

SUBMISSION TO SOUTH AUSTRALIA STATUTORY CONSULTATION – GENETICALLY MODIFIED FOOD CROPS MORATORIUM



30 September 2019

EXECUTIVE SUMMARY

CropLife Australia welcomes the recent announcement by the South Australian Government of its intention to lift the GM crop moratorium on mainland South Australia. CropLife supports freedom of choice for farmers and their right to access GM crops approved by the Gene Technology Regulator.

Lifting the GM crop moratorium on mainland South Australia will deliver significant advantages for South Australian growers who have been deprived of the benefits of growing GM crops for over fifteen years. The GM crop moratorium has had a cumulative cost of \$33 million to the state's canola industry over 2004-2018, with no tangible trade or marketing benefits. Moreover, the persistence of a GM crop moratorium in South Australia, while neighbouring states grow GM crops, has discouraged public and private investments in agricultural research and development in the state.

Recent independent reports have demonstrated overwhelmingly that farmers in South Australia have not received a premium because of the moratorium. The premiums received by South Australian growers are based on the high quality of their products, due to their expertise and dedication, not on the GM crop moratorium. Multiple expert analyses, supported by reproducible economic data, found that the moratorium in South Australia has not led to enhanced premiums over comparable markets for South Australian farmers producing commodities such as canola, wheat, barley, wine grapes, cattle, sheep meat or lamb. A recent report showed that grain prices in South Australia have declined since 2012 compared to those obtained in states where GM crops are grown.

Evidence from neighbouring states that permit the commercial cultivation of GM crops clearly demonstrates that both GM and non-GM crops can be grown and marketed side-by-side without impacting on prices or market access for primary producers.

Over 1 billion acres of GM crops have been cultivated since 1996 and over 1 trillion meals containing GM food ingredients have been consumed globally. GM crops are the most tested and regulated food product in history. There are no substantiated scientific reports of any food safety issues related to the consumption of genetically modified crops, nor any unexpected effects on ecosystems. The development, planting and consumption of an approved GM crop is safe. All GMOs approved by Australia's Gene Technology Regulator for commercial release are as safe for human health and the environment as their conventional (non-GM) counterparts.

Cultivation of GM crops has proven to be beneficial to the environment. Crop biotechnology is an important tool helping farmers become more sustainable by allowing them to produce more while using fewer natural resources and decreasing their usage of pesticides. Since GM crop cultivation started in 1996, more than 183 million hectares of land have been saved from ploughing and cultivation, leading to improved water storage, limited soil erosion and increased availability of land for other environmental uses.

The evidence of the benefit of GM crops is both overwhelming and indisputable. It demonstrates that GM crops could offer all the agronomic, economic, environmental, trade and marketing benefits that are sought by South Australian primary producers.

Lifting the GM crop moratorium on mainland South Australia is not about GM crops being grown by all farmers. This is about all farmers having a choice to grow all available crops, including GM crops.

Lifting the GM crop moratorium on mainland South Australia would be a key step to encouraging the farming sector to grow, build resilience, become more environmentally sustainable and support innovation.

1. INTRODUCTION

As the national peak industry organisation for the plant science sector, CropLife Australia seeks to ensure that the nation's farmers have access to safe, innovative, modern agricultural tools to support the productivity and environmental sustainability of Australian farming.

The plant science industry provides products to protect crops against pests, weeds and diseases, as well as developing crop biotechnologies that are key to the nation's agricultural productivity, sustainability and food security. The plant science industry is worth more than \$20 billion a year to the Australian economy and directly employs thousands of people across the country. CropLife Australia is a part of the CropLife International Federation of 91 national associations globally. Our focus is, however, specifically on an Australian agricultural sector that is internationally competitive through globally leading productivity and sustainability achieved through access to the technological innovation of the plant science sector.

CropLife welcomes the recent announcement by the South Australian Government of its intention to lift the GM crop moratorium on mainland South Australia. CropLife supports freedom of choice for farmers and their right to access GM crops approved by the Gene Technology Regulator.

