85] was representative of a number of submissions from across various industry and interest groups stating "there was a lack of concerted marketing effort to support and further develop the Tasmanian brand."

Valuing GMO-free in the market

Many submissions expressed the view that Tasmania cannot compete in commodity markets, and niche and premium markets can be developed where being GMO-free is a competitive advantage.

The OCT[86] stated that "Tasmanian (non-GM) canola receives a $40 per tonne premium and honey receives a 40 per cent premium over similar GMO product or GMO-contaminated product." Similar figures were provided by other submitters; for example Gene Ethics[87] quoted that non-GM canola in Europe received a $60/tonne premium.

Many organic producers submitted that allowing the release of GM crops in Tasmania presents a significant risk that they would lose their organic certification, or lose the premium prices they receive for their products, and hence cause damage to their business.

The OCT[88] reported that "the organic sector is one of the fastest growing food sectors in Europe and the United Stated and it has been growing at 15 per cent annually in Australia."

A few submissions provided statements, mostly provided commercial in confidence, about their organic produce receiving premiums in gross terms over conventional products. For example some certified organic cattle are attracting a price premium of 30 per cent above the normal cattle price at the farm gate. Producers noted that they rely on their certified organic status, the loss of which would result in the loss of such markets.

The OCT[89] stated that "allowing GM canola into Tasmania again could threaten organic certification and contracts for organic farmers".

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[82] Submission 026
[83] Submission 109
[84] ibid
[85] Submission 098
[86] Submission 039
[87] Submission 124
[88] Submission 039
[89] Submission 039

Bronzewing Botanicals[90] referred to the potential for contamination of organic produce from GM crops including loss of certification and markets, costs incurred in trying to prevent contamination occurring and the costs of testing for contamination. Similar concerns were expressed in other submissions.

The Project Team notes that some examples were provided on the price premiums received for non-GM and/or certified organic products. The Project Team does not dispute these claims; however, it notes that verifiable published research in support of these claims was difficult to obtain, and commercial in confidence considerations often applied preventing the publishing of the information from individual businesses. Based on the information received in submissions, it is also not possible to conclude if the premiums would apply consistently across the whole organic sector, or if the price premium still applies once the relative costs of production of organic and non-organic, or GM and non-GM production systems, were factored in, i.e. to produce a gross margin. This is explored in more detail in the findings section of this Report.

Tasmanian Feedlots[91] noted that while the market relies on Tasmanian production attributes such as no Hormone Growth Promotants (HGPs) or GM inputs, they cannot say what the price premium is for Tasmanian product. However they believe that if GM status changed "we would lose a competitive marketing advantage" and "our opportunities and pricing would be significantly diminished."

Greenham Tasmania Pty Ltd[92], owners of the Smithton abattoir, noted that "it is Tasmania's GMO and HGP free status that underpins our capacity to obtain a premium pricing for Tasmanian beef. These premiums flow back to nearly 1000 farmers, greatly improving their profitability." Conversely they noted that the removal of the GMO-free status would "risk seeing Tasmanian cattle prices returned to their former discount level."

The same submission[93] quoting its customers in Japan, the USA and in Sydney concluded that "Tasmania's GMO-free status is a major reason why our customers are so enthusiastic about our premium grass fed beef and why they are prepared to pay a premium for it."

Summarising the view of submissions from beef industry players, Brett Hall[94] noted that "the beef industry in Tasmania is one of the main contributors to the state's agricultural sector, has successfully developed some of the most recognised beef brands in Australia ... and one of the main benefits to the beef industry in regard to Tasmania's GMO ban has been in allowing access to markets that have restrictions on GMO content food products."

FGT[95] confirmed that "while there is very little GMO research internationally into fruit, lifting of the moratorium to allow other crops could potentially damage Tasmania's fruit export markets. Further markets have been developed in the past ten years with apples into Japan and China and cherries into China and Korea through a committed industry effort." They continued: "in the highly competitive national and international markets, Tasmanian horticulturalists have focussed on developing premium niche markets for fruit, based on the reputation of the State's bio-security positioning." FGT[96] concluded that "given that primary industry remains a key economic driver for Tasmania into the future, lifting the moratorium could significantly impact on the State's reputation as a producer of premium produce."

[90] Submission 040
[91] Submission 049
[92] Submission 105
[93] ibid
[94] Submission 103
[95] Submission 122
[96] ibid

Other submissions expressed the view that Tasmania is a commodity producer first, with some scope for niche products.

PGT[97] said that "the reality is that some 85 per cent of Tasmania's agricultural production, such as dairy, is of world-price, low value commodities with the Tasmanian cost of production the key determinant in industry survival." The Dairy Futures CRC[98] mirrored other submissions from the dairy industry: "there will always be potential to create niche markets, but for major industries (like dairy), the question relates more to the widespread use of products in the supply chain. The market impact of each GM technology should be considered on its merits, as well as the ability for producers with different attitudes to the use of GM technology to co-exist. It is unlikely that there will be any brand differentiation for technology that is in widespread use in Australia and where supply chains operate on a national basis."

Submissions, particularly in support of major Tasmanian industry sectors poppies and dairy were adamant that their industries needed access to gene technology, including positive statements of Government support for the potential use of the technology, so that they can maintain their competitive position.

Croplife[99] noted that "over the last 10 years Tasmania has lost $40 million due to its moratorium." The $40 million loss figure was raised in a number of submissions and refers to the work undertaken by Macquarie Franklin (2012a) looking into the Tasmanian canola market.

Croplife[100] also went on to say "there is no evidence of appreciable gains as a result of being GMO-free with the oft quoted Japanese canola premiums being small and sporadic. Tasmania's international export markets are minimal so there are no international market benefits to the State of a moratorium." TAPG[101] commented that "the Japanese markets that require the GM-free products are relatively small and inconsistent in its demand."

PGT,[102] in highlighting the ongoing expansion of the world market for opioids, noted that "there is no such thing as free trade in narcotics and the notion of Tasmanian farmers themselves seeking out high value markets in pharmaceuticals from poppies GM or not will never become a reality. The profitability of poppy farmers is tied completely to the cost of production, as the ability of farmers to grow poppies outside a processor contract is restricted."

Looking at the potential benefits, Tasmanian Alkaloids[103] submitted that "the main market advantage that GM technology would provide the poppy industry is more competitive pricing to our customers, brought about by increased alkaloid yield per hectare. We expect that the cost advantages would be significant. For instance, we estimate that a 40 per cent higher alkaloid content in poppy crops could be produced using GM technology, which would result in a benefit of $56 million annually across the whole Tasmanian poppy crop." Tasmanian Alkaloids[104] concluded: "even after allowing for the additional costs involved in managing GM crops, this would make our industry much more competitive on the global market, and would assist Tasmania to maintain or increase its share of the world market."

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[97] Submission 082
[98] Submission 045
[99] Submission 089
[100] ibid
[101] Submission 061
[102] Submission 082
[103] Submission 096
[104] ibid

GSK[105] provided a similar, but somewhat qualified view: "the likely near-term opportunities for the use of GM poppy lie in improving disease resistance. If deployed this will aid in continuing the industry's productivity growth, however any deployment must be made within a regulatory environment that serves to build trust with the agricultural, industrial and community stakeholders in Tasmania."

DairyTas[106] affirmed that "the Tasmanian dairy industry including farm and processing is a $1 billion industry and Tasmania's largest agricultural and food sector. The industry has a growth target for 40 per cent more milk in the next five years to meet the processing capacity of the State" and is "heavily reliant on pasture based dairy". DairyTas[107] continued: "to date the Tasmanian dairy industry has not been affected by the moratorium on GM crops. (However) the main issue for dairy in regard to the moratorium is the GM pastures that are being researched and the likelihood of these becoming a commercial reality. Tasmanian farmers do not want a situation whereby they are denied access to new varieties that their dairy counterparts in other pasture-based systems, such as Victoria, can access. Tasmania's dairy farmers need to be able to maintain a competitive advantage and implement new pasture varieties. "

Only a few submissions directly commented on the issue of labelling in a marketing-sense. As also noted under TOR 1 and 4, some submissions saw current product labelling for GMO content as being insufficient to address food safety concerns, however the national food-safety regulator, FSANZ[108] noted that the existing requirements for GM labelling were appropriate. Others highlighted consumer's need to know what is in their food suggesting Tasmania could take advantage of this in labelling more local products as GMO-free, creating a further point of difference in the market. Greenham Tasmania[109] provided some of the few examples of how GMO-free is prominent on its product labelling and critical to its beef product brands.

Food tourism

At least seven submissions represented the restaurant, food and food tourism sector. They all noted how dependent they are on the clean, green and GMO-free image being maintained.

Fat Pig Kitchen[110] was typical noting that "GMO-free is a key part of the Tasmanian proposition for supplying premium and niche products matched to fresh and clean food. In the absence of the moratorium, the (Tasmanian) brand that we and others like us rely on would be devalued substantially. Our task over the next ten years is to build our niche products and figure out ways to connect them to consumers who want them but who live far away from our farmgates. Consumers who want organic, who want pure, who want unadulterated, who want simplicity, who want to be able to trust a single brand: Tasmanian."

The Brand Tasmanian Council[111] noted links between the GM moratorium with tourism as well as the food and beverage and hospitality industries as people are now travelling to eat and "want natural, fresh and local", and being GMO-free supports this.

Conversely, PGT[112] remarked that "the promotion of the GMO ban by its supporters depends so heavily on the 'intangible' yet in the real world the issue of 'are there GM crops in Tasmania' is unlikely to be

[105] Submission 158
[106] Submission 085
[107] ibid
[108] Submission 118
[109] Submission 105
[110] Submission 097
[111] Submission 067

considered by any person connected with the tourism, manufacturing or education markets that Tasmania plays host to."

Co-existence of GM and non-GM

Numerous submissions stated that it is not possible for GM and non-GM crops to co-exist. The issue of contamination of non-GM producers, products or crops from GMO canola, poppies and ryegrasses was also raised by numerous submissions. Helen Hutchinson[113] summed up the view of many who did not think co-existence is possible simply as "you can't keep bees from pollinating".

The SafeFood Foundation[114] said that "arguments that Tasmania's GM moratorium should be reviewed on a case-by-case basis are disingenuous. The introduction of any GM crop be it ryegrass, poppies or canola risks contaminating other crops and jeopardising markets." Whereas some submissions stated that co-existence is very possible with GM and non-GM and should not be a barrier to GMO adoption.

Croplife[115] and Ausbiotech[116] both noted that there were examples around the world of successful co-existence; for example, the Australian grains industry developed the "market choice" framework to enable co-existence to occur between GM and non-GM canola. Furthermore they noted that co-existence frameworks are easily audited with sampling and testing regimes and would provide the necessary certainty and confidence to supply chain participants, consumers and Government.

The practical, policy, and regulatory issues associated with co-existence are explored in detail in the findings section of this Report.

Other submissions explored the concept of co-existence in terms of impacts on markets and marketing.

Fat Pig Kitchen[117] does not think co-existence is possible as "it would impact on marketing – we do not have to explain how or why our particular corner of Tasmania is GMO-free, or spend time and marketing energy re-iterating Tasmania's green credentials."

Whereas PGT[118] clearly consider co-existence is possible: "there is no meaningful link between the relevant markets for food products of any description with that of narcotic raw materials (poppies)."

DairyTas[119] stated that "the moratorium contradicts modern day agriculture which supports co-existence across many platforms and prevents the market from working by denying farmers, customers and consumers the GM option. In terms of co-existence issues with food and non-food crops is unlikely that there will be any brand differentiation for technology that is in widespread use in Australia and where supply chains operate on a national basis."

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[112] Submission 082
[113] Submission 30
[114] Submission 115
[115] Submission 089
[116] Submission 095
[117] Submission 097
[118] Submission 082
[119] Submission 085

Anticipating the concerns of particular sectors David Armstrong[120] stated in his submission that "there is the ability for co-existence and that protocols should be developed to ensure the integrity of non-GMO produce. The protocols should be developed by an independent and trusted Government organisation (DPIPWE or TIA). It should be possible that particular products are GMO-free (leatherwood honey due to the area where it is sourced) and beef to Japan (produced with appropriate protocols and certification) rather than rely on a State ban."

The question of whether there should be exemptions from the moratorium for specific GM crops such as non-food crops drew a mixed response.

Many submissions were against there being any exemptions at all. Intro Tas Pty Ltd[121], a business that supports Tasmanians export to China, was typical in not supporting the growing of non-food GM crops due to cross contamination problems: "As soon as crops are grown, GM-free status cannot be guaranteed as there are no physical barriers to contamination."

The response from Gene Ethics[122] was similar to other submissions noting that "sectional interests should not be allowed to dominate any proposed exemption decision as the commercial release of any GM organisms will have negative effects on the marketing of all Tasmanian produce."

Black Ridge Farm[123] noted that "any exemptions would cloud the way in which Tasmanian agriculture is perceived by our markets. Perceptions of consumers are more important to the future of our agricultural markets than scientific fact."

Picking up on the issue of consumer perceptions, Tasmanian Feedlot[124] reinforced that "for Japanese customers perception of food production systems is more important than technical or scientific assessment of food production systems." Further, "essentially if GM product was to be permitted in the State then the whole agricultural industry could be affected and no one industry sector can be isolated. Our Japanese meat buyers as representatives of our customers have indicated they would have a lot of difficulty selling our beef in Japan if we are unable to continue to guarantee that the inputs to that beef are free from any GM material. The worst case scenario would be that our business would not even be able to operate in Tasmania with the consequential loss of direct jobs, indirect employment and export dollars into the Tasmanian economy."

Penelope Clark[125] was indicative of a small number of respondents who while supportive of maintaining the moratorium were "comfortable with an exemption for pharmaceutical GMOs provided no compromise to non-GM food crops or native species."

The TFGA's[126] view was that "the current exemptions under the *Genetically Modified Organisms Control Act 2004* should remain in place particularly for poppies, other crops for pharmaceutical purposes and research provisions for non-food plants." The TAPG[127] submitted that "pharmaceutical crops should be exempt from any future moratorium." Further, "a clear cut and public exemption from any future moratorium would allow

[120] Submission 022
[121] Submission 025
[122] Submission 124
[123] Submission 043
[124] Submission 049
[125] Submission 014
[126] Submission 109
[127] Submission 061

this critical crop (i.e. poppies) in Tasmania to both maintain and improve its position as a world leading cultivation. A further benefit to be derived from such an exemption would be to better cement Tasmania's place as the preferred poppy growing location within Australia and New Zealand given that all possible variants of this crop could be planted as required by the industry."

PGT[128] called for the lifting of all restrictions on the use of GM technology in research, breeding and commercial cultivations of all plants within the *Papaver* (poppy) genus.

The Project Team notes that a number of submissions referred to existing exemptions from the moratorium in legislation. However, there are no automatic "exemptions" as such from the Tasmanian regulation of GM-free area in any relevant legislation.

The *Genetically Modified Organisms Control Act (2004)* ("the Act") provides for the moratorium. Specifically Section 5 of the Act states that "the Minister, by order, may declare the whole or part of Tasmania to be an area that is free of GMOs if he or she considers that to do so would aid in preserving the identity of non-genetically modified crops and animals for marketing purposes". The Genetically Modified Organisms Control (GMO-free Area) Order 2005 declared all of Tasmania to be GMO-free. This still remains the case at the time of writing this report.

Under the Act, a person may however apply to the Secretary of DPIPWE for a permit to deal with (use, grow, make, sow, plant, etc.) a GMO in a GMO-free area. In assessing the application, the Secretary must consider a number of matters which are defined in the Act. In doing so the Secretary also considers the relevant policy, or policies, of the Government of the day. The current *Policy Statement on Gene Technology and Tasmanian Primary Industries 2009-2014*, states that uses (of GMOs) that may be authorised subject to assessment and conditions are:

- GM pharmaceutical plants (poppies) grown in the field, either for experimental or commercial purposes, and
- GM microbes used in animal vaccines, biological control of pests, and oil spill clean ups, etc.

Further information on how GMOs are regulated in Tasmania is provided in the Issues Paper released for this Review or on the Department's website www.dpipwe.tas.gov.au. The issue of exemptions is also discussed further in the Findings section of this Report.

Only a few submissions addressed the question of should Tasmania's policy allow for exemptions from the moratorium how could any exemptions be determined and by whom. The Gene Ethics[129] response was similar to other submissions believing that "participatory, open, public hearing and submission processes, conducted by parliamentary committees representing all parties, have served Tasmania well in previous reviews of the GM moratorium. These democratic, evidence-based processes should be used again."

[128] Submission 082
[129] Submission 124

Co-existence and commercial beekeepers

In terms of co-existence, many submissions also noted concerns about GM having a negative market impact for the honey industry which relies on clean and green marketing of its branded products.

The Tasmanian Beekeepers Association[130] stated that "allowing GMOs to be grown in Tasmania will create significant market disadvantages for honey producers, particularly those exporting to the European Union". Submissions from the commercial beekeepers also expressed the position that they may be unwilling to offer pollination services to areas where there are GMO crops, or the costs of pollination services may rise if the industry is locked out of high price EU markets.

The Tasmanian Beekeepers Association[131] provided information that honeybees are responsible for $120-$180 million of agricultural production in Tasmania, principally through pollination. They note that there is "every probability" that pollen from GM crops would end up in honey making "the honey not eligible to be sent to the EU". "If the moratorium was to lapse 40 per cent of our State's honey sales to EU would be stopped."

In an extensive analysis of the honey trade PGT[132] concluded that "the high-value leatherwood market in the UK and Germany cannot be affected by GM poppies under the current law".

The same submission[133] referred to a 2004 study by the Australian Government that found the percentage of dry weight canola pollen in 32 Australian canola honey samples ranged from 0.15 per cent to 0.443 per cent. They noted that in September 2011 the European Court of Justice ruled that pollen from GM maize was an ingredient in honey and as such it had to be labelled as contains GM pollen if above 0.9 per cent and that more than 1 per cent GM component requires labelling of honey in Australia. Moreover, the leatherwood variety sourced largely from Tasmania's wilderness areas "hundreds of kilometres away from the main poppy growing areas" accounts for "around 65 per cent of Tasmania's honey."

The issues around beekeepers, honey and pollination services are explored in more detail in the findings section of this Report.

[130] Submission 041
[131] ibid
[132] Submission 082
[133] ibid

TOR 4) ANY OTHER RELEVANT MATTERS

In addition to the first three terms of reference, TOR 4 gave people the chance to raise any other matters they considered relevant to the moratorium in their submissions. Some issues raised in submissions were relevant to more than one term of reference however, for completeness; the Project Team has covered all matters raised under TOR 4 below.

Impacts on health and the environment

Many submissions raised concerns regarding health and environmental impacts from use of GMOs. Some submissions wrote of unknown effects on human (and animal) health from consumption of foods containing GMOs. Helen Hutchinson[134] gave a typical response: "I do not believe that the future effects on our generation's health are known or the effects on future generations."

The Tasmanian Public and Environmental Health Network[135] also voiced similar doubts: "GM technology incorporated into food has still not been proven safe for human ingestion. Intergenerational problems cannot as yet be identified in humans as GM science is not that old, but problems are being identified both acutely and chronically in animal studies. Ingestion of meat from animals fed GM containing food also cannot be assumed to be safe."

On the other hand, some submissions referred to foods containing GMOs as being entirely safe to eat. AusBiotech[136] stated in their submission: "GM crops have been grown and consumed for more than 17 years and people around the world have eaten over two trillion meals containing biotechnology derived foods or ingredients. There are no peer reviewed nor credible scientific reports of any food safety issues related to the consumption of GM foods."

Also relevant to GMO presence in food, some submissions advocated for improved labelling of GMO content on products. The submission of Sandra Murray[137] was a typical example: "The labelling system should be improved so that consumers can easily identify foods containing all ingredients originating from GM organisms, and from animals fed GM feed." FSANZ[138] however, indicated that all new food products produced by gene technology must receive pre-approval from FSANZ and that there are mandatory labelling requirements in Australia and New Zealand and that at last review; they were determined to be current and appropriate.

Environmental impacts mentioned included cross-contamination problems resulting in both agricultural and native plant species containing GM material. Wine Tasmania[139] commented extensively on environmental impacts in their submission and stated: "Genetic transfer has been shown to occur between GM crops and related endemic species. Once these genes are in the environment they may affect the management options for primary producers and landscape managers (i.e. Parks and Wildlife) by reducing the efficacy of current agrochemical tools."

[134] Submission 030
[135] Submission 037
[136] Submission 095
[137] Submission 123
[138] Submission 118
[139] Submission 080

Other submissions referred to an increase in chemical use[140] as a result of planting GM crops however, some submissions stated the opposite: that GM crops result in less chemical use. For example, CropLife[141] referred to decreased insecticide and herbicide use in GM canola in mainland States. AusBiotech[142] also alluded to a reduced environmental impact in the cotton industry with the introduction of GM varieties.

Linked to chemical use, some submissions were also concerned about an increasing prevalence of herbicide/pesticide resistant weeds, pests and diseases. Bronwyn Winfield[143], an organic farmer, cited increasing herbicide use resulting in herbicide resistant weeds in her submission. Anita Wild[144], of Wild Ecology Pty Ltd, also referred to insecticide resistance in some pests on transgenic Bt (a naturally occurring bacterial insecticide) crops.