Regulations should be based on evidence and sound science. Lifting the GM crop moratorium on mainland South Australia will right a wrong for South Australian growers who have been deprived of the benefits of growing GM crops for over fifteen years. The Anderson report recently estimated that the GM crop moratorium has had a cumulative cost of \$33 million for the state's canola industry over 2004-2018, with no tangible trade or marketing benefits¹. Moreover, the persistence of a moratorium in South Australia, while neighbouring states grow GM crops, has discouraged public and private investments in agricultural research and development in the state.

GM and non-GM crops have been grown successfully side-by-side in Australia and in 24 countries worldwide for decades, with coexistence being successfully managed. Almost all countries and regions that examined the potential for GMO-free marketing have concluded that any potential benefits did not outweigh the costs.

Lifting the GM crop moratorium put in place on mainland South Australia will recognise the mounting evidence of the environmental benefits of GM crops. Crop biotechnology is an important tool helping farmers become more sustainable by allowing them to produce more while using fewer natural resources and decreasing their usage of pesticides. Since GM crop cultivation started in 1996, more than 183 million hectares of land have been saved from ploughing and cultivation, leading to improved water storage, limited soil erosion and increased availability of land for other environmental uses.

The world's population is predicted to increase to 9.7 billion by 2050, requiring an increase in global food production of over 70 per cent. Providing enough food in the context of production constraints, volatile consumption patterns and a changing climate represents an unprecedented scientific, economic and public policy challenge. The situation provides an opportunity for South Australian farmers to both assist in the global food security effort and to profit from increased demand for their agricultural products. By adopting innovative farming practices, such as the sustainable and efficient use of GM crops, the South Australian farming sector will be able to produce more with less, strengthening both the sector and the regional communities that rely on it.

¹ Anderson, K (2019) 'Independent Review of the South Australian GM Food Crop Moratorium', Report to the SA Minister for Primary Industries and Regional development, February.

GM crops currently under development in Australia could help South Australian farmers combat environmental stresses such as drought, acid soils and salinity, caused by non-sustainable farming practices and a changing climate. Other GM traits that are currently under investigation by Australian researchers will offer better, more sustainable options for the major individual commodities in South Australia or bring health benefits to South Australian consumers with products such as fortified cereals, healthier starches and oils modified to be lower in saturated fats and with improved cooking qualities.

CropLife's submission addresses the following questions:

- What are the market implications of the GM crop moratorium that is currently in place?
- What are the consumer attitudes regarding GM crops?
- What are the health, safety and nutritional impacts of GM crops?
- What are the agronomic, environmental and economic benefits of GM crops?
- Is coexistence between GM, non-GM and organic crops possible?
- What opportunities are there for South Australian farmers and consumers if the GM crop moratorium is lifted?

2. MARKET IMPLICATIONS OF THE GM CROP MORATORIUM

The South Australian GM crop moratorium has now been in place for fifteen years. Recent independent reviews and reports have shown that the costs of the GM crop moratorium far outweigh any nominal or asserted benefits, none of which have been proven. Independent market analysis by Mecardo in 2016 and 2017 showed there is little evidence to determine that South Australia has achieved a premium for its non-GM canola crop due to the moratorium on GM technology. Comparing the difference between non-GM canola in Adelaide (South Australia) and Kwinana (Western Australia) demonstrated a clear premium for non-GM in Kwinana throughout the entire season. There is even evidence of GM canola in Kwinana achieving a premium over Adelaide non-GM².

In 2018, Mecardo released an independent report jointly commissioned by Grain Producers South Australia and the Agricultural Biotechnology Council of Australia (ABCA), that analysed the price premiums under the South Australian GM crop moratorium³. The results of this analysis demonstrated overwhelmingly that farmers in South Australia do not receive a premium because of the moratorium.

The Mecardo expert analysis, supported by reproducible economic data, found that the moratorium in South Australia has not led to enhanced premiums over comparable markets for South Australian farmers producing the following commodities: canola, wheat, barley, wine grapes, wool, cattle, sheep meat or lamb⁴.