Finally, many submissions made references to impacts of GMOs on bees, the honey industry and pollination services. While most submissions focussed on lost market access to the EU as a result of GMOs being permitted in Tasmania, a number also referred to lost pollination services from bees. The submission from the Tasmanian Beekeepers Association[145] contained detail on both of these concerns. A few submissions also suggested that prevalence of GM crops can have adverse effects on the health of bees and bee colonies[146]. Implications of GM crops on bee associated businesses are discussed further in the findings section of this Report.

The Project Team notes that human and animal health risks as well as environmental risks are assessed for proposed new GMOs by the OGTR under the national regulatory regime for gene technology.

Corporate control of gene technologies

Another issue raised by many submissions was ownership and intellectual property rights of large multi-national companies over gene technologies and products. Of those submissions, many simply stated that these multi-national companies are primarily profit-driven with little regard for anything else.[147]

Other submissions referred to companies using terminator technology to force farmers to buy new seed every year, imposing additional costs. Anthony Schindler[148] gave a typical statement with regard to company control over gene technology: "The shift of power into the hands of large companies who own the technology and rights to seeds is clearly wrong."

Questions of legal liability

Many submissions made references to legal liability issues under a number of terms of reference, including TOR 4. Some submissions made general observations as to how current legal systems would cope with

[140] Submissions 006, 116, 092, 099
[141] Submission 089
[142] Submission 095
[143] Submission 052
[144] Submission 076
[145] Submission 041
[146] Submissions 037, 055
[147] Submissions 011, 017, 031, 071
[148] Submission 032

liability cases arising. Robin Thomas[149] gave a typical response: " ... existing legal systems are not established to deal with complex and unforeseen agricultural and health legal challenges (and arguably never will be)."

Most questions of legal liability however, concerned protection for non-GM farmers who suffer from crop contamination from nearby GM crops. Legal liability matters associated with co-existence are discussed further under the findings section of this report.

Claims of increased yields

While some submissions stated higher yields in GM crop, there were also a number of submissions that questioned whether GM crops do produce higher yields. For example, CropLife[150] suggested improved yields using GM crops and Tasmanian Alkaloids[151] also see opportunities in increased alkaloid yields per hectare with GM poppies.

On the other hand, Gene Ethics[152] suggested GM crops do not provide yields better than conventionally bred crops. Likewise, farmer Mark Burling[153] is of the opinion that claims of increased yields in GM crops are false.

The Trans-Pacific Partnership Agreement

A joint submission from the Tasmanian and Australian Greens[154] reveal concerns regarding potential avenues for multi-national companies who have intellectual property rights in gene technology to sue the Australian Government for restricting ability to sell GM crops in Australia under the Trans-Pacific Partnership Agreement (TPPA).

The Project Team noted that the TPPA and Investor-State Dispute Settlement negotiations are primarily the responsibility of the Australian Government. However, consultation with States and Territories does occur on such matters.

[149] Submission 073
[150] Submission 089
[151] Submission 096
[152] Submission 124
[153] Submission 004
[154] Submissions 98 and 114

Findings: Key Issues

Emerging from this Review are six key issues that are most relevant to determining the future policy position on the GMO moratorium at this time. Each issue is summarised into a review "finding", followed by more detailed analysis. The analysis draws on the submissions received, plus the Project Team's own research, the issues identified in previous reviews, and the specific market research engaged for this Review.

It is important to emphasise that the findings are not policy recommendations. The future policy position on GMOs, including the moratorium, is a matter for the Government of the day to determine.

1) MARKET ADVANTAGES AND DISADVANTAGES

FINDING

There is no collective viewpoint across industry sectors as to whether there is an imperative to change the current policy position on the GMO moratorium from a marketing perspective. The perceptions across industry sectors and their contribution to Tasmania's food production are summarised in the table below.

Tasmania - Industry Sector and/or commodity	Packed and processed value or Gross Production/Food value 2010-11*	Industry perception - Moratorium remaining	Industry perception - Moratorium removed
Canola	$ 1 million	Positive for some markets	Negative for some markets
Beef	$ 262 million	Positive for some markets	Negative for some markets
Honey	$ 6 million	Positive	Negative
Poppy	$ 70-90 million (farm gate)	Negative	Positive
Dairy	$ 416 million	Negative for commodity, positive for speciality	Positive for commodity, negative for specialty
Organics	$ 4.7 million	Positive	Negative
Seafood	$ 692 million	Neutral	Neutral
Wine	$ 40 million	Positive	Negative
Apples and other horticulture	$ 100 million	Positive	Negative
Onions	$ 47 million	Positive	Negative

*Source: *Abridged by DPIPWE from Tasmanian Government (2012a), Bez et al (2012), Tasmanian Government (2012b) and Australian Bureau of Statistics 2010*

Some industry sectors in Tasmania – such as beef, honey and fruit – perceive significant negative market impacts to their overseas markets if the current policy were to be altered. Collectively, a number of other sectors including organics, food tourism and wine all wish the current policy to remain, as they see only market challenges if the moratorium was removed. Conversely, other vital industries such as dairy and poppy growers perceive negative impacts if the current policy does not change. This suggests that industry attitudes towards the GM moratorium are mostly driven by industry specific interest and whether they see a visible medium-term opportunity through GM product attributes.

It is not possible to quantify the market benefits and costs arising from the moratorium. However, it is clear that only a small proportion of the State's food and agricultural output is currently marketed as Tasmanian and within that, only a small number of producers are using the specific attribute of GMO-free as part of the branding and marketing.

The Tasmanian place based brand is built upon a range of attributes including premium quality, clean and green, cool climate and biosecurity. The ability to grow food and other agricultural products in a GMO-free environment is not a core attribute to the brand, but supports the overall food brand position.

From a consumer perspective, GMO-freedom is one of a range of second tier attributes they consider when purchasing, but they rank it behind better known ethical attributes such as Australian grown and organic.

Within the national food supply chain, awareness of the State's GMO-free status is highest amongst brand managers within the retail sector, where a stronger position on food provenance features is being held in response to increased concerns by consumers as to where their food comes from and how it is produced. With this comes sensitivity among retailers to potential adverse impacts on brand and retail sales. As a result, if some products are claiming to be GM-free then by default it implies that other products are not GM-free and this type of promotion would not be welcomed by retailers.

Within the two Asian markets considered as part of this Report, there is not a high level of recognition or understanding by consumers about GM foods. The underlying perception of GM foods is that they are not good for human health but consumers are not prepared to pay a price premium for GMO-free. Retailers largely base their purchasing policy on identifying reliable and safe suppliers of products, of which Australia is considered to be one.

However, a salient observation is that in the domestic market "GM freedom may serve as a hedge against potential future shifts in consumer sentiment and buying behaviour concerning the (GMO-free) attribute" (Freshlogic 2013). Based on consumers' heightened interest in food provenance, and increased level of marketing investment in provenance issues, there is a level of opportunity cost in removing the Tasmanian GMO-free status.

The market research conducted specifically for this Review points out that Tasmania's markets for food and beverage products are on the whole ambivalent about the State's GMO-free status. To develop GMO-free markets (and potential price premiums) in future, Tasmania will need to continue to build a better understanding of consumer preferences for and behaviour toward GM foods and related issues. In addition, any strategy to promote the moratorium would require a far greater understanding of the supply chain dynamics, and support from the gate keepers (retail and wholesale markets), to ensure that optimal brand advantage is captured.

Macquarie Franklin (2012a) captured a further difficulty: "any GM free promotion of Tasmania will need to clearly define Tasmania's point of difference and defined markets where GMO-free products are an

advantage". This is possible for crop based enterprises but becomes more problematic for intensive animal industries. Tasmania's GMO-free status does not restrict the use of GM animal feed[155]. In Australia GM animal feed (such as soybean and cotton) that does not contain viable seed, is not required to be labelled. Therefore "the ability of Tasmanian animal industries to avoid GM animal feed is not a unique point of difference".

DISCUSSION

This section reviews the benefits achieved and costs incurred by maintaining the moratorium, the implications for the brand, and consumer perceptions in the domestic Australian market and key international markets.

It is based on the submissions provided, previous research conducted by Macquarie Franklin (2012a), and additional market research commissioned for this Review.

Cost benefit considerations

From a broad product perspective, evidence from the submissions was inconclusive as to whether a premium was received for many Tasmanian products because of the current policy on GMOs. However, there was a view that lifting the moratorium would be detrimental to some industry sectors such as beef, honey, fruit, food tourism and those that rely on organic certification. Other sectors, such as dairy and poppies, were of the view that if the current policy did not change, they would be at a competitive disadvantage to other regions in the future.

a) Livestock:

Dairy Industry

Several submissions from the dairy industry and agricultural peak industry bodies noted the future opportunities of GM pasture cultivars, such as GM ryegrass and GM clover. Both ryegrass and clover are suited to a range of grazing enterprises, with white clover a good companion legume for perennial ryegrass. This combination forms the basis of many high rainfall pastures in Tasmania (Tasmanian Government, 2012c).

Value of Industry

The Tasmanian livestock industry (wool, dairy and red meat sectors) is largely reliant on pasture production for their feed base. PGG Wrightson Seeds[156] estimate that the pasture value in Tasmania for the livestock industry is $402.7 million. The Department views the contribution of pastures slightly differently. Research into Tasmanian pastures reveals that our suboptimal pasture composition limits animal production (Friend et al, 1997: Smith and Corkrey 2013). Based on this Tasmanian pasture research, the Project Team note that about 40 per cent of the annual farmgate value of Tasmanian agriculture is derived from pasture based

[155] Imports of GMOs into Tasmania are regulated through import requirements contained in the *Plant Quarantine Manual Tasmania*. Only animal feed that contains material from non-viable GM plants, or processed non-viable seed, is permitted in Tasmania. Refer to the Issues Paper for this Review for further information (page 28).
[156] Submission 094

enterprises of red meat, dairy and wool. At a farm gate level for 2010-11[157] this would equate to Tasmanian pastures contributing at least $251 million for these sectors.

The value of red meat produced from Tasmanian herds was approximately $212 million at the farm gate in 2010-11, representing 23 per cent of the total value of agricultural (excluding non-food products) production for the year (Tasmanian Government, 2012a). Beef production dominates the red meat sector at approximately 75 per cent of total production (Tasmanian Government, 2012a).

Dairy is now Tasmania's single biggest agricultural industry, with an estimated packed and processed value of approximately $416 million, representing more than seven per cent of the nation's milk output (Tasmanian Government, 2012a). The most significant share of milk production is devoted to interstate exports at $308 million (Tasmanian Government, 2012a).

Impact

It should be noted that there are non-GM pasture cultivar opportunities in Tasmania. The TIA has bred a range of new perennial grasses, annual legumes and perennial legumes through its Herbage Development Program [HDP] (TIA, 2012). Markets for Tasmanian pasture seed selections are emerging with TasGlobal Seeds recently establishing a trade agreement with Matsuda to import and distribute Tasmanian temperate pasture seed cultivars (Grant, 2013). The quantum of this growth opportunity is unknown. Joshua Morris[158]commented that Tasmania is ideally placed to become a reliable source of uncontaminated seed for other GMO-free countries/areas that have problems with GM contamination.

The Department notes as an example, that the current annual demand for seed of new non-GM cocksfoot pasture plants is currently about 1,000 tonnes with a farm gate value of about $3.5 million per annum. TIA modelling and analysis suggests if the area available to improved pastures in the Northern and Southern Midlands was upgraded at a rate of five per cent per year with pastures containing a botanical composition optimised for site characteristics (for example non-GM cultivars developed as part of the HDP), animal production could be annually increased by 180 000 dry sheep equivalents (DSE). This represents an annual increase of $3.2 million in the farm gate profitability of sheep enterprises in this region. The cumulative benefit after five years would be $49 million (additional 950 000 DSE), and after 10 years $180 million (additional 1.8 million DSE). Over five years the area of botanically optimised pasture for both the Northern and Southern Midlands would be increased from around 30 per cent to approximately 55 per cent, still leaving an unexploited area for improvement of 45 per cent.

A small pasture seed growing and cleaning sector is already established in Tasmania but this could be significantly increased through the opportunities offered by the HDP.

DairyTas[159] in its submission noted that Tasmania has the infrastructure to be the largest supplier for GM ryegrass varieties of seed for the Australian market and that any extension of the moratorium would compromise this opportunity. DairyTas[160] indicated that Tasmania provides approximately 10-15 per cent of national demand for improved ryegrass cultivars, but more importantly provides 30-50 per cent of the supply for national consumption.

[157] This figure is approximated from data sourced from Tasmanian Government (2012a) and ABS (2012)
[158] Submission 058
[159] Submission 085
[160] ibid

Historically within Australia, approximately 60 per cent of sales for pasture seeds were for perennial ryegrass (RIRDC, 2013a). From a Tasmanian perspective, the Department estimates that in 2013 the current gross cleaned seed amount for the whole of the State would be at least 123,500 tonnes for ryegrass and 120,600 tonnes for clover. The Department is not able to comment on the veracity of the proportion of Tasmania's contribution to national supply levels quoted by DairyTas[161].

DairyTas[162] and the DairyFutures CRC[163] indicated that recent research suggests that GM ryegrass has an increase in nutritional value estimated to increase the productivity of dairy land by approximately $200 per hectare and that commercial release could occur between 2015 and 2020. The Project Team note that the timeframe is largely dependent on the outcome of ongoing research and also regulatory approval processes. According to Australian Bureau of Statistics estimates, in 2009-10, Tasmanian dairy businesses reported 161,342 hectares of grazing land (Australian Government, 2013a). Based on historical technological adoption rates in the sector, the Department estimates that the productivity gain (farm gate gross value) of adoption of GM ryegrass over time could be in the vicinity of $10 million (Australian Government, 2009).

The TAPG[164] noted that GM could benefit the dairy industry whose final products are rarely marketed as Tasmanian (no market differentiation). The OCT[165] felt strongly that the dairy industry in particular has not considered the market impact both within the dairy sector and other agricultural sectors of the introduction of GMOs into pasture.

The Project Team notes that no submission discussed in particular how Tasmanian production of GM pasture seeds would impact the existing sales level of non-GM ryegrass or lead to a loss of markets.

Beef Industry

Value of the Industry

The *Tasmania Food and Beverage Scorecard 2010-11* (Tasmanian Government 2012a) indicates that the packed and processed value of the beef industry was $262 million, and accounted for nine per cent of the total processed value of food and beverages.

GMO-free is part of a bundle of attributes used in their marketing, including HGP free, clean and green, bone meal free and antibiotic free. According to the Macquarie Franklin Report (2012a), hormone growth promotant (HGP) free is the most important attribute to the safety conscious Japanese customers.

The Tasmanian Feedlot submission[166] noted the importance of the Premier's certification and the quality assurance systems that underpin the Tasmanian image of clean and green in their marketing to Japanese customers.

Due to confidentiality of information, a comment cannot be made on the actual premium received for Tasmanian Feedlots beef; however, Tasmanian Feedlots[167]noted that red meat exports to Japan in the three

[161] ibid
[162] ibid
[163] Submission 045
[164] Submission 061
[165] Submission 039
[166] Submission 049
[167] ibid

years to 2012-13 totalled in excess of $220 million (mostly beef). If the GM status for Tasmania changed, Tasmanian Feedlots [168] believe their price premium would be significantly diminished.

Impacts

Tasmanian Feedlots[169] revealed that the discussions with their parent company (AEON) and meat buyers in Japan indicate that their business may be severely jeopardised by any amendments to the ban on the use of GM crops in Tasmania.

Summary

If GM pastures were introduced, it appears that the impact on the livestock sector would be mixed. The dairy industry perceives that GM pastures would help to maintain a competitive advantage. However, the beef industry perceives that specific markets, marketing and branding efforts could be impacted in a negative way if GM pastures were introduced into the feed base.

b) Poppies

Value of Industry

In 2010-11, Tasmania produced 325,224 kg of alkaloids (contained in concentrated poppy straw) which was 48 per cent of the legal global manufacture of these alkaloids (INCB, 2011). The farm gate value of Tasmania's poppy industry has been estimated at around $70-90 million or around eight per cent of the value of overall State agricultural production (Macquarie Franklin, 2012b). Industry reports that in 2012 payments made to Tasmanian poppy growers are forecast to exceed $100 million for the first time and that production growth over the next seven years is expected to be similar to the last 10 years (Tasmanian Government, 2012d).

In an increasingly competitive international market, it is vital that Tasmania continues to strengthen and expand the industry to achieve its full potential (Tasmanian Government, 2012b). PGT[170] is concerned that "the competitive threat to Tasmanian pharmaceuticals is more real when recent EU developments of GM crops (in countries such as Spain) are considered". The Tasmanian poppy processors are already managing their production by investigating alternative sources of supply in areas such as Victoria. However, Victoria does not yet have regulations in place around poppy production (Tasmanian Government, 2012b).

Impact

Submissions from the poppy industry indicated that GM varieties may have a role to play in reducing the use of chemicals used for weed control, and have the potential to increase yield and/or alkaloid content or to help in the management of disease such as downy mildew.

[168] ibid
[169] ibid
[170] Submission 082

The poppy industry's view of the market impact is varied and differs from other submissions. PGT[171] perceives that "there is no meaningful link between the relevant markets for food products of any description with that of narcotic raw materials". GSK[172] on the other hand, noted that "GSK exports poppy seed to international culinary markets … hence the concerns about GM food may apply to the poppy crop". However, they did feel that "there is a trend towards acceptance of GMO poppy in relation to the supply of medicinal alkaloids". GSK[173] did not "anticipate any major negative reaction to customer attitude towards Tasmanian sourced, non-GMO poppy products".

The benefit of using GM technology was discussed by all three poppy submissions. PGT[174] noted the "market for opioids is growing relentlessly". Only one submission provided actual quantitative data on the likely benefit to Tasmania of GM poppy production. Based on their 2012-13 export sales turnover, Tasmanian Alkaloids[175] advised that a "40 per cent higher alkaloid content in poppy crops could be produced using GM technology which would result in a benefit of $56 million annually across the whole Tasmanian poppy crop."

Summary

The sector is an important contributor to Tasmanian agricultural industry. The industry perceives that there would be a positive commercial benefit to the Tasmanian poppy sector if commercial production of GM poppy crops commenced. It is currently unclear what the impact would be on local poppy production and processing capacity if the industry in Tasmania could not access gene technology.

c) Honey/Bees

Value of Industry

In 2007, the Tasmanian Beekeepers Association (TBA) noted that there were around 12,000 registered hives in Tasmania, or four per cent of the Australian industry, with two thirds of registered hives managed by six per cent of the registered beekeepers (Tasmanian Beekeepers Association, 2007; RIRDC, 2013b). In 2007, the industry reported the gross industry annual value of honey and beeswax in excess of $6.5 million with leatherwood honey representing 77 per cent or $5,040,000 of this (TBA, 2007).

From industry based information, the Department estimates that the 2012 gross food product revenue (honey and beeswax) has increased to approximately $8.9 million with approximately $1.6 million overseas processed exports. At this level, and based on the Tasmania Food and Beverage Scorecard, the honey production represents approximately 0.3 per cent of Tasmania's packed and processed food value for 2010-11(Tasmanian Government, 2012a). Tasmanian beekeepers receive the highest price for their honey in Australia, representing a premium over their average mainland counterparts of 67 per cent in 2006-07 (RIRDC, 2008).

Almost 60 per cent of all Tasmanian leatherwood occurs within public reserves, 34 per cent is on State forest and the remainder is on other public land or private property (Tasmanian Government, 2007). There

[171] ibid
[172] Submission 158
[173] ibid
[174] Submission 082
[175] Submission 096

is a high level of uncertainty in terms of bee foraging behaviour (EP, 2013). Honey bees are recognised as the most efficient insect to pollinate plants typically farmed in temperate agriculture (Tasmanian Government, 2007). The Tasmanian Beekeepers Association (TBA)[176]reported in their submission that honeybees are responsible for between $120-$180 million of agricultural production in Tasmania, principally through pollination. The same submission said that "many commercial beekeepers have stated that if GMO crops are introduced to Tasmania they would not pollinate crops anymore" (because of contamination concerns).

FGT[177] raised their concerns about the impact on beekeepers if GM crops were introduced and emphasised their close relationship with the horticulture sector through their pollination services.

Impact

Many submissions raised the issue of negative impacts on the honey industry if GMO crops were introduced including cross-pollination (or contamination) and the negative effects on honey markets. TBA[178] noted that there was every probability that pollen from GM crops would end up in honey making. The TBA[179] asserted that their members would lose 40 per cent of their market as the EU would no longer accept Tasmanian honey. This is as a result from the policy debate in the EU regarding GM pollen in honey (following a 2011 European Court of Justice decision).

Based on the 2012 Tasmanian honey export figures, if the industry lost all of the EU market because of the introduction of GM crops, the Department estimates that the gross loss to the industry would be in excess of $600,000 per annum.

Summary

Honey production represents a small contribution to the food packed and processed value for Tasmania; however, if GM crops were introduced into Tasmania, the impact to this sector in certain markets would be significant. The value of pollination services is much more significant. The horticultural industry highlighted that if these services were impacted by GM crops being released to the environment, potential losses in fruit export markets could result.

d) Organics

There were many submissions to the Review that highlighted the serious impact on the organic industry that they foresaw with the introduction of GM crops. The majority of Tasmania's organic production is understood to be distributed to the domestic market.

Value of Industry

From the submissions received, it has been difficult to quantify the value of the organic sector in Tasmania. Anchor Organics[180] noted that they invoice $2 million a year to niche markets and this is increasing by 20-25

[176] Submission 041
[177] Submission 122
[178] Submission 041
[179] ibid
[180] Submission 008

per cent a year. This figure from one organic horticultural producer appears at odds with the publicly reported value of Tasmania's organic industry value (as a whole) at approximately $4.7 million or approximately one per cent of the Australian organic market (Bez et al, 2012). At that level, Tasmania's organic production represents 0.1 per cent of the State's food packed and processed value for 2010-11 (Tasmanian Government, 2012a).

Tasmania, however, does have the highest annual volume of organic vegetable, herb and nursery production and the highest annual volume of organic fruit production in Australia (Mitchell et al, 2010). OCT[181] indicated that the sector was growing at 15 per cent annually.

Globally, organic seeds are sold at a premium above the price of conventional seeds, with the organic seed premium relative to the price of conventional seed averaging 20 per cent (Benbrook, 2009). The Project Team is unable to report on the price of organic seeds.

Impact

The economics of organic production are complex when compared with conventional production (Ashley et al, 2007). Previous research conducted in Tasmania highlights the fact that organic produce does not in itself provide a guarantee that price premiums will be achieved and that the level of price premiums required is directly relative to the production costs (Ashley et al, 2007). At a national level, it is known that the price premium for organic beef and chicken meat reflects the increased costs of production, including segregation costs involved in producing organic stock feed and livestock products (Australian Government, 2011a).

In Australia, the various organic standards have zero tolerances for GM material, including unintended GM presence (Foster, 2010). Many submissions to the Review argued that the impacts to the organic sector would be negative, both in markets and certification. However, TIA[182] countered the common assumption of many submissions that organic cropping and markets will be negatively impacted by the introduction of GM crops by indicating that "rates of organic industries in the USA doubled when GM crops became significant in the market place and half of the world's organic production now takes place in countries where GMOs have been released."

In their Royal Commission on Genetic Modification, the New Zealand Government noted that "it is unlikely that organic exports would attract a sufficient premium in the near or medium future to offset to any degree the contraction effect of not allowing any genetic modification in the country" (RCGM, 2001).

Although the commercialisation of GM canola has been anticipated to have very little direct impact on organic farming, the Australian Government has noted that this view does not extend to the potential impact of commercialising other GM crops (Australian Government, 2011b). Research in Australia has highlighted the need to consider GM contamination testing of relevant crops or other plants on an organic site if GM cropping sites are located within a region (Ashley *et al*, 2007).

Summary

The State's GM-free status provides a platform for organic and biodynamic production systems. The compliance costs for the organic sector would increase if GM crops were commercially produced in Tasmania, because of the zero tolerance to GM material required by Australian organic certifiers. The

[181] Submission 039
[182] Submission 038

industry sector is small, although growing, and the potential loss of certification would impact on individual organic producers through loss of markets.

e) Seeds and Grain:

Wheat and barley

GM crops such as wheat and barley have been identified as medium term opportunities with trials under way in some States[183]. The Project Team note that commercialisation of GM wheat may occur before 2020 and this is largely dependent on the outcome of research results and regulatory approval processes.

Tasmania is viewed as an ideal place to produce non-GM seed due to Tasmania's unique climate and fertile soils, and its out of season seed production in relation to the northern hemisphere (Serve-Ag, 2011). For large seed suppliers, utilising the opportunity of both a northern and a southern hemisphere production base enables them to produce two seed crops in one year.

Seed companies, such as South Pacific Seeds Australia, grow in regions like the east coast, the Coal River Valley and the northern central area as they essentially offer dry summer conditions (South Pacific Seeds, 2013).

Globally, the evidence is that certified non-GM grains (excluding organic grains) occupy only niche markets, mainly with soybeans and corn that would be used for human food in some markets (Foster, 2010). Research overseas indicates that to date price differentials for GM-free crops have been weak in international agricultural markets. However, this might change if availability of GM-free products declines as a result of worldwide adoption of GM crops (Demont & Devos 2008).

Marketing systems have been initiated by private firms in the grain and oilseed industry to extract premiums from a marketplace that has expressed a willingness to pay for an identifiable and marketable product trait or feature (Smyth and Phillips, 2002). Many of the submissions to the Review discussed canola as an example where Tasmania has been receiving a premium.

Wheat remains the predominant grain grown in the State over this period with approximately $6.8 million or less than 0.1 per cent of Australia's gross value produced (ABS, 2012). The major driver for wheat production in future for Tasmania will be expansion of the dairy industry (Freshlogic, 2012).

Each year in Tasmania, around 200 farms produce more than 30,000 tonnes of barley with a farm gate value of around $8 million, representing approximately five per cent of Australia's gross value produced (Macquarie Franklin, 2012c; ABS, 2012). The volume of feed barley imported into Tasmania fluctuates relative to the volume of State production. The need for feed barley is set to grow with the anticipated expansion of the dairy industry in Tasmania (Macquarie Franklin, 2012c; Field, 2013).

[183] Refer to the Issues Paper for this Review p. 32-36

Value of Industry

The overall estimated volume of grain used in Tasmania is summarised as follows (Field, 2013):

Purpose	Dominant Grain Type(s) if known	Estimate total volume (tonnes) used	Total value ($million) @ $200/t	Estimate of local grain (tonnes) used	Farm gate value ($million) @ $200/t
Beer Brewing	Barley	11,000	2.2m	11,000	2.2m
Poultry Feed	Wheat/Barley/Pulses	15,600	3.12m	15,600	3.12m
Livestock feed	Wheat/Barley	36,000	7.2m	12,000	2.4m
Other feed	Pulses/Grains	10,000	2.0m	a	
Dairy	Wheat/Barley	140,000	28.0m	b	
TOTAL		212,600	42.52m	38,600	7.72m
	A industry sources indicate limited local grain is used B Unknown				

Canola

The area of canola grown in Tasmania for 2009-10 was 1,252 hectares, producing approximately 2,000 tonnes (Macquarie Franklin, 2012). The gross value, estimated at $1 million, represents approximately 0.1 per cent of the gross value of canola (both GM and non-GM) produced in Australia (Macquarie Franklin, 2012a; ABS, 2012). It is estimated that around 150-200 hectares is grown for seed companies requiring conventional non-GM seed (Macquarie Franklin, 2012a). There would be very little, if any, organic canola grown in Tasmania (Australian Government, 2011b).

From the submissions, there was a mixed view on the opportunities for canola and how this impacts markets and premiums. Historically, analysts have concluded that there are few price premiums available in conventional markets for non-GM crops proven to be free of co-mingling with GM product (ACIL, 2005: AOF, 2009). Croplife[184] noted in their submission that "deliver prices at port currently range between $475-$505 per tonne with non-GM canola from South Australia receiving the lowest receival price of any mainland State."

The Project Team has explored the price for canola in more detail as this is a crop where GM and non-GM information is publicly available. Information supplied by Croplife[185] was compared with information from the Australian Wheat Board (AWB). When comparing the current AWB daily contract price spreads for canola varieties in Western Australia (no moratorium) and South Australia (moratorium on GM crops) for 2013-14 season (see table below), the Project Team observe that the non-GM variety has been receiving a premium of up to $20 per tonne. However, the South Australian canola (on average) receives the same price as commodity canola from WA (AWB, 2013).

[184] Submission 089
[185] ibid

Price/tonne canola varieties Western Australia and South Australia

Variety	Price/tonne
CSO1-A* Western Australia	Average $498/t
CSO1** Western Australia	Average $480/t
CSO1-A South Australia	Average $480/t
CSO1 South Australia	GM canola varieties not grown in SA because of the moratorium

CSO1-A = non GM canola CSO1 = commodity canola (AOF, 2009)

The Victorian prices for Canola varieties for 2013-14 are indicated as follows:

Victorian (Riverina and North East) canola prices 2013-14 (AWB, 2013)

Variety	Price/tonne
CSO1-A* Victoria	Average $477/t
CSO1** Victoria	Average $470/t
CSO1-A Certified	Average $481/t

CSO1-A = non GM canola CSO1 = commodity canola (AOF, 2009)

In the Victorian example above, it is clear that certified non-GM canola receives a premium of $11/tonne (on average) compared to commodity canola. Some areas such as Elmore received a price premium for certified non-GM canola of $25/tonne compared to the "commodity" price average (AWB, 2013).

One additional point worth noting is that there is very little organic canola grown in Australia (Australian Government, 2011b). Therefore it is unknown whether there is a differential in price for the certified non-GM canola and organic canola. OCT[186] noted within their submission that Tasmanian canola receives a $40 per tonne premium. However, Tasmanian figures for organic canola are unavailable as it is not grown on a commercial scale in the State.

In noting the figures from Croplife[187] and those in the tables above, the Project Team has also observed that in the last twelve months it has been reported that AWB has been providing the opportunity for farmers to fix the varietal spread between "commodity" canola and non-GM canola, so that GM canola is no more than $10 a metric tonne discount to that of non-GM canola. It has been reported that this price decision appears to have been motivated by the reluctance of some countries in the EU to purchase GM crops (Bita, 2012).

As noted in some of the submissions and the research conducted by the Department, a key market for Tasmanian canola is Japan. Import prices for Australian canola to Japan have received a premium (compared to Canadian canola), however, one explanation for the emerging gap for canola prices in Japan is the improvement in oil content of Australian canola relative to Canadian canola (Foster, 2010).

[186] Submission 039
[187] Submission 089

In 2011, Tasmanian Agricultural Producers reported that the price for GMO-free canola for Japan was between $500-520 a tonne (Grant, 2011). Although Tasmanian Agricultural Producers did not put forward a formal submission to the Review, follow up discussions by DEDTA reveal that Tasmanian non-GM canola retains a premium in certain markets such as Japan. Tasmanian Agricultural Producers indicate that specific prices are commercially sensitive. However, they receive upwards of $30-$115 premium per tonne (varies from year to year) based on global canola price rate, plus an additional amount based on the oil content of seed. Tasmanian Agricultural Producers also suggest that any premium must be offset against the yield discount (compared to GM canola) and the need to take account of increased costs such as freight.

Tasmanian Agricultural Producers have also verbally indicated that the non-GM canola market to Japan could increase over time from 600 tonnes to be upwards of 2,000 tonnes. However, the potential of the market depends on identifying and developing non-GM varieties that do well in Tasmania. This situation would be similar for any GM products which would compete in commodity markets against larger, more efficient regions.

Summary

There is a mixed view across seeds and grain sectors as to the impacts on their specific markets from the introduction of GMOs in Tasmania. From a canola perspective, the introduction of GM canola into the State would impact in a small, discrete non-GM market.

Branding and consumer attitudes

The Issues Paper for this Review noted that "branding aims to establish a significant and differentiated presence in the market that attracts and retains loyal customers". Markets are diverse and companies which possess competitive advantage, such as brand recognition, obtain advantages in the retail environment. From the submissions it is apparent that views differ about specific markets, impacts and the degree to which GMO-free status provides a competitive advantage.

It appears GM technology is particularly well suited to commodity products providing on farm productivity gains at scale, but GMOs are not considered in the minds of consumers to be compatible with premium niche products. Further to this, it is argued in Dr Tony McCall's submission[188] that seeking productivity gains with a view to accessing commodity markets does not support Tasmania's positioning as a small volume, high quality producer and in the longer term is not sustainable against regions with larger production capacities.

The Tasmanian brand is built upon a range of attributes. It has a strong profile within the domestic market and has some recognition in particular overseas markets, with the key drivers of brand value being the food and tourism industries. Key Tasmanian brand attributes that are promoted include premium quality, clean and green, cool climate and biosecurity; the State's GMO-free status is not a top level attribute. The ability to grow food and other agricultural products in a GMO-free environment is just one attribute of the Tasmanian brand, sitting alongside others such as HGP and antibiotics free, to support the overall food brand position.

[188] Submission 088

According to the Brand Tasmania Council's submission[189] the GMO moratorium provides a valuable point of difference and is a key part of the bundle of attributes that make up the brand. The linkages between tourism, food and hospitality are well established and people are now travelling to eat fresh natural food that is locally produced.

To gain a broader perspective of the Tasmanian brand and attitudes towards GMOs in domestic and interstate markets, additional market research was conducted specifically for this Review. This research comprised three components and was managed by DEDTA:

1. *Tasmanian food companies*: building on the Macquarie Franklin Report (2012a), follow-up interviews were conducted with 18 Tasmanian based food and agricultural producers. The interview responses are confidential.

2. *Domestic markets*: an attitudinal assessment was conducted by the consulting firm Freshlogic of domestic market gatekeepers to gauge perception and attitudes towards Tasmania, GM crops and food crops grown in areas that allow the cultivation of GM food and non-food crops. The results of this research are referred to in this Report and the consultant's report is available on the Department's website.

3. *International markets*: an attitudinal assessment in relation to GMOs was conducted through Austrade, in Japan and Hong Kong: two of Tasmania's key export trading partners. The reports produced by Austrade are wholly commercial in confidence. Accordingly a summary of the results is provided in this Report.

Tasmanian food companies

During September and October 2013 DEDTA contacted 18 Tasmanian based food and agricultural producers, many of which had been interviewed as part of the separate research project conducted by Macquarie Franklin (2012a). The aim of these interviews was to assess the current impacts (benefits and costs) from the moratorium and potential impacts which might result from any changes to the status.

Of those interviewed, most requested that their responses remained confidential. However on the basis of their responses:

- Products produced in relatively large volumes such as processed vegetables, potatoes, milk powder and bulk cheeses are generally not branded as Tasmanian.

- The majority of products in the beverage (beer and wine), red meat, aquaculture, honey, fresh fruit (particularly export) and gourmet restaurant sectors are Tasmanian branded.

- Specialty cheeses are typically Tasmanian branded, as are some fresh vegetables (such as export onions) and some limited product lines in dairy.

- Businesses/industries that make specific reference to Tasmania's GMO-free status in their marketing or product information include Tasmanian Feedlot (supplying AEON Group) and Greenham Tasmania in the red meat sector, canola exporter Tasmanian Agricultural Producers and vegetable exporter Field Fresh.

[189] Submission 067

The information gained from the interviews supports the proposition that, depending on the food product, there are only a small number of Tasmanian based organisations (of those interviewed) that specifically utilise "GMO-free" to support their brand image and product marketing. More companies do brand product as Tasmanian but usually with no reference to being GMO-free.

From the businesses interviewed, the red meat, fresh fruit and honey exporters were identified with making specific reference to GMO-free. Very few were able to provide direct and verifiable price premiums or greater share as a result of marketing as GMO-free product. However, to illustrate the potential value from specific branding that includes GMO-free references, these sectors as a whole contribute over $135 million per annum to Tasmania's international exports. The table below values Tasmania's international exports by food product for agriculture for 2012-2013.

International exports: food product	A$(million) 2012-2013
Dairy Product Total ($23.64 is speciality cheese)	120.70
Fruit products	19.80
Vegetable products	32.52
Live animals	9.15
Beef products	113.64
Sheep products	22.57
Other meat	2.79
Beverages (including wine)	4.32
Chocolate	45.64
Honey	1.59
Other (including poppy seed $4.4)	15.83
Seafood	131.99
TOTAL	**520.54**

Source: Tasmanian Government, 2013

PGT[190] noted within their submission that "clean and green" and the brand of a place can exist regardless of the presence of GM in local agriculture; however, Tony McCall[191] also noted that "provenance branding place based strategies must be more than just place, it must be backed by quality."

Domestic markets

Globally, commodity prices for many of Tasmania's quality products like milk powders, onions and red meat remain relatively low (Tasmanian Government, 2012a). This, together with the high value of the Australian

[190] Submission 082
[191] Submission 088

dollar and a number of input cost factors, has resulted in an increasing proportion (50 per cent) of Tasmania's food production being sold in the domestic markets. This valuable interstate trade is 2.5 times our overseas exports at $1,552 million (Tasmanian Government, 2012a).

As many of the submissions to the Review discussed negative impacts to the domestic food, food tourism and organics sector if the moratorium was lifted, an important piece of work was to test the perceptions of GMOs in the domestic market. The following section discusses the research findings by Freshlogic (2013), which conducted domestic market research specifically for this Review.

Prevailing consumer views

According to consumer panel research conducted by Freshlogic, the primary considerations for consumers in the domestic retail market are price, value, waste and convenience. "Ethical" attributes such as GM-free are, in general, secondary purchasing considerations. GM-free ranked behind better known ethical attributes such as Australian grown, pesticide-free, certified organic and fair trade but above lower tiered priorities such as use of recycled products and CO^2 footprint labelling. GM-free food is a higher priority for singles and couple households compared with families and empty nesters.

While consumer attitudes show a high inclination to buy ethical attributes, the willingness to actually pay more for these attributes is uncertain. This is similar to overseas examples where the level of demand for GM-free products is ultimately dependent on the willingness or otherwise to pay higher consumer prices (Moses & Brookes, 2013).

Primary Producers and Peak Industry Bodies

Producers see Tasmania's reputation for "clean and green" food as an edge in the export market although this is viewed as secondary by export market buyers to the broader "clean and green" reputation of Australian exports in general.

On the domestic market, Freshlogic noted that "in the majority of cases Tasmanian food is not labelled as Tasmanian or otherwise differentiated from other Australian food. As a result there is a low visibility of the Tasmanian 'brand' and therefore little benefit to producers from the State's reputation". There is doubt amongst peak industry bodies that consumers are generally aware of Tasmania's GMO-free status or make a connection between this and the State's "clean and green" image.

Both producers and the peak bodies that represent them have views which vary by industry and depend upon the opportunities that GM attributes present to them in the medium term.

Retail channel

The influences on food retailers are centred on the brands the retailers own and manage and the range of products they offer. Freshlogic noted that in recent times, retailers have reflected commitments in their brand values and positioning such as:

- Hormone Growth Promotant (HGP) free meat;
- Permeate-free milk; and
- Commitments to move fresh egg supplies to free range production systems.

These changes reflect retailers' increased sensitivity towards consumers' concerns about where their food comes from and how it is produced. Most if not all major Australian retailers have a policy that their retail (in-house) branded products will be produced from non-GM ingredients and additives and are to remain GM-free as much as possible. However, Freshlogic noted that "retailers do not have policies regarding preferential purchasing from regions that are GM-free".

Freshlogic noted that retailers have positive perceptions about the quality of food on offer from Tasmania with the brand image anchored in "pure", "natural" and "clean" attributes. However, when tested against a supply scenario of comparable products sourced from the mainland, product with Tasmanian origin is not enough to earn exclusivity with retailers. There is also a high awareness that if some products are claimed to be GM-free, this action by default implies that all other products are not GM-free and retailers do not see this as a welcome situation and are concerned how this may impact on retail sales.

Retail managers who are responsible for managing retail brands are more aware about GMO issues due to their involvement in checking food ingredients to meet policy requirements. Significantly, however, those who are purchasing the bulk of retail merchandise, and not involved in the private label programs, are not all aware that the Tasmanian GM moratorium is in place. Freshlogic also noted that "potential retailer responses must be considered within the current context, in which the Tasmanian GM moratorium has little impact on retail purchasing decisions". Freshlogic concluded: "as there is minimal trade with local retailers based on the moratorium being in place, there are minimal commercial consequences for the local retailers if the moratorium is lifted".

Food wholesalers and distributors

The wholesale and distribution channel is made up of traders and vertically integrated growers. As "middle men" they generally have lower level of investment in consumer attitudes.

Tasmanian product often has low visibility in this sector because of higher volumes of product from other States. At present, GM attributes are not a significant factor in their commercial decisions.

The wholesalers and distributors responded to Freshlogic that a lapse in the moratorium is unlikely to initiate any significant response given the low awareness of the current moratorium status and the attitudes of their supply chain.

Beverage producers and distributors

Freshlogic noted from their research that this sector has a higher exposure to consumer attitudes and that there is the perception in this sector of a low awareness of both the moratorium and GM issues in general; in their marketing, there was little perceived commercial benefit in marketing a GM-free trait. Freshlogic's research indicated that removal of the moratorium would have minimal impact in this sector.

Food service suppliers and operators

The foodservice channel distributes the food that consumers do not prepare themselves. In the majority of cases food ingredients are combined with other products into an end product that is then made available to consumers. This makes food ingredients and their attributes somewhat anonymous. There are exceptions such as "organic", "free range", "responsibly sourced", or "locally grown" and this did not appear to extend out to widespread GM-related claims at the meal ingredient level.

In this market segment, purchasing behaviour is completely dominated by a requirement to achieve the lowest possible cost. However the small number of specialty businesses that have positioned their offer on Tasmanian food quality would have concern if the moratorium was lifted and this would be framed by the media profile any change attracts.

Private sector certification organisations

Freshlogic also spoke to some of Australia's regulators and certifiers. Private sector certifiers see the moratorium as a potential advantage for the Tasmanian agricultural sector, with the key advantage of a marketing edge in the global trade area. The certifiers note the disadvantage of an increase in regulatory and certification costs to primary producers if GM varieties were introduced in Tasmania.