The recent Anderson review echoed these findings, showing that the GM crop moratorium has not led to price premiums for grain in South Australia. The report found that average prices of key crops obtained by farmers at the main port in South Australia were no higher than those obtained at the main port in Victoria or Western Australia. In fact, grain prices in South Australia have declined since 2012 compared to those obtained in states where GM crops are grown⁵.

The independent expert report estimated the cumulative cost of the GM crop moratorium to South Australian canola growers to be up to \$33 million between 2004 and 2018. Moreover, in the absence of the GM crop moratorium, gross revenue for producers of GM canola would have been an estimated \$5.4 million higher during the 2004-2018 period. Other benefits, such as reduced weed control costs, reduced farm chemical use, reduction in greenhouse gas emissions, have been so far denied to South Australian farmers due to the GM crop moratorium, further impacting the state's economy⁶.

Due to an inadvertent drafting error, the South Australian legislation imposed a total ban on the transport of genetically modified (GM) seed and grain through the state of South Australia. Lifting the transport ban would create a strong demand for South Australian transit services, should there be a need to move grain or seed between Western Australia and the eastern states. This would place South Australian GM canola growers and seed suppliers in a strong position, allowing them to provide seeds to neighbouring states.

More broadly, the failure to implement a consistent national regulatory scheme has created significant uncertainty in the agricultural biotechnology sector in Australia. Lifting the GM crop moratorium on mainland South Australia would be an important step to ensure Australia continues to have a competitive and productive food industry with safe and affordable food choices available for all consumers.

² Whitelaw A (2016) 'Is the GM ban in South Australia providing a premium?'. Mercado Expert Market Analysis: 25 July 2016; and Whitelaw A (2017) 'Controversial canola'. Mercado Expert Analysis: May 25 2017.

³ Whitelaw A, Dalglish M and Agar O (2018) 'Analysis of price premiums under the South Australian GM moratorium'. Report independently produced by Mecardo, under commission from Grain Producers South Australia (GPSA) and the Agricultural Biotechnology Council of Australia (ABCA), March.

⁴ *Ibid.*

⁵ Anderson, K (2019). Op cited.

⁶ *Ibid.*



The Final Report of the Productivity Commission’s Inquiry into the Regulation of Australian Agriculture in November 2016 recommended that, “the New South Wales, South Australian, Tasmanian and ACT Governments should remove their moratoria on GM crops. All states and territories should also repeal the legislation that imposes or gives them powers to impose moratoria on GMOs by 2018”⁷. The state moratoria on GM crops were also identified in the March 2015 Harper Competition Policy Review as a significant example of a regulatory restriction on competition⁸.

The South Australian Government recently published its Food, Wine and Agribusiness Discussion Paper, as part of its Growth State plan for prosperity. The discussion paper highlights the important role played by the grain industry in achieving greater productivity, profitability and competitiveness. Lifting the GM crop moratorium would be a key step to encourage the farming sector to grow, build resilience and support innovation. Furthermore, bringing South Australia GM legislation into line with its neighbouring states and the Commonwealth would lift the regulatory costs associated with enforcing the moratorium, and will have an impact on attracting and retaining agricultural research and development investments to South Australia.

⁷ Productivity Commission 2016, Regulation of Australian Agriculture, Report no. 79, Canberra.

⁸ Harper I, Anderson P, McCluskey S and O’Byrne M 2015, The Australian Government Competition Policy Review, pp116.

3. CONSUMER ATTITUDES ON GM CROPS

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

Even in the European Union, which has some of the strictest regulations regarding genetically modified imports and labelling, more than 50 genetically modified crops are approved for use as food and feed. These include maize, soybean, rapeseed, sugar beet and cotton⁹.

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

Segmenting the audience into four groups based on their support for GM foods, almost half the respondents were open to the production of GM food as long as regulations were in place to make sure it was safe. About a quarter were against the production of food this way until the science could prove it was safe¹⁰.

In another survey, conducted by Food Standards Australia New Zealand (FSANZ), 1,200 Australians were asked, “which types of foods do you have concerns about?”, fewer than three per cent nominated food containing GM ingredients. They also listed 16 other elements before genetic modification when asked, “what information do you usually look for” on a food label when purchasing a product for the first time¹¹.

A 2019 Eurobarometer survey of 27,650 Europeans found that concerns about GMOs in food or drinks have more than halved since 2010 and is rapidly decreasing¹².

Several studies have shown that voiced negative consumer attitudes to GM foods expressed in surveys is not a reliable guide for what consumers purchase at the supermarket when pricing of products becomes a competitive factor in decision-making¹³. “What consumers say they will choose in a survey and what they actually choose in a real-purchase situation may differ substantially when their decision is framed by a socially charged issue such as genetic modification”¹⁴.

⁹ http://ec.europa.eu/food/dyna/gm_register/index_en.cfm

¹⁰ Cormick C and Mercer R (2017) ‘Community attitudes to gene technology’. Prepared for the Office of the Gene Technology Regulator, Canberra.

¹¹ FSANZ (2008). ‘Consumer attitudes survey 2007: A benchmark survey of consumers’ attitudes to food issues’. Food Standards Australia New Zealand, Canberra.

¹² European Commission (2019) ‘Eurobarometer survey on food safety in the EU’. Retrieved from https://www.efsa.europa.eu/sites/default/files/corporate_publications/files/Eurobarometer2019_Food-safety-in-the-EU_Full-report.pdf.

¹³ Sleenhoff S & Osseweijer P (2013) ‘Consumer choice’. *GM Crops & Food*, 4:3, 166-171; Knight, J. G., Mather, D. W., Holdsworth, D. K., & Ermen, D. F. (2007). ‘Acceptance of GM food—an experiment in six countries’. *Nature biotechnology*, 25(5), 507;

¹⁴ Mather, D. W., Knight, J. G., Insch, A., Holdsworth, D. K., Ermen, D. F., & Breitbarth, T. (2012). ‘Social stigma and consumer benefits: trade-offs in adoption of genetically modified foods’. *Science communication*, 34(4), 487-519; as quoted in Lucht, J. M. (2015). ‘Public acceptance of plant biotechnology and GM crops’. *Viruses*, 7(8), 4254-4281.



4. HEALTH, SAFETY AND NUTRITIONAL IMPACT OF GM CROPS

GM crops currently grown around the world and the food they produce have been studied extensively and repeatedly declared safe by scientific bodies and regulators globally.

Commercial production of GM crops is only permitted when environmental and consumer safety has been thoroughly demonstrated. In Australia, the Gene Technology Regulator is responsible for licensing any dealings with live and viable genetically modified organisms. FSANZ is required to approve any GM food ingredient and the Australian Pesticides and Veterinary Medicines Authority (APVMA) regulates those GM crops with inbuilt pest protection. The GM canola and GM cotton crops that are grown in Australia have passed these regulatory assessments.

GM crops have been grown and consumed for more than 20 years and people worldwide have eaten billions of meals containing biotech derived foods or ingredients. There are no substantiated scientific reports of any food safety issues related to the consumption of biotech crops. The development, planting and consumption of an approved GM crop is safe.

GM technology is being used to develop nutrient dense varieties of staple crops that could be grown for a fraction of the recurrent estimated annual costs of supplementation programs in developing countries and could reach far more people. The nutritional quality of staple foods can be substantially improved using transgenic methods compared to what can be accomplished using traditional breeding.

There is considerable Australian research into GM traits that will bring health benefits to South Australian consumers, such as cereals with increased iron levels, healthier starches or cooking oils modified to be lower in saturated fats and with improved cooking qualities. Lifting the GM crop moratorium would give South Australian farmers access to these innovations and would also support the state's agricultural research and development sector.

A good example of GM crops with nutritional benefits is a canola crop that has been modified to produce high-levels of long-chain omega-3 oils, like those found in fish oil. This GM crop has been developed through a joint venture between the CSIRO, the Grains Research and Development Corporation and Nuseed, a CropLife Australia member. The health benefits of long-chain omega-3 oils are well documented with adequate intake having an overall positive impact on brain, eye and heart health, and inflammation management. Omega-3 oils also play an important role in child and infant development.