Freshlogic also noted that the actions of some non-government organisations counteract efforts to establish a marketing advantage based on Tasmania's GMO-free status, specifically when they put the credibility of this status in doubt. Freshlogic highlight an example of the True Food Guide (established by Greenpeace) where they have "seen products manufactured in Tasmania labelled with a "red warning", despite the State's GM-free status."

Domestic market summary

In summary the awareness and value associated with GMO-free indicates it is more of a supporting product attribute for marketing purposes rather than a leading or sole product attribute.

The Australian marketplace awareness of Tasmania's GMO-free status is higher amongst those investing in consumer brands than those trading in food products. All indications are that this is led by heightened consumer interest in food provenance issues, and reflected in new levels of marketing investments from food market brand managers, including the major retailers. Based on this heightened interest and increased level of marketing investment in provenance issues, there is a level of opportunity cost in removing the Tasmanian GMO-free status.

International market research

From Tasmania's international trade figures, food products exported into North Asia in 2012-13 totalled $265 million, or 51 per cent of Tasmania's total food product exports[192] (Tasmanian Government, 2013). As a way to ascertain perceptions of Tasmania and GMOs in overseas markets, Austrade was commissioned to conduct market research in two of Tasmania's key export trading partners, Japan and Hong Kong. The following is a summary of the main points from the research.

Hong Kong

Austrade interviewed five companies in Hong Kong representing supermarkets, food importers and/or distributors. Two currently buy Tasmanian products and all purchase Australian products. These buyers considered Australian foods to be clean, green, natural and have good quality with a high food safety standard. The majority of companies included Tasmanian food in this perception with only one indicating that they perceived Tasmania products to be cleaner and more natural compared with those of other States in Australia.

[192] The values for exports to North Asian markets are updated from what was included in the Issues Paper for this Review.

Since July 2006, the Hong Kong Government has provided a set of guidelines on voluntary labelling of GM food. The guidelines set out the principles underlying the recommended labelling approaches for GM food, and provide assistance for the trade to make truthful and informative labels in a consumer-friendly manner. The guidelines are advisory in nature and do not have any legal effect. Adoption is entirely voluntary and is not binding.

In general there is a lack of understanding and education around GM food. Consumers do not possess adequate information about the relative advantages and disadvantages of GM food and are not able to differentiate the different types. Consumer perceptions towards GM food in this market are not positive, with GM foods generally thought to be unhealthy.

All interviewed companies advised that they do not purchase meat, vegetables, fruit and/or dairy products from countries/regions that grow GM products commercially. However, they were not certain if the food products that they import are GM-free or not. When asked to rank which factors (list of eight factors) most influence their food purchasing decisions, the companies in Hong Kong ranked "presence of GMOs" and "grown in a GMO-free environment" as the least important factors in their purchasing decisions. Other attributes such as "country of origin", "quality" and "reliability and reputation of producer" were considered most important. In addition, brand attributes such as HGP free, organic, and "clean and green" are considered to be relatively more important than GMO-free, possibly because there is a lower awareness of GM foods.

Most companies interviewed in the Hong Kong survey emphasised that GMO-free products may not be able to attract market advantages such as price premiums but if the price was the same, consumers prefer Non-GM products. On the hypothetical question of Tasmania allowing non-food GMOs to be produced in Tasmania most interviewed said they would continue to purchase food from Tasmania, with price, uniqueness and quality the factors driving purchasing decisions. Interestingly, many of those interviewed equated pharmaceuticals with food because they are ingested and they were therefore reluctant to accept GM pharmaceuticals.

Japan

Austrade interviewed five companies in Japan of varied size and customer base, including companies with retail chains, merchandising stores, supermarkets and food specialist stores. The companies source products from suppliers (locally and overseas), through Japanese importers, with only one selling Tasmanian food products. All of those interviewed recognised Australia as a region with high standards of food safety and a producer of quality seafood and agricultural products, principally flour, beef, salmon and prawns. Retailers had a limited concept of Tasmania but considered it to have a very clean environment.

All interviewees source products from countries producing GM food and see it as unavoidable. As a consequence, some retailers restrict the sourcing of beef, vegetables, fruit and dairy to only their known suppliers (e.g. beef only from Japanese farmers).

Since 2001 the Japanese government has regulated the cultivation and distribution of GMO products through the Japanese Food Sanitation Act and the Japanese Agricultural Standards law. This includes the labelling laws requiring GM ingredients that make up more than five per cent of food products to be labelled. Labelling is not required for animal fodder.

The interviewed retailers did not have a preference for sourcing from GM-free countries, mainly because they perceive that this would be extremely restrictive. The decision on sourcing of product categories was

generally based around finding sources that are of significant scale and can provide a reliable and safe supply. When the retailers were asked to rank what influences their decision making, the top four considerations were "reliability and reputation of producers", "country of origin", "price" and "traceability of product". Use of additives, hormones and antibiotics were all considered relatively less important but the majority ranked them higher than GMO-free and grown in a GMO-free environment. This is partly due to the fact that these retailers rely on their manufacturers and importers to supply safe products.

Austrade reported that one food category that seems to spark some concerns for Japanese consumers is soya bean derivatives such as soy sauce, tofu and natto, which are consumed on a daily basis. For these products processors mark their products as GM or non-GM. Soya bean, the main ingredient, is mostly imported from GM crop-growing countries such as USA, Brazil and Canada. Some Japanese trading houses are paying 25-30 per cent more for Non-GM soya beans where they can source product. However, the retailer noted that it is increasingly difficult to source GM-free soya beans globally.

If the awareness about GM labelling and food safety were to increase, retailers would consider taking a more proactive role in promoting non-GMO produce. Currently, these retailers do not actively promote GMO-free products in store. Any additional changes to retail policy would be driven by a response to increased consumer concern about food safety issues.

As with the Hong Kong market, the Japanese retailers do not believe that consumers would pay a premium for GMO-free products but where two products are priced the same there is a preference for GMO-free.

According to the research the general awareness of GM food products is fairly low and consumers do not appear to actively seek out information on the use of GM technology in food production. The general consumer perception is that GMO food does not have a positive impact on human health and the environment.

There was very low awareness of Tasmania's GMO-free status due in part to these retailers having a fairly low involvement in direct importation (fewer than five per cent of in store products).

None could see any major issues, in the short term at least, with a potential change in State Government policy to allow the production of non-food GM products. Some retailers commented that they would want to check with their Tasmanian suppliers that this policy change would not impact on their ability to supply GMO-free. However, some felt it may also prompt them to question if the government policy was likely to extend to food as well.

Summary

It is clear from the Austrade research that in the Japanese and Hong Kong markets general consumer awareness of GM technology in food is fairly low and that the purchasing policy for retailers is generally based on accessing reliable and safe supply of product. The Project Team notes however, that in some areas consumer awareness of GMOs is higher. For example, the Green Co-op[193], a consumer co-operative from western Japan with 376,000 members, has a "food for life" campaign that opposes GM.

Most companies in these two countries pointed out that other brand/product attributes such as "organic", "hormone free" and "clean and green" are more important than "GMO-free". In addition the retailers'

[193] Submission 087

awareness of the State's GMO-free status was also fairly low but there was some recognition of Tasmania being a clean and green environment.

Macquarie Franklin (2012a) noted in their Report that the current market advantage that can be gained from specific promotion of Tasmania's GMO-free status is currently quite limited. Their finding appears to be supported by the research in the export markets of Hong Kong and Japan.

Although Tasmania's products do not have a significant differentiated presence in the Japanese and Hong Kong markets, the retailers considered that Tasmania has a very clean environment.

Research (Anderson & Jackson, 2005) has found that overseas countries adopting GM have initially lost market share to GM-free suppliers. The feedback from Japan and Hong Kong suggests that at this point in time if the GMO moratorium was removed, overall there would be very little impact on Tasmanian products *as a whole* in these overseas markets. However, there could be an impact in a small number of specific market segments such as canola, cherries and beef to Japan.

2) MONITORING FUTURE DEVELOPMENTS IN GENE TECHNOLOGY

FINDING

In coming years there will most likely be an increasing number of GM crops commercialised with claims of direct benefit to a wider range of stakeholders. These advanced modifications will apply to crops that are of relevance and able to be produced in Tasmania. The most prominent examples are pharmaceutical poppies and pasture cultivars.

Keeping track of developments in gene technology will help lead to a balanced debate and sound decision making. Formal mechanisms for monitoring these technological developments by Government, industry and other stakeholders will be important, either to assess the benefits and implications of the technology in the absence of a moratorium, or to inform future GMO policy in the presence of a moratorium.

DISCUSSION

"GM crops can be categorised as having either first, second or third generation traits: first generation traits provide benefits on the farm; second generation traits provide benefits to the producer and consumer; and third generation traits allow the plant to be used as a 'factory' to produce pharmaceuticals or industrial products" (Glover *et. al.*, 2005).

Of the commercially available GM crops, the only one of relevance to Tasmania at present is canola and it is representative of having first generation traits. These are primarily resistance to different herbicides. These traits are designed to simplify weed management in the crop and enhance production of the crop on farm.

Future developments

In Tasmania the focus has been primarily on GM canola as the most relevant of GM crops to the State. Though currently the GM trait relates to herbicide resistance, as one submission highlighted[194], canola plants genetically modified to synthesise long-chain omega-3 fatty acids could potentially be available for use before 2018, which could replace fish oil as an alternative source of these acids for use in stock feeds. This crop is an example of second generation traits and could potentially be produced in Tasmania. This example is illustrative of the importance of looking ahead and being aware of technology developments.

There are a range of other agricultural crops that are currently, or potentially, at the research and development stage in Australia and internationally, representing both second and first generation traits. These include GM pasture grasses (disease resistance, nutrition), GM poppy species (alkaloid yield and types), GM wheat (nutrient utilisation efficiency, enhanced yield) and GM forestry (growth rates, yield).

Similarly to canola, genetically modified forestry species may also be agronomically suited to production in Tasmania. Forestry Tasmania[195] "envisaged that in forestry, GMO's will improve wood yields from plantations under conventional production systems, reducing the pressure to produce wood from native forests and or using less land for plantations." However it is noted that Forestry Tasmania[196] stated that it "has not, and does not, use GMO's in its field operations or in its genetic improvement programs". As noted previously in this Report: "Forestry Tasmania has no intention to use GMO's in its field or tree breeding

[194] Submission 065
[195] Submission 057
[196] ibid

operations as doing so would be in contravention of the current Australian Forestry Standard and Forest Stewardship Council principles, to which Forestry Tasmania subscribes."

Several submissions stated that the relevant industries in Tasmania would need the option to access gene technology to remain competitive and at the leading edge of their industries in the future. The two most prominent future applications of direct relevance to Tasmania, raised in several submissions, are dairy and poppy production.

Pasture

A mixture of first and second generation traits are currently the subject of R&D work in Australia and overseas. This includes virus resistance in white clover species and nutritional characteristics of ryegrass pasture grasses. Both are identified to directly benefit productivity, particularly in dairy cattle.

Timeframe for commercial release is estimated to be over the next five to 10 years: submissions from the dairy industry indicated a timeframe for commercialisation in the 2015-2020[197] period. Others, like Gene Ethics,[198] suggest the research is only "proof of concept" and state that "the possibility of other commercial (GM) products becoming available for Tasmania in the five to ten year timeframe of a new GM-moratorium is extremely remote."

Pharmaceutical Poppies

Submissions received from the poppy industry suggested that in future GM poppies may provide a range of benefits for Tasmanian poppy producers and that such benefits may be the difference between being competitive with other poppy producers in the world or not. Traits generally relate to changes in types of alkaloid being produced and the efficiency of alkaloid production, and are good examples of third generation traits. Timeframe for commercial release is not known and current work is at the R&D stage. Field research and development in Tasmania would be expected to occur ahead of commercialisation.

Others

There is extensive R&D on a range of other species investigating a range of first, second and third generation traits. The timing of commercial release for crops ranges from "imminent" for some canola crops producing modified oils, through to a decade or more for some of the "nutriceutical" crops presenting third generation traits. In addition there is a large range of factors that influence whether a GM crop plant is taken through to commercialisation including the outcome of the R&D work itself, commercial viability of the modified crop, marketing considerations and regulation. The mere fact that R&D is being conducted does not mean a commercial product will result.

A mechanism for monitoring future developments

"Knowing what GM crops are under development is needed to ensure a balanced debate and informed decision making on their adoption. Advanced notice is beneficial for crops that require monitoring or industry stewardship. It is also important to assess GM crops under development internationally because of their potential impacts on Australia's trade and competition, as well as the issues surrounding the unplanned presence of GM material in non-GM crop imports" (Glover *et. al.*, 2005).

[197] Submissions 045, 085
[198] Submission 124

At least three submissions[199] suggested a mechanism was needed to monitor future developments of GM technology for relevance to Tasmania. Whether a moratorium is in place or not, the Government could consider establishing a mechanism to monitor GM technology developments, including the newer second and third generation trait developments. Such a mechanism would need to consider a range of issues related to the technology including the technical development itself, as well as assessing the potential economic and market implications that the new gene technology development would have for Tasmania.

Such monitoring would assist in any subsequent reviews of the moratorium. If a moratorium is not in place a monitoring mechanism would still be able to assess the technology for application in the State and be able to assess benefits or otherwise.

It should be noted that the existing administrative system used by the Department in relation to the GMO policy in Tasmania incorporates internal monitoring processes via a "Communities of Practice" of staff specialising in, and sharing knowledge related to, gene technology developments. It also includes an Interdepartmental Committee (IDC) for gene technology. The IDC membership includes representatives from DPIPWE, DEDTA, Department of Health and Human Services (DHHS), and Department of Premier and Cabinet (DPAC) and meets as required. Both these mechanisms are primarily government-based memberships, whereas what has been proposed in submissions suggests broader stakeholder involvement.

[199] Submissions 038, 061 and 109

3) THE TASMANIAN GMO REGULATORY FRAMEWORK

FINDING

The *Genetically Modified Organisms Control Act 2004* ("the Tasmanian Act") operates concurrently with the Commonwealth and Tasmanian *Gene Technology Acts*. A matter for future policy could be to provide further guidance on the "likely impact on markets test" (for when determining whether to grant or refuse a permit for dealing with GMOs in Tasmania). The South Australian approach that provides for an exemption to a GMO-free area to be granted after taking into account market requirements offers an alternative test.

There is a view that the moratorium and associated regulation is stifling biotechnology research at the University of Tasmania, with negative economic consequences for the education economy. The future policy on GMOs may benefit from reinforcing the Government's support for agricultural R&D, and in doing so clarify the position on tightly controlled GM trials and contained trials.

DISCUSSION

Issues raised in the submissions

The legal validity of the dual Commonwealth-State regulatory regime for gene technology in Tasmania was raised in two submissions. The operation of the regulatory regime and its effect on R&D was also an associated matter raised by TIA[200].

On the issue of legal validity, PGT[201] stated that the legal basis for the moratorium, in particular the test for refusing a GMO permit under section 9(2) of the *Genetically Modified Organisms Control Act 2004*, was open to successful legal challenge: "the wafer thin legal basis for the state ban on GM, already narrowed due to the obvious constitutional issues, could be about to get thinner."

Ausbiotech submitted that: "the current Tasmanian moratorium on GM is inconsistent with the policy intent for a national, coordinated national approach to the research, development and commercialisation of agricultural biotechnology as agreed by the COAG and has created a two-tier regulatory process." [202]

The point that was made by TIA[203] in relation to the dual regulatory process and its effect on R&D was that: "Attempts to do research on genetically modified plants at UTAS have been made difficult by the regulatory processes imposed by Commonwealth and particularly State agencies … the associated transaction costs have prohibited any serious research associated with GM technologies."

The Project Team sought further information from TIA on this assertion, and they stated: "numerous science opportunities have been missed because the regulatory environment is at odds with the fast paced environment of transgenic research … the above comments do not imply that the Tasmanian and Commonwealth … processes are overly slow, onerous or bureaucratic in themselves, but that they are relatively time consuming in an international context of fast-paced, high level research development" (H Meinke, pers.comm., 15 Nov 2013).

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[200] Submission 038
[201] Submission 082
[202] Submission 095
[203] Submission 038

A response to these issues raised in submissions is provided below. In so doing, this Report is not intended to constitute legal advice or opinion and should not be relied on as such.

Power to regulate

The *Gene Technology Agreement 2001* (Cth) sets out the policy intent of the national regulatory regime. Tasmania supports a national regime for the scientific assessment of risks to the environment and human health and safety posed by GMOs, provided that the sovereignty of the State to determine its appropriate level of protection in marketing matters is not impeded.

The Commonwealth legislature has powers to make laws on certain matters listed in the *Commonwealth of Australia Constitution Act 1900* (the Constitution). GMOs are obviously not among these matters; therefore the *Gene Technology Act 2000* (Cth) was enacted using a collection of constitutional powers (see section 13 of that Act). The *Gene Technology (Tasmania) Act 2012* expressly provides that the Commonwealth Act applies in Tasmania to its fullest extent, but is modified to prohibit a GMO licence if the dealing is in contravention of an order declaring a GMO-free area (section 7 of that Act).

The purpose of the *Gene Technology Act 2000* (Cth) is set out in section 3 of that Act: "… 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." It is important to note that this object is limited to environment and human health and safety. "Marketing purposes" is not an object of the Commonwealth Act, therefore that Act applies in Tasmania, concurrently with the *Gene Technology (Tasmania) Act 2012* to "cover the field" and regulate dealings with GMOs for the environment and human health and safety, but not for marketing purposes.

The Australian Government has also made the Gene Technology (Recognition of Designated Areas) Principle 2003 for the Gene Technology Regulator to recognise State-based controls for marketing purposes. Thus the *Genetically Modified Organisms Control Act 2004* (Tas) operates concurrently with the Commonwealth Act.

PGT also submitted that the test, in section 9(2) of the *Genetically Modified Organisms Control Act 2004* (Tas – "the Tasmanian Act") is legally flawed and bad law.[204]

Section 9 of the Tasmanian Act provides:

> *(1) On receipt of an application under section 8, the Secretary may –*
>
> *a. grant a permit to the applicant; or*
>
> *b. refuse to grant a permit to the applicant.*
>
> *(2) In determining whether or not to grant a permit, the Secretary is to consider –*
>
> *a. the location and purpose of the dealing with the GMO as proposed in the application; and*
>
> *b. the **likely impact on market access** for non-genetically modified crops and animals of the dealing with the GMO as proposed in the application; and*
>
> *c. the management regime for the GMO as proposed in the application; and*
>
> *d. any other matter the Secretary considers relevant.*

[204] Submission 82, page 26.

In making a decision the Secretary (DPIPWE) could have regard to the *Policy statement: gene technology in Tasmanian primary industries (2009-2014)*. The Policy Statement contains some information that could be relevant to a decision. For example, clause 6.6 reads:

> Release of plants, seeds or other propagules genetically modified for pharmaceutical purposes and not intended for use as food or feed, to the Tasmanian environment for open-air trials or commercial purposes may be authorised under the *Genetically Modified Organisms Control Act* 2004. However, authorisation will be subject to:
>
> - prior approval by the national Office of the Gene Technology Regulator as required; and
> - assessment by the Department … of the likelihood of GMO entry to the broader environment, other plants, or human or animal food supplies; and
> - conditions as required.

A point of comparison may be drawn with South Australia where the Minister may grant an exemption to a GMO-free area if, among other considerations, the Minister is satisfied that it is reasonable that an exemption be granted after taking into account market requirements: s.6(2)(b) of the Genetically Modified Crops Management Act 2004 (SA). This is a slightly different test that does not require a consideration of "likely" impacts on markets and may offer an alternative approach.

A matter for future GMO policy could be to provide further guidance on the likely impact on markets test (for when determining whether to grant or refuse a permit for dealing with GMOs in Tasmania).

Regulation and R&D

On the question of whether the Australian national regulatory regime for gene technology and the State-based controls hinder GMO R&D, the Project Team notes that this requires consideration of the national regulatory regime as well as the State-based measures.

Under current regulatory controls, any "dealing" with a GMO in Tasmania requires a licence from the OGTR to first be issued (unless under the *Gene Technology Act 2000* (Cth) a licence is not required), then the licensee must apply to the Secretary (DPIPWE) for a permit. It is recognised that this is a two-stage process that does not apply in any other State in Australia other than South Australia. It is also recognised that this issue was raised in only one submission and none of the research institutions that have previously been granted GMO permits in Tasmania[205] have expressed these concerns.

The regulatory burden of the national regulatory regime was addressed in the 2011 review of the *Gene Technology Act 2000 (*Cth), where it was recognised that almost all regulations impact on productivity, yet this and compliance costs were justified due to the risks identified and the benefits achieved by the legislation (Allen Consulting Group, 2011). It was also recognised in that review that State moratoria result in additional compliance costs, including forgone opportunities.

Addressing this issue is a matter for the Australian Government in its administration of the national regulatory regime. However, it is recognised that controlled R&D on GMOs in Tasmania is not precluded by the existing legislation and is supported in the current Policy Statement. Nonetheless, it may be beneficial for the future policy on GMOs to reinforce the Government's support for agricultural R&D, and in doing so clarify the position on tightly controlled GM trials and contained research.