When commercialised, the long-chain omega-3 canola will relieve pressure on wild fish stocks and maintain an adequate supply of this important nutrient via a proven land-based, sustainable source. One hectare of this canola has the potential to provide the omega-3 oil yield from 10 tonnes of fish. Lifting the GM crop moratorium would allow South Australian canola growers to access and benefit from this new technology.



5. AGRONOMIC, ENVIRONMENTAL AND ECONOMIC BENEFITS OF GM CROPS

Since being first commercially cultivated in 1996, GM crops have contributed to global food security, sustainability and helped farmers to adapt to and mitigate climate change by:

- Increasing the value of crop production by US\$186 billion¹⁵
- Reducing pesticide usage (kg active ingredient) by 671 million kg¹⁶
- Reducing CO₂ emissions in 2018 alone by 27.1 billion kg¹⁷ (equivalent to taking 16.7 million cars off the road for one year, more than all the passenger vehicles registered in Australia and 86 per cent of all vehicles registered in Australia)
- Increasing the incomes of more than 17 million small farmers and their families – some of the poorest people in the world – and thereby helping to alleviate poverty¹⁸

GM crops have helped farmers financially. Globally, GM technology directly increased farm income by US\$18.2 billion in 2016¹⁹, with over half the gains going to farmers in developing countries²⁰. According to the meta-analysis published by Klumper and Qaim, GM crops have reduced pesticide use by 37 per cent, while increasing crop yield by 22 per cent and increasing farmer profits by 68 per cent²¹.

Cultivation of GM crops has equally proven to be beneficial to the environment. Crop biotechnology is an important tool helping farmers become more sustainable by allowing them to produce more while using fewer natural resources and decreasing their usage of pesticides. Since GM crop cultivation started in 1996, more than 183 million hectares of land have been saved from ploughing and cultivation, leading to improved water storage, limited soil erosion and increased availability of land for other environmental uses.

A 2012 study reported in the journal *Nature*, found that in China over a period of 16 years, vast plantings of GM insect resistant crops have helped to control several major insect pests and reduced the need for additional insecticide applications by promoting the bio control services offered by beneficial predatory insects²². On conventional crops, these beneficial insects were killed by the broad-spectrum insecticides used to control the major target pests, for example, cotton bollworm. This study found a marked increase in the abundance of three arthropod predators (ladybirds, lacewings and spiders) and a decreased abundance of aphid pests associated with the widespread adoption of GM insect resistant cotton and reduced insecticide sprays in this crop²³.

A 2014 study by the International Food Policy Research Institute (IFPRI) measures the impacts of agricultural innovation on farm productivity, prices, hunger and trade flows to 2050 and identifies practices that could significantly benefit developing nations. The study reinforces that no single agricultural technology or farming practice will provide sufficient food for the world in 2050²⁴. This highlights the need for a combination of agricultural technologies and practices, such as heat tolerant crops and no till farming.

¹⁵ Brookes G and Barfoot P (2018) *'GM crops: global socio-economic and environmental impacts 1996-2016'*. PG Economics, Dorchester, UK (June).

¹⁶ *Ibid.*

¹⁷ ISAAA (2019) *'Global Status of Commercialized Biotech/GM Crops in 2018: Biotech Crops Continue to Help Meet the Challenges of Increased Population and Climate Change'*. ISAAA Brief No. 54. ISAAA: Ithaca, NY.

¹⁸ *Ibid.*

¹⁹ Brookes and Barfoot (2018) *Op. Cit.*

²⁰ ISAAA (2019) *Op. Cit.*

²¹ Klumper, W. and Qaim, M., (2014). *'A meta-analysis of the impacts of genetically modified crops'*. PLoS one, 9(11), p.e111629.