[205] See page 14 of the Issues Paper for this Review.

4) LEGAL DEFINITIONS AND EMERGING TECHNOLOGIES

FINDING

The national regulatory regime for gene technology contains adequate definitions and mechanisms to incorporate new organisms and technologies. A previous Commonwealth Government review identified that any limitations in the regime that lead to uncertainty for researchers and users of new undefined technology, are a matter for the Office of the Gene Technology Regulator to address.

Confusion and lack of understanding of the complex scientific process for using gene technology to create new organisms is not a new issue. While the Gene Technology Regulator has statutory responsibility to address this, and provides information to the public, the Tasmanian Government may need to take additional steps to increase public awareness and understanding in the event that an application to deal with a GMO in Tasmania is received that meets the requirements for a permit to be issued (should the current legislative approach be retained).

DISCUSSION

Two submissions from stakeholders raised concerns about the definitions of GMO and whether gene technology is properly understood by those engaging in the debate. The potential for such confusion was mentioned in the Issues Paper for this Review, along with the preferred terminology for conventional breeding, biotechnology, gene technology and GMO.

The TFGA raised concern about the general understanding of gene technology and what organisms are covered by the term GMO: "One key issue is the fact that there is little real understanding of what is actually meant by the terms "genetic modification" or "genetic engineering". It is clear that there is widespread confusion about what actually constitutes a GM process and what might be a natural breeding program ... Before any meaningful conversation can be had about the moratorium, there needs to be a consistent and agreed position on a definition."[206]

TIA submitted: " … it should be highlighted that simplistic definitions of GMOs and conventional breeding do not represent the current diversity of approaches to breeding. Trans-genic organisms (in which genetic material from different species are combined) might be considered quite differently from intra-genic organisms. In the latter only DNA from within the host organism itself is used to transform the organism – hence it is not transgenic (no foreign DNA) but intra-genic even though the means of developing these organisms follows typical GMO processes. These processes can have similar or even identical outcomes to mutagenesis approaches which speed up the rate of genetic recombination in a random way, and are not considered to be genetic modification under Tasmanian law."[207]

An ancillary question is the ability of legislation to adapt to emerging technologies.

As Australia has a national regulatory regime for "dealings" with GMOs, of necessity the relevant legislation must contain definitions of gene technology and the organisms produced by it. These definitions are crucial to the operation of the national regulatory regime and organisms that do not fall within the relevant definitions are not subject to the legislation.

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[206] Submission 109
[207] Submission 38

The term "GMO" is defined in section 3 of the *Gene Technology Act 2000* (Cth) as: *"An organism that has been modified by gene technology, or an organism that has inherited particular traits from an organism (the initial organism), being traits that occurred in the initial organism because of gene technology"*. Gene technology is defined in the Cth Act as: *"any technique for the modification of genes or other genetic material, but does not include sexual reproduction or homologous recombination."*

While the definitions of gene technology and GMO in the *Gene Technology Act 2000* (Cth) can be extended in the *Gene Technology Regulations 2001* (Cth) to account for emerging technologies, no such regulations have been made to date. However, schedules 1A and 1 of the Regulations operate to remove certain techniques and organisms from the definitions of gene technology and GMOs in the Commonwealth Act. The Project Team is of the view that the complexities in defining technologies and the organisms produced using these technologies can be adequately dealt with under the national regulatory regime.

The definitions in the *Gene Technology Act 2000* (Cth) are incorporated by reference in the corresponding *Gene Technology Act (Tasmania) 2012* and the *Genetically Modified Organisms Control Act 2004 (Tasmania)* and the definitions as set out in the *Gene Technology Act 2000* (Cth) are thus the official definitions of gene technology and GMO therefore apply in Tasmania.

The *Gene Technology Act 2000* (Cth) requires the Gene Technology Regulator to provide information and advice to the public about the regulation of GMOs (s.27(f)). The Allen Consulting Group (2011) noted that, while the OGTR website contains up-to-date information and advice and the OGTR regularly communicates via media, event participation and the like, there remains some confusion about GMOs and GM crops in the community. In response, Australian jurisdictions[208] agreed, in principle, that the Gene Technology Regulator should increase communications to the public and address misinformation about gene technology in the public arena (Australian Government, n.d.).

In its submission, the TFGA[209] also committed to working with Government and stakeholders to ensure a widespread understanding of terminology, in particular to avoid confusion with conventional or traditional selective breeding and enhancement methods.

Further, in the 2011 review of the *Gene Technology Act 2000* (Cth) the Allen Consulting Group found that the Act already contemplates emerging technologies, as the Minister has the power to narrow or broaden the scope of the definition of GMO in the *Gene Technology Regulations 2001* (Cth). However, significant problems with this approach were noted: it could take up to 18 months for a new regulation to be made, thus leading to uncertainty for researchers and users of new, undefined, technology. In responding to the 2011 report, all Australian jurisdictions agreed that the OGTR should investigate ways of streamlining the process for regulatory amendments so emerging technologies can be covered (Australian Government, n.d.).

As mentioned above, the Tasmanian legislation that regulates GMOs and gene technology incorporates the Commonwealth *Gene Technology Act 2000* (Cth) definitions by reference, so any amendments made to the definitions by virtue of the *Gene Technology Regulations 2001* would automatically apply in Tasmania.

[208] Other than the Queensland Government
[209] TFGA ob cit.

5) THE FORM OF THE MORATORIUM

FINDING

Unless the *Genetically Modified Organisms Control Act 2004* (Tas) is amended to remove or extend the operation of section 36, the current moratorium on GM crops and animals in Tasmania will automatically expire on 16 November 2014. Therefore the first decision-point is whether to lift or maintain the moratorium.

If a decision was made to lift the moratorium, this would effectively create an open co-existence regime, or "market choice" model of industry self-regulation. It should be noted, though, that no submissions advocated removing all regulatory controls including the Gene Technology Act 2001 (Cth). This would make Tasmania's regulation of GMOs similar to that of Queensland and the Northern Territory, which have no moratorium legislation; whereas the other States all have moratorium legislation, but with differing approaches for commercial release of GM canola and GM cotton.[210]

In the current circumstances, if a decision is made to maintain a moratorium there are effectively three options as to what form it could take:

1. The "***status quo***" where dealings with GMOs are assessed for environment and human health and safety risks by the Gene Technology Regulator (GTR) under the national regulatory regime, and prohibited in Tasmania for marketing purposes unless approved on a case-by-case basis via a permit. To maintain this option requires legislation to remove or extend the sunset clause in the *Genetically Modified Organisms (Control) Act 2004*;

2. A "***blanket moratorium***" which winds-back the ability to apply for a permit to deal with GMOs in Tasmania. Again, legislation would be required to implement this option. Under a blanket ban option issues to consider would include the approach taken to R&D into GMOs, and the need to recognise pre-existing permits and management arrangements of historical canola trial sites; or

3. A "***co-existence by regulation regime***", with specific legislative provisions to exempt certain crops from the moratorium, for example non-food crops, with Government controls on how the crop is grown and managed throughout the supply chain via mandatory standards and protocols.

For the option of a co-existence by regulation regime, the current legislation could be amended to allow for GM-designated areas where only certain GM crops could be grown, and/or to allow for exemptions to be granted on specific GM crops.

Some submissions[211] raised the need for participatory and transparent decision-making. [212] The current Tasmanian legislation does not require public or stakeholder input when the Minister is considering declaring GMO-free areas[213] and when the Secretary is assessing an application for a permit to deal with a GMO.[214]

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[210] For further information on the regulatory position of other States, refer to the issues Paper for this Review.
[211] For example, submission 124
[212] This is a separate question to the consultation processes employed by the OGTR. The OGTR invites submissions when assessing applications for licences under the Commonwealth legislation, which regulates risks to the environment and human health and safety. The Tasmanian legislation regulates for marketing purposes only.
[213] Under the South Australian *Genetically Modified Crops Management Act 2004* the Minister is required to undertake a public consultation process prior to recommending that the Governor make a regulation declaring GM or non-GM crop areas.

To date this has not been a major issue, with numerous reviews before a decision has been made on whether the moratorium should be extended and limited applications of GMOs being relevant to Tasmania. However, any future decisions, either approving or rejecting dealings with GMOs, will generate considerable public interest.

Investigation of any option other than a blanket moratorium will raise a fundamental question: "what is the 'watershed' event that tips the balance from GM-free to GM for marketing purposes?" Some suggest that this has already happened in Tasmania with the GM canola trials in the late 1990s and early 2000s[215], while the Project Team observes that this could be when the first commercial GM crop, either a food or non-food crop, is planted in Tasmania.

In that event, consideration must then turn to how co-existence between GM and non-GM crops can be managed. The issues associated with co-existence are discussed in detail in the next Finding in this Report.

DISCUSSION

As outlined in the Background to this Report, the majority of submissions supported the continuation of a GM moratorium in Tasmania, 11 were against maintaining the moratorium and four expressed no particular position either way.

Views as to an appropriate length of the moratorium, not unexpectedly, ranged from zero to indefinite, yet the majority of respondents to the question of how long should a moratorium remain indicated that it should be for 10 or more years. Some stated that this would be long enough for GMO-free markets to develop while others suggested that as soon as research and development of benefit to Tasmania emerge, the moratorium should be lifted either wholly or on a case-by-case basis.

Open co-existence

An open co-existence regime, where there is no moratorium, can be considered as one where the national regulatory regime is the primary system for managing risks to the environment and human health and safety from the release of GMOs, and market impacts are left to industry self-regulation.

Of the submissions against any continuation of the moratorium, Ausbiotech and the ADIC[216] advocated a "Market Choice" framework. Using GM canola as an example, this framework effectively recognises industry's ability to manage marketing aspects of co-existence under the national regulatory regime. The following table, from Australian Oilseeds,[217] was provided by ADIC to illustrate the GM canola Market Choice model:

[214] Contrast with section 6 of the South Australian *Genetically Modified Crops Management Act 2004* where the Minister must consult the Advisory Committee.
[215] See for example submission 112.
[216] Submissions 95 and 111
[217] Adapted from Australian Oilseeds, n.d, *Delivering Market Choice with GM canola*, http://australianoilseeds.com.

Step	Action
1	Australian regulatory approval gained for GM varieties
2	Market requirements identified • Need for segregation to meet the various requirements of domestic and international consumers
3	Threshold levels established • Australian AP thresholds established for the presence of GM traits in canola at 0.5% for seed (Australian Seed Federation) and 0.9% for grain (NACMA CSO1 Canola standard) • AP thresholds established in key trading partners, such as Japan (5%) and Europe (0.9%), for contractual or labelling purposes
4	Importing market approvals in place • GM varieties have approvals in key importing countries
5	Supply chain processes to meet market requirements • Protocols available to segregate throughout the supply chain

Expiry of the *Genetically Modified Organisms Control Act 2004* (Tas) would pave the way for the GM canola Market Choice (or similar) model to be implemented in Tasmania by participating industries.

The "status quo"

As the moratorium is achieved through a legislative mechanism, any extension of it must be made by the Tasmanian Parliament as an amendment to the *Genetically Modified Organisms Control Act 2004* (Tas), ("the Tasmanian Act").

Legislative options for extending the moratorium in its current form could include:

1. Repealing section 36 of the Tasmanian Act , that is, to remove any reference to an expiry date in legislation; or
2. Amending section 36 by inserting a new expiry date.

The Tasmanian Act currently provides for, among other things:

1. The Minister to declare the whole or any part of Tasmania to be an area that is free of GMOs if he or she considers that to do so would aid in preserving the identity of non-GM crops and animals for marketing purposes (section 5);
2. A prohibition on dealing with GMOs in a GMO-free area (part 2);
3. Exceptions from the prohibition for those who have obtained a GMO licence from the Gene Technology Regulator (when required under the *Gene Technology Act 2000* (Cth)) and a permit under the Act; and
4. Power for the Secretary (DPIPWE) to grant permission to a person to deal with a GMO in a GMO-free area.

It is important to note that the Tasmanian Act does not give the Minister power to declare GM areas, or areas on a crop-by-crop basis. Rather, if the Minister was to declare some areas of the State to be GM-free areas, the remaining areas would be GM permitted areas, by default.

It should also be noted that there is no statutory requirement for the Minister to consult with any person, group or industry prior to declaring GMO-free areas.

A "blanket" moratorium

Many submissions argued for stronger controls so that no GMO plants or animals can be permitted in Tasmania. As the current legislation allows for permits and limited exemptions (for inadvertent dealings) any decision to retract those aspects of the moratorium may require removal of relevant provisions from the legislation.

There are two issues that would need further consideration if there was to be a blanket moratorium. The first relates to how the ban would apply to R&D into GMOs. For example, a blanket moratorium could apply to all dealings with GMOs, including R&D trials and contained research. Alternatively the blanket moratorium could apply to the release to the environment of GMOs for commercial purposes only, leaving open the possibility for R&D into GMOs. The second issue relates to how the historical GM canola trial sites in Tasmania would be recognised to avoid a potential situation where volunteer GM canola plants could put the landholder in breach of the moratorium.[218] In this case the legislation may require specific provisions to recognise the pre-existing permits and management arrangements for the trial sites, which aim to eradicate any GM volunteer plants.

Co-existence by regulation

Some submissions advocated for automatic exemptions for non-food crops, such as GM poppies, other GM pharmaceutical plants and GM pastures for dairy and grazing. The TFGA and TAPG also raised the idea of "triggers" for all or part of the moratorium to be lifted.

Contrary to the assertions made in some submissions, the Tasmanian Act does not currently contain specific provisions that exempt certain crops or products from the moratorium. The legislation contains limited exemptions in section 19 for people who unintentionally deal with a GMO in a GMO-free area, but it appears that this exemption provision is directed towards inadvertent dealings. This is likely not the type of exemption that some submissions advocated for.

A person wishing to deal with GM crops in a GMO-free area can currently be granted a permit to do so, but that permit is on a case-by-case basis and applies only to the applicant and other people named in the site management plan. The permit does not attach to the particular GMO crop per se.[219]. In order for a permit to be issued, the Secretary is to consider the items set out in section 9(2) of the Act.[220] Clearly any person wishing to "deal" with a GMO can apply to the Secretary (DPIPWE) for a permit to do so, once a valid

[218] For further information on the management of the historical GM canola trial sites in Tasmania see the Issues Paper for this Review, or the DPIPWE website.
[219] The Issues Paper for this review provides further information on the permits issues in Tasmania for dealing with GMOs (page 14).
[220] For a detailed discussion of these elements, refer to Finding 3 of this Report.

licence from the GTR has been obtained (if required). [221] A permit, if approved, would be issued to a particular person and is not blanket coverage for anyone to grow a particular GM crop.

Exempting certain crops from the moratorium would likely require moving to a "co-existence by regulation regime". In this scenario the Government would need to consider mechanisms to tightly control the GM crop, so that the risks associated with it co-existing with other non-GM crops or enterprises are managed. It is likely that legislative changes would be required.

First, the Tasmanian Act does not allow the Minister to declare GMO areas or restrict those areas to certain GM crops. Here a comparison can be drawn between the Tasmanian Act and the South Australian *Genetically Modified Crops Management Act 2004*, under which the Governor may designate GM-food crop free areas or GM areas where only certain GM food crops may be cultivated (section 5). Once an area has been designated the Minister may declare that specified GM crops are able to be cultivated in the area, provided that appropriate and effective co-existence systems are in place and are reasonably expected to be complied with (section 5(5)). The South Australian legislation may provide for a more flexible moratorium arrangement that can allow for certain GM crops to be cultivated in areas across the State.

Alternatively, the current legislation could be amended to grant exemptions for specific GM crops. The growing of any exempt GM crop and how it is managed throughout the supply chain, could conceivably then be controlled through notification and reporting requirements, as well as standards and protocols, that are mandated in legislation (or in supporting regulation).

The TFGA and TAPG also both indicated qualified support for a short continuation of a moratorium as there are no new GM crops in the immediate pipeline, and advocated for "triggers" to be established so that any moratorium in place could be reviewed. It was not entirely clear from these submissions what those "triggers" could be; however, technological change, increased availability of GMO products and shifts in consumer market trends (presumably towards greater acceptance of GMOs) were mentioned in this context.[222]

The discussion in Finding 2 on establishing a formal mechanism for Government and stakeholders to monitor future developments is relevant in this context. It was noted that second and third generation trait developments, technical development and potential economic and market implications would need to be monitored over time. Such information could then be used to inform policy decision making at a future point in time.

Aside from the sunset clause in section 36, the Tasmanian Act does not currently provide triggers as such for winding back the moratorium in whole or in part, although at any time Parliament can conceivably decide to repeal or amend the legislation. However, the development and passage of legislation through Parliament is typically a lengthy and involved process.

In terms of stakeholder engagement, the Act currently does not contain any statutory requirement for the Secretary to consult any person prior to granting or refusing a permit to deal with a GMO in a GMO-free area. The Secretary has the power to require the applicant to provide further information (s.8(3)), and consider any other matter the Secretary considers relevant (s.9(2)(d)). It is considered that these powers could be used by the Secretary to obtain further details relevant to market access and other relevant

[221] Note that there are rights of administrative and judicial review under the *Genetically Modified Organisms Control Act 2004* (Tas) so any such decision, is subject to review by those with standing to appeal.
[222] Submissions 109 and 61 respectively.

considerations, and to consider the terms of any Policy Statements[223] as relevant direction from the Government of the day, but do not necessarily equate to a public consultation process. Moving to exempt certain crops would necessitate giving further consideration to stakeholder consultation processes.

What is the "watershed" event?

Notwithstanding the mechanics of how to manage any future moratorium as described in the above options, the "watershed" event is a fundamental policy question to be satisfied before any measure other than a blanket moratorium is imposed.

The decision to release a GM crop has been described in New Zealand as the "watershed" decision because at that point "we would no longer be a genetic modification-free nation in terms of crops" (Royal Commission on Genetic Modification, "RCGM", 2001, p338). The Project Team concurs with this finding of the RCGM, and considers that, in the Tasmanian context the first commercial release of a GM crop into the Tasmanian environment could be considered our "watershed" event. At that point our State could no longer market itself as "GMO-free".

This position is in contrast to the submission of Mark Poll, who cited the persistence of GM canola from the field trials in Tasmania in the late 1990s and early 2000s as evidence that the GM-free balance had already tipped.[224] In this case, the Project Team considers that because the GM canola in question was not permitted for commercial release, is relatively small-scale and is being actively managed and audited for eradication, it does not materially impact on the State's ability to market itself as GMO-free.

Depending on the market segment, submissions differed on whether commercial release of a non-food GM crop would allow the State, and individual businesses, to continue to market as "GMO-free". The first test when contemplating the future policy on the moratorium is therefore whether permitting the commercial release of any GM crop would put at risk the benefits arising from the moratorium for marketing purposes. If it does not, then it becomes a question of how to manage for co-existence between GM and non-GM crops.

Managing co-existence is explored in detail in Finding 6 in this Report.

[223] For example the current *Policy Statement: gene technology and Tasmanian primary industries 2009-2014*.
[224] Submission 112.

6) MANAGING CO-EXISTENCE OF GM AND NON-GM CROPS

FINDING

Co-existence is a complex policy area. An appropriate co-existence framework would be required if any GM crop were permitted to be grown in Tasmania. Given the range of issues involved, developing such a framework would require input from industry and other stakeholders. The framework would need to include protocols, standards and thresholds, as well as new marketing strategies to reassure non-GM markets. The roles of each party, Government and industry, would also need to be clearly defined and the question of who pays to manage for co-existence resolved.

Co-existence across non-GM production systems and crops is already occurring in Tasmania. However co-existence would become much more complicated following the introduction of a GM crop in Tasmania. As soon as the commercial release of a GMO to the environment, either a food or non-food crop, is contemplated it raises a number of inter-related issues including segregation, risk of contamination to non-GM crops (including organics), thresholds (adventitious presence and low level presence of GM) and legal liability.

There are different approaches that Tasmania could consider for establishing a co-existence framework to manage the introduction of a GM crop. To segregate GM from non-GM materials on-farm and in supply chains the options include regulatory standards and protocols and/or industry certification systems.

Segregating and managing the risk of contamination between non-GM and GM crops is likely more feasible for some crops than others: e.g. pharmaceutical poppies are already a highly regulated crop. However, regardless of any co-existence framework introduced, there will always be some risk of contamination. It is noted that contamination may occur to non-GM crops from GM crops, and also vice versa.

However, co-existence occurs at two levels. Beyond physical segregation, there is the additional complexity of whether Tasmanian products, either GM or non-GM, can co-exist in the marketplace without causing economic harm to particular products, markets or the Tasmanian brand as a whole.

The Government's role in managing co-existence would seem more straightforward if the State's policy position was absolute: either to have a blanket ban on dealings with GMOs, or to allow the moratorium to lapse so that GMOs would be entirely regulated through the existing national system. In the former case, the issue of co-existence generally becomes one of managing the quarantine barrier for imports of GM materials through appropriate thresholds, testing and audits. The latter becomes a "case-by-case" approach with a clearer onus on the industry to develop appropriate co-existence protocols to segregate GM from non-GM in the supply chain, with disputes managed through the courts and industry self-regulation of the marketing aspects. The marketing position is also clearer in either case, i.e. Tasmania is either entirely GMO-free or it is no longer GMO- free.

Co-existence is more complex to manage if the policy is to maintain a moratorium to protect non-GM market opportunities, but potentially provide for the commercial release of specific GM crops, e.g. non-food crops. In this case the co-existence framework has to manage the risk of contamination both between GM and non-GM crops (in the field and in the supply chain) and between different production systems, e.g. organic and conventional. It also needs to protect the integrity of the moratorium itself and manage the market perceptions to maintain the very values (markets, future opportunities and Tasmanian brand position)

for those other sectors relying on non-GM. Marketing is also more complex as Tasmania's GMO status becomes more complex to explain to markets and consumers.

An issue that will also require further consideration is who pays the additional costs associated with managing for co-existence. For example, the costs include monitoring, reporting, compliance, auditing, physical segregation of materials in the field and at point of harvest, logistics in the supply chain, plus the marketing strategies to manage Tasmania's non-GM markets and brand positioning.

Regardless of the policy position on the moratorium, it will become increasingly difficult for Tasmania to sustain a zero-tolerance position on GMO materials. As time progresses and the presence of GM plants increases in Australia it is likely the only way to mitigate risk at a "zero tolerance" level would be to increase regulation – e.g. testing of all seed and grain entering Tasmania for GMOs, not just canola. This would be costly and impractical and could lead to Tasmania being unable to access some product or having to ban at-risk commodities. For feed grain that would not be feasible as Tasmania is a net importer of feed grain and we would have a range of issues, including animal welfare, arising for feed grain dependent industries. If any GM crops, food or non-food, are permitted in Tasmania the issue of thresholds will become even more pressing.

Therefore the issue of thresholds also warrants further consideration by Government, in consultation with industry and other stakeholders, in preparation for a time when additional GM crop types are commercially grown interstate in the future, and as part of determining the longer term policy on GMOs.

Associated with the issue of co-existence is the question of legal liability and the concerns of non-GM and organic farmers who may suffer contamination and economic loss in the event that GM crops are approved for release in Tasmania. All Australian jurisdictions have agreed that compensation for GM contamination should be sought through the courts rather than enacting specific civil liability laws. This is consistent with other jurisdictions, other than New Zealand, although it can be seen that the New Zealand strict liability scheme is not absolute and compliance with regulatory requirements for environmental release of a GMO is likely to affect the success of any action for compensation.

The ability of common law to address GM contamination and subsequent economic loss remains unclear in Australia, making it difficult for GM and non-GM farmers and producers alike to accurately assess their legal risks from GM crops. Questions remain about the ability of the liability system in Australia to deal with GM contamination under a co-existence framework. It is recognised however, that the potential exists for non-GM and organic farmers to inadvertently infringe Federal gene technology, intellectual property and consumer laws in the event of GM contamination.

DISCUSSION

Co-existence: managing segregation

As noted previously in this Report, numerous submissions stated that it is not possible for GM and non-GM crops to co-exist, whereas some submissions stated that co-existence between GM and non-GM is entirely possible and should not be a barrier to GMO adoption. Others highlighted the well regulated non-food crop of poppies as a highly suitable crop for Tasmania to manage in terms of co-existence because of its established risk management systems.

In Tasmania, our agricultural supply chains have been managing the co-existence of different production systems for many years. Industrial hemp and poppies are two examples of regulated non-food crops that

currently co-exist with other food crops. Tasmanian producers already choose between wholly certified organic/biodynamic or conventional production systems.

Tasmania can look to other jurisdictions for examples of how to establish co-existence frameworks to segregate GM and non-GM crops.

For the introduction of GM canola in Western Australia from 2009 a two stage process was adopted to first assess and then manage co-existence. During the first year there were only limited plantings and analysis of the capacity of the grains industry to manage segregation, with the second year comprising permitted plantings with further assessments of the effectiveness of segregation (McCauley et al, 2012).

In January 2011, a broad range of industry representatives met in Western Australia to consider management of the co-existence of GM, conventional (non-GM) and the organic production systems (McCauley et al, 2012). The main finding was that:

> Growers from all three farming systems should conduct their risk assessments and implement risk mitigation strategies before planting. Communication between neighbours is the key to co-existence of different farming systems. Due to the uncontrolled forces of nature, it is not possible to completely eliminate the risk of accidental GM presence on neighbouring properties and therefore communication between neighbours and relevant parties such as local government, contractors and service utilities … is required.

New Zealand has adopted a "preserving opportunities" approach. This requires each GM crop or field use to be treated on a case-by-case basis. It establishes an intermediate step ("conditional release") between field testing and open release with a range of mitigation measures proposed to achieve crop capability and to protect environmental and cultural values (RCGM, 2001). However, as noted in the Issues Paper for this Review, New Zealand is yet to "reality test" its stepped approach because as yet, and despite it being possible to do so, no GM crops are grown commercially in that country.

Even with an effective assessment process to approve co-existence of GM crops, challenges can still emerge after commercial release. As the existing zero tolerance position of the organic industry remains, any staged approach for the commercial release of GM crops could create a challenge in the organic sector (Australian Government, 2011b). Any risk would depend on the nature of the GM crop, its location and the management of the GM crop along its specific supply chain.

In GM growing regions, two typical co-existence regulation measures include isolation distances and pollen barriers. These measures have been adopted widely for the commercial production of GM canola and GM cotton in Australia. Mandatory isolation distances do not affect all farmers equally, so growing GM crops in "clusters" can be easier with levels of adventitious presence below a target threshold achieved "simply by cleaning shared equipment" (EC, 2006).

Some of the submissions noted that specific areas could be established for GM production. However if these were to be considered, overseas experience highlights that they need to be proportional and time-based around various crop rotations, to manage co-existence effectively (Demont and Demos, 2008). As noted previously in this Report, under current legislation, the Minister can only declare GMO-free areas, which by default could create areas where GMO production is permitted.

Experience in the EU shows co-existence problems emerge in seed and honey production in particular (EC, 2012). The OCT[225] and the Tasmanian Beekeepers Association[226] suggested that contamination of non-GM crops by GM crops is a proven risk with resulting impacts on certification and additional costs incurred in trying to prevent contamination.

A further challenge that Tasmania would need to consider is managing co-existence of GM and non-GM across supply chains. Beyond the farm gate, co-existence is not easily addressed as there are different components and management systems along supply chains and there can also be different strategies for handling co-existence between food and feed sectors (Co-Extra, 2013).

The Issues Paper for this Review discussed assurance systems. Estelle Ross[227] suggested the "Non-GMO Project" as a verification system that Tasmania could adopt for verification of non-GM. However, the ADIC[228] presented the existing "Market Choice" system as an effective process for managing co-existence. Croplife[229] noted that co-existence frameworks are easily audited with sampling and testing regimes. Overseas experience highlights that "suitable technical and organisational measures during cultivation, harvest, transport and storage may be necessary to ensure coexistence" and to maintain the levels of adventitious presence of GM material below labelling thresholds (EC, 2006).

Co-existence: managing market impacts

Even less certain than segregating GM from non-GM products on-farm or in supply chains, is whether managing co-existence in the marketplace is possible. That is, can Tasmania promote and sell product as "clean and green" in some markets, at the same time as producing specific GM-derived products for another market. This is the critical question at this point in time and particularly relates to the question of whether non-food GM crops should be permitted.

As referred to previously in this Report, the Review received strong representations in some submissions that allowing any GMOs would negatively impact on Tasmania's brand as a whole, and on the ability of some sectors to market their produce and to achieve premium prices. Some submissions implied that this "brand-damage" would apply even if their product was completely unrelated to a particular GMO-product. However, other submissions generally discounted the value of the clean, green and GMO-free brand proposition in delivering market advantages or price premiums anyway. PGT[230] was adamant that there is "no meaningful link between relevant markets for food products and the markets they target for narcotic raw materials, and pharmaceuticals generally".

The international and domestic market research conducted for this Review[231] would indicate that consumers and retailer perceptions of Tasmanian products would likely not differentiate between GM food and non-food products. "Any extension of GMOs into non-food products may raise consumer concerns, however, this is likely impacted by the media exposure generated by any change" (FreshLogic 2013).

[225] Submission 039
[226] Submission 041
[227] Submission 011
[228] Submission 111
[229] Submission 089
[230] Submission 082
[231] Refer to finding number 1 for further information.

The answer is not straightforward. However, what is clear is that to address the question of co-existence in the marketplace, the Government would need to engage closely with those sectors trading on Tasmania's GMO-free status to reinforce brand credentials, allay any concerns and retain market confidence. Based on submissions it is highly likely that there would be claims on Government to provide the resources for specific marketing strategies. The issues associated with developing GMO-free markets were explored further under Finding 1 of this Report.

Thresholds: Zero Tolerance

Thresholds or tolerance levels are the maximum allowable level of adventitious (unintended) presence of GM material set by regulators and/or markets (ACIL, 2005; Victorian Government, 2012). Overseas experience highlights that some industries may request high thresholds (Demont and Devos, 2008), whereas many of the Review submissions were clear that they sought low or zero limits.

In 2005, the Primary Industries Ministerial Council (PIMC) agreed to "adopt threshold levels for canola grain and seed approved by the OGTR of 0.9 per cent GM seed for canola crop and 0.5 per cent GM seed for commercial seed for sowing" (Emslie et al, 2007). These levels are consistent with other areas such as the European Union.

Tasmania's current policy position is different to that of other States, in that our threshold for GM material is zero tolerance[232]. Some of the submissions, such as TIA's,[233] urged regulators to "rethink the approach to zero tolerance levels" where as others such as Toehold Farm[234] note that GMO-freedom "cannot be guaranteed for the State (due to former trial sites)".

David Armstrong[235] noted that "Tasmania could not claim to be GMO-free as some of the livestock feeds we import probably contain GMO materials". In 2006-07, an estimated 487,200 tonnes of GM material was used in Australia in animal feed, representing approximately five per cent of "total grain and grain products used in animal feed that year" (Australian Government, 2011a). Tasmania is a net importer of stock feed (Field, 2013). However, as mentioned in the Issues Paper for this Review,[236] imports of GMOs in Tasmania are tightly regulated through import requirements and this includes canola and other seed and grain.

Annual wheat imports into Tasmania have averaged between 80,000-90,000 tonnes over the last two years and it is anticipated that an extra 67,000 tonnes will be required by the dairy industry alone in the next five years (Field, 2013). It should be noted at present there are no GM wheat crops grown commercially in the world.

Maintaining the zero tolerance level for contamination by GM crops in future could result in increased analysis requirements on imports of grain and seeds, which would increase costs for importers/exporters of the product. This would be especially so if and as more genetically modified seed and grain crops are grown commercially interstate. To maintain a zero tolerance of such contamination in Tasmania, the State would

[232] Tested canola grain and seed is deemed to meet this threshold standard if tests are undertaken such that a level of contamination by GM material of 0.01% would be detected with a probability of 95% and the test has returned a negative result for GM events known to have been inserted into canola.
[233] Submission 038
[234] Submission 104
[235] Submission 022
[236] Pages 16 and 17

need to maintain the same testing regime as at present (testing to the limits of detection), but across a wider range of seed and grain commodities.

Testing to the limit of detection is more expensive than testing to a threshold level of adventitious presence as, for the latter, fewer samples are involved and testing time is reduced. At present GMO testing only applies to canola grain and seed as it is the only commercial GMO crop being grown of relevance to Tasmania (Tasmanian Government, 2012e). The wider availability of GM seeds and grains could result in increased regulatory burden and costs on importers/exporters inasmuch as additional sensitive testing would be required. The alternative would see such commodities no longer being available to Tasmania due to the costs involved. Where feed grain is involved it should also be noted that even allowing and enforcing a threshold value of adventitious presence, for certain grades of feed grain, may still be uneconomic for exporters/importers of the feed grain.

As well as adventitious (unintended) presence, another issue of increasing importance globally is the low level presence (LLP) of GM material in non-GM crops[237]. LLP refers to: "the unintended presence, at low levels, of a GM event which has undergone a full science-based safety assessment and has been approved in accordance with the Codex Plant Guidelines for food (and domestic regulatory process for feed and environment) in at least one country but not in the country of import" (Tranberg, 2013). Overseas research has shown that the most sophisticated infrastructure cannot prevent different crops or crop varieties from potentially coming into contact with one another (Stein & Rodriquez-Cerezo, 2010; Tranberg, 2013).

For Tasmania, this issue arises because licensed GM crops are grown in other States and, through the everyday importing of seeds and grains, there is the increased risk that GM material may end up in Tasmania at low levels. This will likely become a greater challenge for the State to manage, particularly as the occurrence of LLP is also likely to increase interstate with the adoption of more GM crops.

To deal with this problem, the experience of the Organisation for Economic Cooperation and Development (OECD) indicates that Tasmania, like other States and overseas countries, may need to continue to manage the LLP problem by dealing with any environmental risks and returning the situation to compliance with relevant legislation (OECD, 2013).

In summary, given the growing need to import material such as seed and grains into Tasmania, for either stock feed or propagating crops, the Project Team observes that it will be increasingly difficult to maintain a zero tolerance position for GMOs as the means to manage for either adventitious presence or low level presence. Moreover if any GM crops, food or non-food, are permitted in Tasmania the issue of thresholds will become even more relevant.

Co-existence case-studies

Submissions to the Review highlighted that the most immediate issue for Tasmania to confront is how to manage co-existence for poppies, pastures, canola, animal feed, honey and organics. The following case-

[237] The Project Team notes that there are differing views on what the difference is between adventitious (unintended) presence (AP) and low level presence (LLP). For the purposes of this Review, AP is considered an event where GM material is unintentionally or accidentally introduced into the State. An example is the Grace canola unintentional release in Tasmania in 2003-04 (refer to the Issues Paper for this Review, pages 17-18, for further information). LLP is where GM material has received full regulatory approval and is commercially produced in other States and, even though it has not received approval for commercial release in this State, due to the levels of commercial production of the GM crop we can reasonably anticipate a LLP of GM material in some products imported into Tasmania.

studies look at the question of whether co-existence through effective segregation is possible for each of these sectors.

a) Poppies

As submissions from the poppy industry confirmed, it is a Government requirement that all stages of growing and production are carefully controlled, and there are strict regulatory requirements in place coordinated by the Poppy Advisory and Control Board (Macquarie Franklin, 2012b). The poppy industry considers that the existing regulatory environment makes the poppy industry highly suited for GM non-food production in Tasmania.

Poppy Growers Tasmania (PGT) [238] suggests that a "limited moratorium on herbicide resistant poppies could be feasible in order to enable scientific analysis of the benefits and any risks associated with such use". PGT[239] also suggest that a "focus on GM poppy breeding to 'poppy only' genes would be in keeping with trends overseas introducing genes from the plant family, not genes foreign to the species".

Is it possible to set appropriate tolerance levels?

As GM poppies are not currently grown in commercial quantities in any jurisdiction across the globe, there are no existing industry tolerance levels in place. None of the submissions from the poppy industry suggested tolerance levels of GM and non-GM poppy material. Thresholds for low level presence would need to be determined with stakeholders.

Managing contamination

PGT[240] argued in their submission that "history shows that Tasmanian poppy DNA stays intact within the poppy". However, GlaxoSmithKline Australia (GSK) [241] noted that "in Tasmania, growers are contracted by the processing companies to sow commercial poppy crops and as such may be growing for up to three companies on the same farm". GSK[242] considered "that it may be virtually impossible to prevent cross-pollination between GM and non-GM poppy crops".

If GM poppy crops were grown in Tasmania, clearly there would need to be extra segregation measures in place to prevent cross-pollination of poppy cultivars on-farm as well as across farming landscapes. GSK[243] raised the concern of lateral gene transfer of herbicide tolerance to wild weed populations. There will need to be management of the probability of contamination occurring in five species of wild poppies identified as weeds in commercial poppy crops in Tasmania, particularly *P. somniferum* spp. *Setigerum* L. (Bishop, 2001).

Industry would need to carefully consider what components of the poppy supply chain are excluded (such as seed for culinary uses). GSK[244] noted "challenges with seed being so small it is easily spread by wind, machinery, livestock, foot and vehicle traffic". Segregation for harvesting, transportation and processing would need to be managed by industry.

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[238] Submission 082
[239] ibid
[240] Submission 082
[241] Submission 158
[242] ibid
[243] ibid
[244] ibid

As GSK[245] also pointed out, "industry also needs to consider management and control of poppy regrowth within a paddock utilised for a different crop, or different poppy cultivar belonging to a competing company in the following season". GSK[246] noted "the possibility for legal issues to arise for both growers and the three competing poppy companies in terms of cultivar ownership and patent rights".

Regulatory burden

This industry is already highly regulated. However, the sector would need to manage increased regulation if GM poppy production was introduced.

Summary

The poppy industry is currently highly regulated. It is potentially suited to manage co-existence of a non-food GM crop. However the existing regulatory regime and production requirements would need to alter to accommodate GM varieties and the following may need to be considered:

Requirement (Conventional)	Changes to Existing production system
Accredited Production System	Systems already exist as the industry highly regulated. Would need to be adjusted to address the GM issues
Notification requirements	The existing system already has requirements in place for statutory authorities and neighbours. Would need to be adjusted to address the GM issues
Property and farm system requirements	The existing system requires systems for pesticides, herbicides, fertilisers. Would need to be adjusted to address the GM issues.
Market thresholds in produce	The threshold in produce for GM material is unknown.
Consequence of exceeding market thresholds	Unknown
Regulatory burden to industry	Already highly regulated but may be additional regulation due to GM crops
Indicated impact to industry with GM	Indicated to be positive

[245] ibid
[246] ibid

b) Pastures

Is it possible to set appropriate tolerance levels?

No GM pastures are produced commercially in Australia. No submission from the dairy industry indicated what a suitable tolerance level for GM pasture seeds would be. The ADIC[247] highlighted that industry has relevant thresholds to manage tolerance of GM contamination. Other jurisdictions like Victoria have agreed to "allow the market to determine whether segregation in GM and non-GM canola in the supply chain is required" (Victorian Government, 2013).

It is assumed that existing thresholds (as agreed by PIMC) that are used for GM crops such as canola and cotton could be adopted for other GM crops, though this may be influenced by the agronomic characteristics of the crop in question.

Managing contamination

The ADIC[248] noted that the "Market Choice" system demonstrates the industry's ability to manage co-existence through market requirements, identified thresholds and supply chain processes. However, it might not be that simple for pastures as compared with annual crops. According to a recent report from a New Zealand organisation, "Government officials describe grass pollen as 'notoriously difficult to contain' and warn of GM grasses becoming 'irreversibly established in the environment' and 'permanent components of New Zealand's pasture and dairy production systems'." (Sustainability Council of New Zealand, SCNZ, 2011)

This issue is perhaps best summarised by the submission from Fat Pig Kitchen[249]: "while in its infancy and research phase, the reality is that ryegrass can cross-pollinate with other ryegrass in the vicinity, and infest neighbouring paddocks." Other submissions noted that ryegrass is in extremely widespread use in Tasmania and questioned how it would be possible to differentiate the non-GM ryegrass pasture from a GM one.

Regulatory burden

Although no submission commented on the cost to manage co-existence and segregation, the regulatory burden on industry is anticipated to be significant. A New Zealand report investigating the introduction of GM grasses estimates "… the loss of premiums, separation distances and testing costs to assure customers of the GM-free status of production systems at between $3.1 to $12 million per annum" (SCNZ, 2011).

Summary

GM pasture production would be problematic to manage for co-existence in Tasmania. If the existing production system requirements were to alter, the following may need to be considered:

[247] Submission 111
[248] ibid
[249] Submission 097

Requirement (Conventional)	Changes to existing production system
Accredited Production System	Would need to be adjusted for GM material
Notification requirements	Would need to be adjusted for GM material
Property and farm system requirements	Would need to be adjusted for GM material
Market thresholds in produce	No specific thresholds in place for pasture as no GM pasture crop currently grown commercially. Would need to meet specific industry thresholds once set.
Consequence of exceeding market thresholds	Indicated to be significant
Regulatory burden to industry	Would be sizeable
Indicated impact to industry with GM	Indicated to be positive for livestock productivity but could have loss to beef markets in export markets such as Japan.

c) Canola

As the only GM food crop approved in Australia that could potentially be grown in Tasmania, managing co-existence for canola provides insights into the likely issues if GM seeds and grains were introduced. The management of the former Tasmanian GM canola trial sites is discussed in the Issues Paper for this Review.

Is it possible to set appropriate tolerance levels?

Sources of adventitious presence for seeds can include machinery, transport and storage processes and cross-pollination. Joy Phillips from Heritage Seeds[250] stressed the concerns regarding cross-pollination and transport between areas and did not think co-existence could occur. Joy Phillips considered that Tasmania's future is in niche markets such as specialty non-GM seed production.

In 2005, PIMC specified AP thresholds for GM canola approved by the Gene Technology Regulator of 0.9 per cent in non-GM canola grain and 0.5 per cent in non-GM canola seed for sowing. These thresholds are also agreed nationally by the Australian seed and grain industries (Mewett et al, 2008).