²² Lu Y, Wu K, Jiang Y, Guo Y and Desneux N 2012. *'Widespread adoption of Bt cotton and insecticide decrease promotes bio control services'*. *Nature* doi: 10. 1038/nature11153 published online 13 June 2012.

²³ *Ibid.*

²⁴ Rosegrant Mark W. et al. 2014 *'Food Security in a World of Natural Resource Scarcity: The Role of Agricultural Technologies'* International Food Policy Research Institute (IFPRI)

Although not grown in South Australia, GM cotton is a good example of the positive impact of GM crops on the Australian farming sector. By growing GM cotton varieties, Australian farmers have seen environmental benefits resulting from decreased insecticide use and changes in the type of insecticides and herbicides used. First grown in 1996, almost 100 per cent of Australia's cotton crop is now grown with GM varieties²⁵. Cultivation of GM insect resistant cotton varieties has enabled a reduction in the amount of insecticide active ingredient used by up to 85 per cent^{26, 27}. This, in conjunction with industry stewardship practices, has greatly reduced the potential for chemical runoff into rivers in cotton growing regions of Australia²⁸.

The adoption of GM technology in cotton has coincided with a 40 per cent increase in water use efficiency of the crop over the past decade. New cotton varieties released have contained new features such as improved fibre quality, disease resistance, maturity and regional adaptability – research is being undertaken to develop varieties that require less water and/or are drought tolerant²⁹.

The types of chemical being used have also changed. Because of the 'in built' insecticide in GM insect resistant cotton, insect control can be more targeted and specific meaning there is less of an impact on non-target organisms thereby allowing beneficial insects (i.e. predatory insects) to remain in the crop. It is worth noting that the insecticidal 'Bt' protein expressed in GM insect resistant cotton is also an approved input in organic agriculture. Fuel use during crop production is reduced because of fewer pesticide applications being required.

GM herbicide tolerant cotton and canola have increased the adoption of minimum tillage practices and the replacement of some herbicides with less hazardous alternatives. By facilitating minimum tillage, GM herbicide tolerant crops have reduced soil erosion, increased retention of soil moisture and increased soil carbon. Reducing the use of some residual herbicides, together with good industry stewardship, has decreased the potential for herbicide runoff into waterways³⁰.

Economic and social benefits have also been realised through the adoption of GM crops in Australia. For example, in GM cotton growing regions, the incidence of on-farm workplace incidents have decreased because of reduced insecticide spraying and the reduced need for hand weeding in cotton fields. Community perceptions of the Australian cotton industry have also markedly improved since GM cotton was first grown in 1996. Cultivation of GM cotton varieties has allowed cotton farmers to spend less time on the tractor and more time with their families, an important social implication for rural Australia that should not be overlooked.

The adoption of GM herbicide tolerant canola varieties in Australia has resulted in environmental benefits and increased environmental sustainability. These benefits include no-till cultivation, that helps conserving soil moisture and reducing soil erosion. Just as for farmers growing GM herbicide tolerant cotton, cultivation of GM herbicide tolerant canola has allowed farmers in New South Wales, Victoria and Western Australia to use selective, targeted and lower hazard crop protection products and has helped them alleviate the development of weed resistance.

²⁵ Cotton Australia Cotton Fact File: Biotechnology <http://cottonaustralia.com.au/cotton-library/fact-sheets/cotton-fact-file-biotechnology>
²⁶ Hattersley P, Johnson H, Glover J, Foster M, Wesley V and Mewett O 2009. 'Plant Gene Technology: Improving the Productivity of Australian Agriculture'. Australian Government Bureau of Rural Sciences, Canberra.

²⁷ Holtzapffel R, Mewett O, Wesley V and Hattersley P 2008. 'Genetically modified crops: tools for insect pest and weed control in cotton and canola'. Australian Government Bureau of Rural Sciences, Canberra.

²⁸ *Ibid.*

²⁹ Cotton Australia <https://cottonaustralia.com.au/cotton-library/fact-sheets>

³⁰ Hattersley *et al.*, Op. cit.



6. COEXISTENCE OF GM, NON-GM AND ORGANIC CROPS

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

Coexistence is not about environmental or health risks as it refers only to the use of crop biotechnologies or crop protection products that have been approved as safe for the environment and human health by Australian Government regulators. It is important to remember that industry routinely, efficiently and effectively segregates and supplies to the market a wide variety of differentiated products, from food to feed or even industry purposes.

Coexistence of various production methods is not a new concept to the agricultural community. Farmers have practiced coexistence for generations to meet customer demands for different types of products. Breeders and farmers are accustomed to breeding and producing different crops alongside each other, such as bread and noodle wheat, or feed and malting barley. They are also accustomed to producing certified seed to meet defined purity standards.

Varietal segregation has been a normal part of Australian bulk grain transport and storage for decades³¹. Years of experience have demonstrated that coexistence of a wide range of production methods is not a problem, provided technical and procedural guidelines are carefully followed and cooperation between neighbouring farms is encouraged. This applies equally to the use of modern crop protection and crop biotechnology products in farming systems.

For example, prior to the introduction of GM canola, industry was already segregating commodity canola from high oleic low linolenic (HOLL) canola or high erucic acid canola³², feed barley from malting barley, and many different grades of wheat. Introducing GM canola varieties into the Australian seed and grain supply chain did not represent significant difficulties for the bulk grain handling industry, as it was purely a case of 'business as usual', with simply an additional segregation and sampling and testing protocol added at the grain receival site.

The experience of GM canola production and marketing in other mainland states over the past decade reveals that segregation and identity preservation protocols and practice codes can and do ensure the successful coexistence of GM and non-GM crops. The Australian grain industry has put in place robust, safe and sophisticated methods to manage GM and non-GM supply chains. Tools are available to ensure coexistence of GM, non-GM and organic crop productions in South Australia and have been tested and used for decades all around Australia. It is crucial that South Australian farmers are given the opportunity to remain competitive by getting access to proven and safe methods of production that suit their circumstances.

Sampling and testing can be used to validate coexistence strategies and confirm industry has maintained the integrity of the products they supply to the market. Industry segregates and supplies products to meet customer preferences and carries out sampling and testing both to verify that their systems are working properly and to provide customers with the assurance that products meet their specifications.

³¹ White, P., Carter, C. and Kingwell, R. 2018. Australia's Grain Supply Chains: Costs, Risks and Opportunities. Report produced for the Australian Export grain Innovation Centre. South Perth, Western Australia.

³² High erucic acid varieties are grown for industry purposes to produce slip agents and lubricants.



The 'Market Choice Framework' introduced in 2007 by the Australian grain industry to manage the commercial introduction and coexistence of GM canola in the Australian seed and grain supply chain could be applied to manage the introduction of commercial GMOs in South Australia. With more than ten years' experience, it provides the necessary certainty and confidence to supply chain participants, consumers and the South Australian Government that GM products can be managed alongside non-GM and organic products to meet market and customer requirements.

7. CURRENT AND UPCOMING OPPORTUNITIES

Australian cotton and canola farmers have gained \$1.37 billion worth of extra income and produced an additional 226,000 tonnes of canola that would otherwise not have been produced if conventional technology had been used³³. South Australian farmers have so far missed out on their share of these economic and agronomic benefits. In fact, several independent reports, including the recent Anderson report, show that the GM crop moratorium has had a cumulative cost of \$33 million for the state's canola industry over 2004-2018, with no tangible trade or marketing benefits.

GM technology has enabled Australian farmers to reduce their use of insecticides and herbicides by 22 million kilograms of active ingredient, equal to a 26 per cent improvement in the environmental impact associated with pesticide use in these two crops. Improving the sustainable use of pesticides on GM crops has also resulted in a saving of nearly 27 million litres of fuel use and 71.5 million kilograms less carbon dioxide being released in the atmosphere³⁴.