Seed purity is a crucial basic factor of co-existence "with any seed threshold largely lower than labelling to leave enough leeway to make coexistence possible at the field level" (Co-Extra, 2013). Results from overseas indicate that maintaining a threshold of 0.1 per cent, particularly for canola, is extremely demanding with additional production management measures meaning an increase in production costs of up to 40 per cent

[250] Submission 135

(GMO Compass, 2006a). PGG Wrightson Seeds[251] believes that the removal of bans on GM crops in New South Wales and Victoria is evidence that the grain industry can manage co-existence problems.

Ute Muller[252] highlighted the point made by many organic sector submissions, that organic certifiers in Australia have zero tolerance for GMO in organically certified produce.

Managing contamination

Seed production is organised in plots. The examples of GM canola and GM cotton in Australia indicate that production systems and associated supply chain system requirements can be adjusted to meet the needs of GM crop production. Arranging GM and non-GM seed plots would need to consider ensuring optimum orientation with respect to the dominant wind direction, growing varieties with different flowering times, isolation distances (depending on the seed, this can range from 100m to 600m) and contract arrangements between growers involved in the same seed production group and the seed company (EC, 2006).

Regulatory burden

Due to the nature of seeds and grains and the specific requirements along the supply chain, there would be an extra regulatory burden to industry for GM canola production.

Summary

GM canola production would be problematic to manage for co-existence in Tasmania. If the existing production requirements were required to alter, the following may need to be considered:

Requirement (Conventional)	Change to Existing production system
Accredited Production System	Depending on the crop, would need to be adjusted for GM
Notification requirements	Depending on the crop, would need to be adjusted for GM
Property and farm system requirements	Depending on the crop would need to be adjusted for GM
Market thresholds in produce	Existing thresholds for GM are 0.9% GM seed for canola crop and 0.5% GM seed for commercial seed for sowing
Consequence of exceeding market thresholds	Indicated to be significant
Regulatory burden to industry	Would be sizeable
Indicated impact to industry with GM	Indicated to be positive for productivity but could have loss to seed and grain markets in export countries that are seeking GM-free (such as some countries in Europe).

[251] Submission 089
[252] Submission 001

d) Honey/Bees

Is it possible to set appropriate tolerance levels?

GM pollen will normally be derived from commodity crops when hives are located near to experimental GM crops or locations where there are high levels of GM commodity crops (EP, 2013). It has been reported that "the maximum distance honey bees may forage is up to 13.5km from the hive" (EP, 2013). An international workshop on GMOs and honey proposed "… a range in size of isolation zones from flowering GMO crops … varying between 1-10km; but typically about 5km" (EP, 2013).

Good production practices would keep beekeepers informed if they were within a certain perimeter of GM crops. Co-existence measures for crops such as maize in areas like the EU "have isolation distances that range between 25-600m for conventional maize and 50m-600m for organic maize which are insufficient to protect against GMO transmission to honey" (EP, 2013).

Current organic standards specify that bees may only forage on organic crops or natural flora and that "hives must be placed more than five kilometres from either conventional or GM crops" (Australian Government, 2011b). PGT[253] noted "that it is inconceivable that poppy pollen, let alone GM poppy pollen could contaminate leatherwood honey as the source of honey is hundreds of kilometres from the major growing regions of poppy". Nevertheless, some Tasmanian honey producers are certified organic and they would risk the loss of their certification if GM pollen was evident in their honey; this is a reasonable possibility if hives are located within a bee's flight distance from a GM crop.

The marketing of non-authorised GMOs and ingredients derived from them "is not permitted in the EU" (EP, 2013). Accurate detection of GM pollen DNA is problematic and, as at the end of May 2013, "there was no GM pollen standards available … and potentially would be difficult to produce" (EP, 2013). The Tasmanian Beekeepers Association[254] noted that if pollen in the EU is defined as a "natural constituent" then testing and labelling would not be required as traces of GM pollen would account for less than 0.9 per cent of the final product (the threshold trigger). The Project Team notes that the EU is still to finalise its position on pollen.

Managing contamination

In addition to managing the location of hives, attention would need to be given to the risk of volunteers (i.e. inadvertently germinated GM plants from previous plantings) releasing GM pollen in subsequent years if GM crops were introduced into Tasmania. Some possible strategies to minimise accidental inclusion of GM material in bee products include (MAF, 2002):

1. Separating GM and non-GM crops via planting distances or flowering times;
2. Screening the crop to exclude bees;
3. Using bee management techniques that maximise foraging on a particular crop;
4. Using biotechnological solutions; and
5. Using post-harvest honey treatments to remove pollen.

The Tasmanian Beekeepers Association[255] indicated that commercial beekeepers may be unwilling to offer pollination services to areas where there are GMO crops or the cost of pollination services may rise if the

[253] ibid
[254] Submission 041
[255] ibid

industry is locked out of high price EU markets (which effectively cross subsidises pollination services). In Australia, apple pollination prices over $65 per hive are common (CPA, 2011). Any of the management strategies mentioned above would incur an additional cost to beekeepers.

No submission provided specific examples of other States (such as Western Australia, New South Wales and Victoria) and the direct impact to the honey industry or pollination services as a result of the introduction of GM crops. The EU has approved residue monitoring plans in place for honey with Australia authorised under these plans to export honey to the EU with traces of GM cotton and canola (EP, 2013).

As identified by RIRDC (2009), crops likely to be impacted by a possible change in pollination services as a result of an introduction of a GM crop in Tasmania would be pome and stone fruits, broadacre crops such as canola, and seed production for plants such as broccoli, beans, canola, carrot, lucerne, mustard and onions.

Regulatory burden

For producers who are at risk from their bees foraging on GM plants, testing would be required (EP, 2013). In addition, for those who wish to be certified as organic, appropriate documentation and evidence to meet the Australian certifier requirements would be necessary.

The regulatory burden would rise for industry, particularly to retain their market share in European markets and organic certification. As an indication of regulatory burden, in the EU, the potential costs of label changes and testing for the identification of the presence of GM pollen could be in the vicinity of an ongoing €6,578 per annum (EP, 2013).

Summary

The production of GM crops in Tasmania would be problematic for the honey industry. Co-existence would need strict requirements particularly for pollination:

Requirement (Conventional)	Change Existing production system
Accredited Production System	Would need to change if GM crops were introduced.
Notification requirements	Would need to change if GM crops were introduced.
Property and farm system requirements	For organic honey current standards specify that bees may only forage on organic crops or natural flora and that hives must be placed more than five kilometres from either conventional or GM crops
Market thresholds in produce	If more than 1% GM component, the product requires labelling of honey in Australia
Consequence of exceeding market thresholds	Indicated to be significant
Regulatory burden to industry	Would be sizeable
Indicated impact to industry with GM	Indicated to be negative for industry, particularly for markets such as EU and organics

e) Organics

There were many submissions to the Review expressing concerns about the serious impact on the organic industry of the introduction of GM crops.

Zero tolerance

Many submissions to the Review expressed the view that co-existence between GM crops and organics was not possible due to the GM zero tolerance requirements for organics under Australian certifier standards. Overseas research indicates that "… analytical testing to a strictly zero-presence level is not possible as detection will always be limited by the sensitivity of the test methods used, by the number of samples taken and the number of seeds analysed per sample" (Mewett et al, 2008).

The EU provides some useful examples.

The policy criterion in the EU for organics, states that organic foods can be labelled "GM-free" even if they contain up to 0.9 per cent GM content (Foster, 2010). The argument for the 0.9 per cent approach was that "… the lowest level at which GM organisms could be scientifically detected would place standards which would make organic produce too expensive for farmers and that the higher ceiling was sufficient for accidental presence of approved GMOs" (Meikle, 2007). As an observation, it should be noted that some certification bodies in the EU still do not allow any GM content (Meikle, 2007; Moses & Brookes, 2013).

Under the Australian organic certification standards, organic production is to be isolated from the production of non-organic products (Australian Government, 2011a). There is a zero tolerance of GMO material in organic products (Western Australian Government, 2010).

Managing contamination

Some countries, such as the Netherlands, have developed guidelines for appropriate distances for separating GM and non-GM crops (such as maize) to keep the possibility of cross-pollination at a minimum (GMO Compass, 2006b):

Organic	Conventional
Sugar Beets - 3 Metres	Sugar Beets – 1.5 Metres
Potatoes – 10 Metres	Potatoes – 3 Metres
Maize – 250 Metres	Maize – 25 Metres

Overseas research indicates that even achieving a threshold goal above zero (0.1) for organic agriculture for GM crops such as canola "could mean an increase in production costs of between 20-40 per cent, depending on the distribution of GM crops" (GMO Compass, 2006b).

Regulatory burden

The regulatory burden on the organic industry would be significant, with extra testing costs to maintain certification.

Summary

The commercial release of a GM crop in Tasmania would be highly problematic to the organic sector and co-existence would need to be carefully considered and managed. If the existing production requirements were required to alter, the following may need to be considered:

Requirement (Organic)	Change Existing production system
Accredited Production System	Standards and certification requirements are existing.
Notification requirements	Yes for pesticide, fertiliser and GM material
Property and farm system requirements	Only permitted substances. GM material not permitted
Market thresholds in produce	Zero tolerance
Consequence of exceeding market thresholds	Loss of market and possible certification suspension of affected land until risk is minimised.
Regulatory burden to industry	Would be sizeable
Indicated impact to industry with GM	Indicated to be negative for industry,

f) Animal feed

The Issues Paper for this review provided an overview of animal feed derived from GM plants[256].

Is it possible to set appropriate tolerance levels?

The Murray Goulburn Dairy Cooperative allows up to five per cent GM in the diet of suppliers' milking herds, while others such as National Foods recommend against the use of GM stock feed (Hunt, 2011). The Australian pig meat industry and some chicken meat processors have tried to avoid using GM material in stock feed due to concerns about market acceptance; however, the Australian Government noted that "virtually all imported pig meat consumed in Australia is likely to be produced using at least some GM stockfeed" (Australian Government, 2011a).

[256] Pages 28 and 29.

Managing contamination

Segregation of GM material already occurs on a "client-need" basis (Australian Government, 2011a) with the ADIC[257] highlighting the "Market Choice" system that demonstrates industries' ability to manage co-existence and contamination.

Regulatory burden

Based on research in Australia, an increase in the use of GM ingredients in stock feed imported from mainland Australia is unlikely to require additional administration costs in Tasmania (Australian Government, 2011a). However, If GM crops were produced in Tasmania for use as stock feed, this position would change (refer to the previous discussion in this Report on pastures and canola). As also noted previously in this Report, maintaining the zero tolerance level could result in increased analysis requirements of imported grains and seed, which could increase costs for importers.

If the existing requirements were required to alter, the following may need to be considered:

Requirement (conventional)	Existing production system
Accredited Production System	Standards and certification requirements, particularly for importation of stock feed
Notification requirements	As per existing importation requirements.
Property and farm system requirements	The growing of the crop used in stock feed would require additional compliance in relation to GM
Market thresholds in produce	Importation of stock feed is zero tolerance for viable seed/grain
Consequence of exceeding market thresholds	Destruction of material and the need to replace material imported into Tasmania.
Regulatory burden to industry	Unlikely to increase costs
Indicated impact to industry with GM	Indicated to be negative for industry,

Co-existence: questions of liability

A number of submissions raised legal liability issues and the related concerns of non-GM and organic farmers who may suffer contamination and economic loss in the event that GM crops are approved for environmental release in Tasmania.

[257] Submission 111

The legal liability issues for non-GM farmers as raised in the submissions can be categorised into the following areas of concern:

1. The ability of regulators and courts to protect non-GM and organic farmers from GM contamination, particularly in the absence of a statutory strict liability scheme;
2. The availability of compensation at common law for farmers who suffer damage and loss from GM contamination;
3. Potential for prosecution of non-GM farmers for "dealing" with a GMO in a contamination event;
4. Enforcement of intellectual property rights against non-GM farmers in a contamination event; and
5. Potential for action under consumer protection laws when GM-free claims cannot be substantiated.

The following discussion outlines the key issues for each of these concerns raised.

Absence of statutory liability for GM contamination

Several submissions questioned the ability of regulators and courts to protect non-GM and organic farmers from GM contamination that affects the ability of these farmers to market their products, raising the idea that a statutory liability scheme should be put in place in Australia.

For example, the Safe Food Foundation[258] submitted that: "to resolve the liability issues posed by potential GM contamination, the Act should be amended to ensure that the GM crop companies are held liable for any damage caused by their products and to ensure there is no liability for non-GM farmers."

In Australia the *Gene Technology Act 2000* (Cth) contains licence conditions to control and minimise the entry, spread and persistence of GMOs in the environment, and offence provisions and powers to force remediation of environmental damage by those that deal with GMOs without a licence or in contravention of licence conditions, yet potential victims of GM contamination are not provided for (Rogers, 2002).

During drafting of the *Gene Technology Act 2000* (Cth), the option of including civil liability provisions was considered but rejected on the basis that risks and damage or loss could be resolved at common law (Dalton et al, 2003). This position was reviewed by the (then) Gene Technology Ministerial Council in the 2006 Statutory Review of the *Gene Technology Act 2000* and the *Gene Technology Agreement 2001* (Commonwealth of Australia, 2006a), which concluded that specific provisions for strict civil liability, compensation funds and mandatory insurance were not required (Commonwealth of Australia, 2006b). This conclusion was upheld in the subsequent 2011 review of the *Gene Technology Act 2000* (Allen Consulting Group, 2011).

Dalton et al (2003) noted that the United Kingdom, Canada and the USA also do not have specific civil liability schemes for damage or loss caused by dealings with GMOs, similarly relying on existing statutes and common law to provide redress.

Lawson (2005) argued that a strict liability scheme for third parties suffering economic, health or environmental loss or damage caused by a person dealing with a GMO is consistent with the purpose of the *Gene Technology Act 2000.* However Dalton et al (2003) contend that in the absence of a cooperative national approach such a regime would need to be imposed under State and Territory laws. No State or Territory statutes currently contain civil liability provisions for those who cause GM contamination, leaving such

[258] Submission 115

matters to be dealt with by the common law (potential common law actions for GM contamination are discussed further below).

An example of a statutory civil liability scheme can be found in New Zealand. The New Zealand *Hazardous Substances and New Organisms Act 1996*, which is used to regulate GMOs, contains strict liability provisions (s.124G); but this liability is not absolute as it is limited by the provision of defences in s.124H (Lunney & Burrell, 2006). These defences mean that liability may not be attributed to a person who follows all controls set by the authorising authority (McGuinness and Mokena-Lodge, 2013).

Common law liability

In Australia, and in the most likely scenario of GMO contamination from seed or pollen drift, the main causes of action available at common law for farmers who suffer damage and loss include trespass, negligence or nuisance (Dalton et al, 2003).

To date there have been no decided cases in Australia specifically in relation to GMO contamination. At the time of writing this Report a case is ongoing in the West Australian Supreme Court for private nuisance and economic loss to an organic farmer who has lost his ability to sell produce under the label "certified organic" due to GM contamination allegedly from a neighbouring farm (*Marsh* v *Baxter* [2013] WASC 209). This case was cited in many submissions as evidence of the practical and legal obstacles in terms of non-GM and organic farmers being compensated for economic loss arising from GM contamination. These obstacles include the costs and duration of litigation.[259]

In hearing an application by the Plaintiff in *Marsh v Baxter* to prevent further planting of GM canola until the original case is decided, Martin J stated:

> I evaluate the strength of the Plaintiff's case viewed at this time on a basis the plaintiff has, in principle, an arguable case, not necessarily a strong or overwhelming case, to take to trial. That, of course, is only my provisional evaluation as of now, on the material before me. A trial has not yet begun. ((Martin J in Marsh v *Baxter* [2013] WASC 209, p31*)*

The trial in this matter is likely to commence in early 2014. The decision of the West Australian Supreme Court in this matter will be persuasive in any future cases for loss of organic certification from GM contamination. However, it should be noted that each case turns on its facts, and in this case the Plaintiff's claim is in nuisance, not negligence or trespass, and the claim is that the contamination was caused by the harvesting method used by the Defendant (swathing) and wind, not from pollen drift.

Until a final judgement is delivered in the *Marsh v Baxter* case, liability and compensation for GM contamination in private nuisance remains unclear in Australia. Further, a recent review of potential legal actions in private law for GM contamination concluded that the chances of success in an action for negligence or nuisance are small (Lunney & Burrell, 2006). While only briefly considering trespass as a potential action, Lunney & Burrell (2006) again concluded that the chance of such an action being successful is remote.

[259] In particular see submissions 115, 124 and 125.

Potential for prosecution of non-GM farmers

Concerns raised in submissions about the legal risks to non-GM farmers from GM presence on their farms included the risk of prosecution for dealing with GMOs without a licence, an offence under the *Gene Technology Act 2000* and corresponding State laws.

Dalton et al (2003) concluded that the current regulatory regime in Australia had potential for victims of GM contamination to be prosecuted for "dealing with a GMO without a licence". However, the OGTR has discretion not to proceed to prosecution depending on the particular facts and circumstances of the matter.

In provisions designed to provide some protection for growers of non-GM crops from inadvertent and unauthorised cultivation of GMOs in South Australia (South Australia, House of Assembly, 2004), the *Genetically Modified Crops Management Act 2004* (SA) provides special protection from liability for the spread of GM plant material such that no court action can be taken against an owner or occupier of land for the presence of GM material (s.27(2)). This protection is not absolute and action may be taken if the owner or occupier deliberately dealt with the GM material for commercial benefit and it is in the interests of justice that another person's rights with respect to the GM material should be protected or recognised (s.27(3)).

Intellectual property infringement

Ownership of intellectual property in GMOs and the potential for infringement by those "contaminated" with GM material was a recurring theme in many submissions, citing the high-profile Canadian case of *Monsanto Canada Inc. & Monsanto Co.* v *Percy Schmeiser & Percy Schmeiser Enterprises Ltd* (2001) (FCT 256, Federal Court of Canada, Trial Division) where the court found that Schmeiser had infringed Monsanto's intellectual property rights by harvesting and selling crops that he ought to have known contained GM material (Dalton et al, 2003).

While that Canadian case is only of persuasive application in Australia, the Australian Centre for Intellectual Property in Agriculture (ACIPA) has recognised patent infringement as a possible liability for non-GM farmers, noting that the Supreme Court in Canada indicated that courts should be slow to impose liability when non-GM farmers were unaware of the GM presence (ACIPA, n.d.).

Infringement of consumer protection laws

A small number of submissions referred to the operation of consumer protection laws that prohibit misleading and/or deceptive conduct in the context of "GM-free" claims. The Australian Competition and Consumer Commission (ACCC), the Australian Government agency responsible for ensuring compliance with the Competition and Consumer Act 2010, has warned food producers that "that within the strong wording of our misleading conduct laws, 'free' has to mean 'free'" and products under such a label cannot contain any GM inputs, including animal feed (Sylvan, 2004).

Bibliography

In preparing this report, the Department has sought to acknowledge the author(s) of the information used or the works consulted from the following sources:

ACIL Tasman, 2005, *Managing genetically modified crops in Australia,* viewed 6 November 2013, <http://www.aciltasman.com.au>.

ACIPA, n.d., *Farmer's liability and GM crops*, Fact Sheet, Australian Government Department of Agriculture, Fisheries and Forestry, viewed 13 November 2013, < http://www.daff.gov.au/__data/assets/pdf_file/0008/197081/factsheetliabilityandgmcropsweb.pdf>.

Allen Consulting Group, 2011, *Review of the Gene Technology Act 2000*, Australian Department of Health and Ageing, Canberra.

Anderson, K., & Jackson, L.A., 2005, 'GM crop technology and trade restraints: economic implications for Australia and New Zealand', *The Australian Journal of Agricultural and Resource Economics*, vo. 49, pp. 263-281.

Ashley, R., Bishop, A., & Dennis, J., 2007, *Intensive organic vegetable production, integrated development,* RIRDC Publication 04/121, ISBN 1 74151 029 5.

Australian Bureau of Statistics, 2012, *Agricultural Production 1301.0 Year Book Australia,* <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by per cent20Subject/1301.0~2012~Main per cent20Features~Agricultural per cent20production~260>.

Australian Government, 2001, *Fact Sheet: What is Biotechnology? What is Gene Technology?,* Office of the Gene Technology Regulator, viewed 1 August 2013, <http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/factwhatis-htm>.

Australian Government, 2003, *Regulatory Impact Statement Policy Principle to Recognise Genetically Modified (GM)/non-GM Designated Areas*, Department of Health, Canberra.

Australian Government, 2009, *Promoting productivity in the agriculture and food sector value chain: issues for R&D investment,* Department of Agriculture, Fisheries and Forestry, *viewed 13 November 2013,* <http://www.daff.gov.au/__data/assets/pdf_file/0007/1463992/rd-abare-report.pdf>. Australian Government,, 2011a, *GM stockfeed in Australia, economic issues for producers and consumers,* viewed 13 November 2013 <http://www.daff.gov.au/__data/assets/pdf_file/0006/1107339/stockfeed-prod-consum.pdf>.

Australian Government, 2011b, *Biotechnology: GM Canola – potential impacts on organic farming in Australia,* viewed 1 November 2013, <http://www.daff.gov.au/agriculture-food/biotechnology/pamphlets/gm_canola_potential_impact>.