The most appropriate current GM crop suited to South Australian farming systems is GM herbicide tolerant canola. South Australian growers are already growing non-GM herbicide tolerant canola varieties (such as Triazine Tolerant and Clearfield) and the addition of GM varieties will be a valuable extra tool in their weed control toolbox. Australia's Gene Technology Regulator has concluded that approved GM herbicide tolerant canola varieties pose no greater risks to human health or the environment than their conventionally bred herbicide tolerant counterparts.

The agronomic benefits of GM (when compared to non-GM) herbicide tolerant canola include increasing the options for in crop weed control, allowing herbicide rotations that address the risk of herbicide resistant weeds developing and increasing the yield in subsequent cereal crops, which could be adversely affected by herbicide carry over from the herbicides used in non-GM herbicide tolerant crops (triazines and imidazolinones).

The control of insect pests and weeds is a significant cost for South Australian farmers. While insect resistant GM cotton is not suitable for South Australia, GM herbicide tolerant canola is a new tool that South Australian farmers could use as part of an Integrated Weed Management program to improve the sustainability of weed control options in South Australia.

GM crops currently under research and development in Australia will help South Australian farmers address the unprecedented challenges they are facing in a changing climate. GM traits currently investigated at the national level will be crucial tools for farmers to combat drought, soil acidity and/or salinity, as well as emergent diseases.

Benefits from lifting the GM crop moratorium could be far greater than just those from canola, due to the development and approval of new GM varieties of other crops (and pasture grasses) of relevance to South Australia. For example, a GM high-oleic safflower variety was recently approved for commercial cultivation by the OGTR. Current field trials approved by the OGTR include GM ryegrass, providing more energy and better nutrition to grazing livestock, or potato plants resistant to viruses and fungus. Lifting the GM crop moratorium would give South Australian farmers access to these innovations and offer further potential benefits.

As mentioned above, there is also considerable Australian research into GM traits that will bring health benefits to South Australian consumers, such as cereals with increased iron levels, healthier starches or cooking oils modified to be lower in saturated fats and with improved cooking qualities. Once again, lifting the GM crop moratorium would give South Australian farmers access to these innovative crops, and will provide healthier choices to consumers who buy South Australian products.

³³ Brookes G (2016) 'Adoption and impact of Genetically Modified Crops in Australia: 20 Years' Experience'. Report prepared for CropLife Australia Ltd, Canberra, May 2016.

³⁴ *Ibid*



Moreover, South Australia is well-known domestically and internationally for its state of the art, world-class research and development facilities in plant breeding and plant functional genomics to improve plant performances and quality. Lifting the GM crop moratorium would encourage public and private agricultural research and development investment in the state. It could also help attracting and retaining more scientists and students to South Australia.



8. CONCLUSION

The South Australian GM crop moratorium has caused a trade and marketing disadvantage to the state. South Australian primary producers have been denied access to the newest and most innovative agricultural technologies for over fifteen years. The evidence clearly shows that the GM crop moratorium has been a costly burden to South Australia, hurting farmers and limiting agricultural research and development investment.

Ultimately, it is farmers that best understand the pressures faced by a farm. Lifting the GM crop moratorium would support productive, profitable and innovative agriculture, by allowing farmers to make decisions in the best interests of their own businesses. This will mean allowing farmers to adopt any one of a range of farming systems, or a combination of them.

The evidence of the benefits of GM crops is both overwhelming and indisputable. It demonstrates that GM crops could offer all the agronomic, economic, environmental, trade and marketing benefits that are sought by South Australian primary producers.

CropLife supports the announcement by the South Australian Government of its intention to lift the GM crop moratorium on mainland South Australia. This will give farmers the freedom to choose the crops and agronomic practices that best suit the effective and sustainable management of their businesses. Each individual farm faces specific challenges in terms of climate, soil type, farming system, demography and economy. These circumstances all have an impact upon the choices available to farmers to manage their farms. GM crops have been shown in all other Australian mainland states to have great potential to offer the agronomic, economic, environmental, social, trade and marketing benefits that are sought by South Australian producers.

Lifting the GM crop moratorium would be a key step to encourage the farming sector to grow, build resilience, become more environmentally sustainable and support innovation.