Australian Government,, 2013, *Caring for our Country: Land management practice trends in Tasmania's dairy industry,* Department of Agriculture, Fisheries and Forestry, viewed 13 November 2013, <http://www.daff.gov.au/__data/assets/pdf_file/0011/2278307/tas-practices-dairy.pdf>.

Australian Oilseed Federation, 2009, *Keeping non-GM canola Non-Gm canola: a guide for growers and handlers, viewed 15 November 2015,* <http://www.riverland.com.au/riverlandhome/documentmanager/riverlanddocs/canoladeclarationform/1037968500>.

Australian Wheat Board, 2013, *AWB Daily Contract Prices,* viewed 15 November 2013, <*http://www.awb.com.au/growers/awbgrainprices/dailygrainprices/*>.

Benbrook, B., 2009, *The Magnitude and impacts of the Biotech and Organic Seed Price Premium,* The Organic Centre, viewed 27 October 2013, <http://www.organic-centre.org>.

Bez, N., Lobo, A., Chen, J., Monk, A., 2012, *Australian Organic Market Report,* viewed 13 November 2013, <http://www.bfa.com.au/Portals/0/Organic per cent20market per cent20report per cent202012-web.pdf>.

Bishop, A., 2001, *A comparison of solarisation and secondary cultivations to control Papaver Dubium L. in commercial poppy crops,* viewed 12 November 2013, <http://www.regional.org.au/au/asa/2001/6/c/bishop.htm>.

Bita, N., 2012, *Monsanto props up weak GM crop price,* viewed 15 November 2013, <*http://www.theaustralian.com.au/news/health-science/monsanto-props-up-weak-gm-crop-price/story-e6frg8y6-1226335724205#*>.

Co-Extra, 2013, 'Results and perspectives on the coexistence and traceability of GM and non-GM supply chains', in Directorate-General for Research and Innovation Biotechnologies, Agriculture and Food (eds), *A decade of EU-funded GMO Research (2001 – 2010)*, European Commission, Brussels, pp 215-115, viewed 6 November 2013, <ftp://ftp.cordis.europa.eu/pub/fp7/kbbe/docs/a-decade-of-eu-funded-gmo-research_en.pdf>.

Commonwealth of Australia, 2006a, Statutory Review of the *Gene Technology Act 2000* and the *Gene Technology Agreement 2001*, report prepared for the Gene Technology Ministerial Council, Canberra.

Commonwealth of Australia, 2006b, State, Territory and Australian Government' response to the recommendations of the Statutory Review of the *Gene Technology Act 2000* and the *Gene Technology Agreement 2001*, Canberra.

Crop Pollination Association Inc, 2009, *Typical Pollination Costs, viewed 13 November 2013,* <http://www.aussiepollination.com.au/services/pricing/>.

Dalton, D, Jones, B, & Maxwell, B, 2003, *Liability Issues Associated with GM Crops in Australia,* Department of Agriculture, Fisheries and Forestry, viewed 18 August 2013, <http://www.daff.gov.au>.

Demont, T., & Devos, Y., 2008, 'Regulating co-existence of GM and non-GM crops without jeopardizing economic incentives', *Trends in Biotechnology*, vol. 26, no. 7, pp 353-358.

Emslie, K.R., Whaites, L., Griffiths, K.R., Murby, E.J., 2007, 'Sampling Plan and Test protocol for semiquantitative detection of genetically modified canola (*Brassica napus*) seed in bulk canola seed', *Journal of Agricultural and Food Chemistry*, viewed 13 November 2013, <http://www.daff.gov.au/__data/assets/pdf_file/0011/533783/nmi-article.pdf>. European Commission, 2006, *New cases on the coexistence of GM and non-GM crops in European agriculture Technical Report,* EU 22102 EN, ISBN 92-79-01231-2.

European Parliament, 2013, *Impact of the European Court of Justice ruling on the honey directive and relevant existing legislation,* viewed 13 November 2013, <http://www.europarl.europa.eu/studies>.

Field, B., 2013, *Is grain an opportunity for the emerging irrigation landscape?* TIA Showcase presentation, Launceston.

Foster, M., 2010, 'Evidence of price premiums for non-GM grains in world markets', *ABARE Conference*, ABARE, Adelaide, paper 10.04.Freshlogic, 2012, *Wheat Market Profile,* viewed 13 November 2013, <http://www.dpipwe.tas.gov.au/inter.nsf/Attachments/JBAS-8W9VTS/$FILE/Wheat per cent20Profile.pdf>.

Freshlogic, 2013. *An attitudinal assessment of key domestic market gatekeepers to gauge perceptions of and attitudes towards Tasmania, GM crops and food grown in areas that allow the cultivation of GM food and non-food crops.* Department of Economic Development, Tourism and the Arts, Tasmania.

Friend DA, Thompson RP & Ball PD, 1997, 'The Pastures of the Midlands and Derwent Valley Tasmania. Relationships to environment and management factors', *International Wool Secretariat Final Report: Project DAT 44*, TIAR, Launceston.

Glover, J., Osman, M., Tifan, M., Cunningham, D., Ritman, K., & Morrice, B.,2005, *What's in the pipeline? Genetically Modified crops under development in Australia,* Bureau of Rural Sciences, Canberra.

GMO Compass, 2006a, *Coexistence possible: Often with no additional effort,* viewed 7 October 2013, <http://www.gmo-compass.org/features/printversion.php?id=201>.

GMO Compass, 2006b, *Coexistence with consensus,* viewed 7 October 2013, <http://www.gmo-compass.org/features/rpintversion.php?id=135>.

Grant, R., 2011, *Tasmanian canola secures bigger premium being GM-free,* Australian Broadcasting Commission, viewed 15 November 2013, <http://www.abc.net.au/site-archive/rural/tas/content/2011/12/s3381294.htm>.

Grant, R., 2013, *New South American seed export market for Tasmania,* Australian Broadcasting Commission,<http://www.abc.net.au/news/2013-11-07/matsuda-seed-deal/5075568>.

Hunt, P., 2011, *Wait on GM pasture,* The Weekly Times, viewed 13 November 2013, <http://www.weeklytimesnow.com.au/article/2011/01/14/280941_grain-and-hay.html>. International Narcotic Control Board, 2011, *Part four statistical information on narcotic drugs,* viewed 13 November 2013, <http://www.incb.org/documents/Narcotic-Drugs/Technical-Publications/2012/NDR_2012_Part4_Tables_EFS.pdf>.

Lawson, C, 2005, 'Information Asymmetry, GMOs and Strict Liability Under the *Gene Technology Act 2000* (Cth)', *Queensland University of Technology Law and Justice Journal*, vol. 9, p. 123.

Lunney, M & Burrell, R, 2006, *A Farmer's Choice? Legal Liability of farmers growing crops*, Department of Agriculture, Fisheries and Forestry, Canberra, viewed 19 August 2013, <http://www.daff.gov.au>.

Macquarie Franklin Pty Ltd, 2012a, *Market Advantage of Tasmania's GMO-free Status: Current and Potential Future Benefits and Costs,* Devonport, viewed 31 July 2013, <http://www.development.tas.gov.au/__data/assets/pdf_file/0011/67736/MF_Tas_GMO-free_Marketing_Advantage_2.pdf>.

Macquarie Franklin, 2012b, *Enterprise Profile – Poppies,* viewed 11 November 2013, <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/JBAS-8MU496/$FILE/WfW_EnterpriseProfile_Poppies.pdf>.

Macquarie Franklin, 2012c, *Enterprise Profile – Barley,* viewed 11 November 2013, <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/JBAS-8MU3Z6/$FILE/WfW_EnterpriseProfile_Barley.pdf>. McGuinness, W & Mokena-Lodge, R, 2013, *An Overview of Genetic Modification in New Zealand 1973 – 2013: The First Forty Years*, McGuiness Institute, viewed 4 September 2013, <www.mcguinnessinstitute.org>.

Meikle, J., 2007, 'Food with 0.9% GM still organic say farm ministers', *The Guardian*, 13 June 2007, viewed 11 November 2013, <http://www.theguardian.com/science/2007/jun/13/gm.food>. Mewett, O., Emslie, K.R., Johnson, H., Lizzio, J., Dibley, K.L., Murby, E.J., & Hattersley, P, 2008, *Maintaining product integrity in the seed and grain supply chain – the role of sampling and testing for GM events,* Australian Government Bureau of Rural Sciences, Canberra.

Ministry of Agriculture and Food, 2002, *Literature Review on Genetically Modified Plants and Bee Products,* viewed 5 November 2013, <http://maxa.maf.govt.nz/mafnet/rural-nz/research-and-development/biotechnology/literature-review-gm-plants-and-bee-products/>. Mitchell, A., Kristiansen, P., Bez, N., & Monk, A., 2010, *Australian Organic Market Report 2010,* viewed 13 November 2013, <http://www.bfa.com.au/Portals/0/Australian-Organic-Market-Report-2010 per cent20- per cent20Final per cent20- per cent20Part per cent201.pdf>.

Moses, V., & Brookes, G., 2013, 'The world of "GM-free', *GM Crops and Food: Biotechnology in agriculture and the food chain*, vol. 4, no 3, pp1-8.

McCauley, R., Davies, M., & Wyntje, A., 2012, 'The step-wise approach to adoption of genetically modified (GM) canola in Western Australia', *AgBioForum*, vol.15, no. 1, pp. 61-69.

South Australia, House of Assembly, 2004, *Debates*, 29 March 2004 pp. 1731- 1734.

Organisation for Economic Co-operation and Development, 2013, *Low level presence on transgenic plants in seed and grain commodities: environmental risk/safety assessment and availability and use of information,* viewed 11 November 2013, <https://www.google.com.au/url?sa=f&rct=j&url=http://search.oecd.org/officialdocuments/displaydocumentpdf/%3Fcote%3Denv/jm/mono(2013)19%26doclanguage%3Den&q=&esrc=s&ei=p_mDUrXFH62jiAeFkYGABA&usg=AFQjCNEbauDYK3pRIO8v635ktWtiallajA>.

Rural Industries Research and Development Corporation, 2008, *Australian honeybee industry survey 2006-07*, viewed 13 November 2013, <https://rirdc.infoservices.com.au/items/08-170>. Rural Industries Research and Development Corporation, 2009, *Pollination Fact Sheet – the real value of pollination,* viewed 13 November 2013, <https://rirdc.infoservices.com.au/items/13-115>. Rural Industries Research and Development Corporation, 2013a, *Stakeholder Map and Industry Biosecurity Plan for Lucerne, Oaten Hay, Ryegrass and Subterranean Clover,* viewed 14 November 2013, <https://www.google.com.au/?gfe_rd=cr&ei=ogeEUpW0A6uN8Qee7YDgBQ#q=australian+bureau+of+statistics+ryegrass+production+australia>.

Rural Industries Research and Development Corporation, 2013b, *Honeybee,* viewed 13 November 2013, <http://www.rirdc.gov.au/research-programs/animal-industries/honeybee>.

Rogers, N, 2002, 'Seeds, Weeds and Greed: An Analysis of the *Gene Technology Act 2000* (Cth), Its Effects On Property Rights, and the Legal and Policy Dimensions of A Constitutional Challenge', *Maquarie Law Journal* 2 vol 1, viewed 31 October 2013, <http:www.austlii.edu.au/au/journals/McLawJl/2002/1.html>.

Royal Commission on Genetic Modification, 2001, *Report of the Royal Commission on Genetic Modification,* viewed 25 October 2013, <http://mfe.gov.nz/publications/organisms/royal-commission-gm>.

Serve-Ag, 2011, *Seed Production,* viewed 11 November 2013, <http://serve-ag.com.au/services/seed-sales-production/seed-production/>.

Smith, R.W. & Corkrey S.R., 2013, *Tasmanian Pasture Resource Audit: A review of the botanical composition of Tasmania pastures in 2011 - Final Report*, Tasmanian Institute of Agriculture, Launceston.

Smyth, S., & Phillips, P.W., 2002, 'Product differentiation alternatives: identity preservation, segregation and traceability', *AgBioForum*, vol. 5, no. 2, pp. 30-42.

South Pacific Seeds, 2013, *South Pacific Seeds,* viewed 13 November 2013, <http://www.sps-seedproduction.com/our-company.html>.

Stein, A.J., & Rodriguez-Cerezo, 2010, 'Low level presence of new GM crops: An issue on the rise for countries where they lack approval', *AgBioForum*, vol. 13, no. 2, pp. 173-182.

Sustainability Council of New Zealand, 2012, *Betting the Farm, economic impacts of introducing GM grasses,* viewed 13 November 2013, <http://purehawkesbay.org/wp-content/uploads/2011/05/Betting-the-Farm.pdf>.

Sylvan, L (Australian Competition and Consumer Commission Deputy Chair) 2004, *Changes to 'GM-free' chicken labelling underway*, media release, Canberrra, 6 December, , viewed 14 November 2013, <http://www.accc.gov.au/media-release/changes-to-gm-free-chicken-labelling-under-way>.

Tasmanian Beekeepers Association, 2007, *Submission to the inquiry into the future development of the Australian Honey Bee Industry: House of Representatives Standing Committee Agriculture, Fisheries and Forestry,* viewed 13 November 2013, <http_www.aphref.aph.gov.au_house_committee_pir_honeybee_subs_sub063.pdf>.

Tasmanian Government, 2007, *Inquiry into the future development of the honey bee industry: A submission to the House of Representatives Standing Committee on Agriculture, Fisheries and Forestry,* viewed 13 November 2013, <http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=3&ved=0CEYQFjAC&url=http per cent3A per cent2F per cent2Fwww.aph.gov.au per cent2Fparliamentary_business per cent2Fcommittees per cent2Fhouse_of_representatives_committees per cent3Furl per cent3D per cent2Fpir per cent2Fhoneybee per cent2Fsubs per cent2Fsub072.pdf&ei=60CEUr6YOMOuIAWx1oCAAw&usg=AFQjCNFOMt1jTZ4Fs0Fbt79oVqWX8iEkZA&bvm=bv.56343320,d.dGI>.

Tasmanian Government, 2012a, *Tasmanian Food and Beverage Scorecard 2010-2011,* Department of Primary Industries, Parks, Water and Environment, ISBN 978-0-7246-6651-5.

Tasmanian Government, 2012b, *Tasmanian Government Submission Legislative Council Select Committee Inquiry: Tasmanian Poppy Industry,* viewed 11 November 2013, <http://www.parliament.tas.gov.au/ctee/Council/Submissions/tpi.sub.191112.TasGovernmentSubmission.pdf>.

Tasmanian Government, 2012c, *Perennial ryegrass growing in Tasmania: suitability factors for assisting in site selection,* Department of Primary Industries, Parks, Water and Environment, viewed 13 November 2013, <http://www.dpipwe.tas.gov.au/inter.nsf/Attachments/JBAS-8UM3W9/$FILE/WfW per cent20Ryegrass_factsheet.pdf>.

Tasmanian Government, 2012d, *Poppy sub-sector profile – southern region,* viewed 19 November 2013, <http://www.development.tas.gov.au/__data/assets/file/0005/67118/Southern_Poppy_sub-sector_profile.pdf>.

Tasmanian Government, 2012e, 'Import Requirement 32- Canola seed and grain- freedom from Genetically Modified (GM) Brassicaceae Seed', *Plant Quarantine Manual Tasmania 2013 Edition*, Department of Primary Industries, Parks, Water, and Environment. ISBN: 978-0-7246-6609-6.

Tasmanian Government, 2013, *Tasmania's International Exports: 2012-2013,* viewed 19 November 2013, <http://www.development.tas.gov.au/__data/assets/pdf_file/0008/79208/Exports12-13.pdf>.

Tasmanian Institute of Agriculture, 2012, *Herbage Development,* viewed 13 November 2013, <http://www.tia.tas.edu.au/centres/extensive-agriculture-centre/r-and-d/research-and-development/herbage-development>.

Tranberg, J., 2013, 'Developing a policy for low level presence (LLP): a Canadian case study', *AgBioForum*, vol. 16, no. 1.

Victorian Government, , 2013, *Thresholds*, Department of Environment and Primary Industries, viewed 1 November 2013, <www.dpi.vic/gov.au/agriculture/innovation-and-research/biotechnology/genetically-modified>.

Western Australian Government, , 2010, *Organic farming and genetically modified crops,* Department of Agriculture and Food Western Australia, viewed 13 November 2013, <http://www.agric.wa.gov.au/objtwr/imported_assets/content/fcp/gmcrops/organicfarmingjan2010-web.pdf>.

Appendix 1: List of submissions

Submission No.	Name
001	Bio-Dynamic Education and Consultancy Tasmania
002	Wild Artisan
003	Lesley Keegan
004	Mark Burling
005	Julie Clearihan
006	Wayne Thompson
007	Kerri Cross
008	Anchor Organics
009	R W & K N Hyland
010	Paul Watson
011	Estelle Ross
012	Rick Calitz
013	Malcolm Mars
014	Penelope Clark
015	Greg Bradfield, Musselroe Beef
016	G & B Lindsay
017	Karl Stevens
018	Timothy Gunn
019	Jens Volkmann
020	Seaview Farm
021	Mandy Gunn
022	David Armstrong

023	Jodie Epper
024	TSJ Barrett
025	Intro Tas Pty Ltd
026	Rowena McDougall
027	Carlos Andrade
028	David & Lyndy Pinner
029	Our Mates' Farm Pty Ltd
030	Helen Hutchinson
031	Wilhelmine Engel
032	Anthony Schindler
033	Ray Meredith
034	Joyce Johnston
035	Confidential
036	Luke Nicholson
037	Alison Bleaney
038	Tasmanian Institute of Agriculture
039	Organic Coalition of Tasmania Inc
040	Bronzewing Botanicals
041	Tasmanian Beekeepers Association
042	York Town Organics
043	Black Ridge Farm
044	Bagdad Hills Vineyard
045	Dairy Futures CRC
046	P&B Rubenach

047	Ilona Powell
048	Warren Hastings
049	Tasmania Feedlot
050	Heather Thorpe
051	Tom Kingston
052	Merri Bee Organic Farm
053	Nathan Sidney
054	Adriene Cobcroft
055	Jeanette Cooper
056	Anne Layton-Bennett
057	Forestry Tasmania
058	Joshua Morris
059	Leon Quilliam
060	E Pugh
061	Tasmanian Agricultural Productivity Group
062	CSIRO
063	Eatem Organic Foods
064	P Wadsley
065	Skretting Australia
066	Garagistes
067	Brand Tasmania Council
068	Michelle Hudspeth
069	Ben Clark
070	Kev Rothery

071	Malcolm Ryan
072	Paul Thomas
073	Robin Thomas
074	Kelty Farm
075	Harvest Feast
076	Wild Ecology
077	Susan & Geoffrey Probert
078	Quill Australia
079	Confidential
080	Wine Tasmania
081	Hon Lin Thorp – Labor Senator
082	Poppy Growers Tasmania
083	Lissa Villaneuve et al (169 signatures)
084	Environment Tasmania
085	DairyTas
086	Hannah Rubenach
087	Green Co-op Union
088	Dr Tony McCall - UTAS
089	CropLife
090	Anonymous
091	Simon Tassell
092	Eternal Source Pty Ltd
093	Slow Food Hobart
094	PGG Wrightson Seeds

095	AusBiotech
096	Tasmania Alkaloids
097	Fat Pig Kitchen
098	Greens Party – Milne, Whish Wilson & Booth (same as submission no. 114)
099	Kaylyn Geeves
100	Margot White
101	Marcia Watkins
102	Callum Eachern
103	Brett Hall
104	Toehold Farm
105	Greenham Tas
106	The Environment Association
107	Toni Radcliffe
108	Essential Oils of Tasmania
109	Tasmanian Farmers and Graziers Association
110	Joseph Hartley
111	Aust Dairy Industry Council
112	Mark Poll
113	Curringa Farm
114	Australian and Tasmanian Greens Party (same as submission no. 98)
115	Safe Food Foundation
116	Confidential
117	Sustainable Living Tasmania
118	Food Standards Australia New Zealand

119	Frogmore Creek
120	Ethos Eat Drink
121	Fork & Hoe Collective
122	Fruit Growers Tasmania
123	Sandra Murray - UTAS
124	Gene Ethics
125	Provenance Growers
126	ANTU Trading
127	Jamie Brooks
128	Zachary Morris
129	The Agrarian Kitchen Pty Ltd
130	George Vorillas
131	Confidential
132	Grace
133	Sapphire
134	Island Cards
135	BB Heritage Seeds/Heirlooms of Tasmania
136	Confidential
137	Good Life Permaculture
138	Jonathon Carter
139	Julie Vaughan
140	Tara Hoy
141	Patricia Kahler
142	Edwin Morris

143	Rosemary Ann Ogilvie
144	Seraphim Blueprint Tm
145	Joanna McRae
146	Diggers Club
147	Veena Tilly
148	Mike Smith
149	Geraldine de Burgh-day
150	Mark & Janet Buckerfield
151	Forest Hill Farm Organic Produce
152	Lynette Taylor
153	Sarah Buckerfield
154	John Heck
155	Anna Clements
156	Robyn Wood
157	Evan Scherrett
158	GSK Australia
159	Tasmanian Active Honey Group Pty Ltd
160	Harvest Launceston

Appendix 2: Issues paper and invitation to comment

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