

NEW SOUTH WALES GOVERNMENT

REVIEW OF THE

GENE TECHNOLOGY
(GM CROP MORATORIUM) ACT 2003

Submission

Pioneer Hi-Bred Australia Pty Limited

31st August 2007

**Mr. Ian Armstrong
Chair- Review Panel
GM Canola Review Panel
NSW Department of Primary Industries
Locked Bag 21
Orange NSW 2800**

Dear Ian,

RE: SUBMISSION TO THE NEW SOUTH WALES GOVERNMENT'S REVIEW OF THE GENE TECHNOLOGY (GM Crop Moratorium) ACT 2003

Thank you for the opportunity to provide a comment on the GENE TECHNOLOGY (GM Crop Moratorium) ACT 2003 .Pioneer Hi-Bred is a world leader in plant biotechnology and in Australia we are a seed genetics and crop planting seed provider.

Pioneer Hi-Bred International, Inc., a [DuPont](#) company, is the world's leading developer and supplier of advanced plant genetics to farmers worldwide. With headquarters in Des Moines, Iowa, Pioneer develops, produces and markets a full line of top-quality seeds and forage and grain additives and provides services to customers in nearly 70 countries. Each year Pioneer invests more than US \$200 million in just corn biotechnology (Pioneer's global research budget is around \$US 600 million).

The company's three key research and development objectives are:

1. To improve harvestable yield
2. To reduce crop losses, grower input costs and risks
3. To create value in grain

Plant biotech adoption now stands at 80 percent for soybeans in the US and 55 percent worldwide. Cotton adoption in the US is 73 percent and 21 percent worldwide. Corn is 40 percent of the US market and 11 percent worldwide. This is, by far, the most rapid acceptance of any technology in agricultural history. Companies can't drive that kind of adoption. It occurs because people see the value and are convinced it is safe. Examples of biotechnology to come from Pioneer include drought and salinity tolerance, improved nitrogen use efficiency, bio-based clothes and plastics from corn, higher levels of starch in corn for better biofuel efficiency, further improvements to yields and quality.

Pioneer Hi-Bred Australia Pty Ltd was founded in 1975. The company works closely with New South Wales farmers to develop seed products for the diverse agricultural environment in New South Wales. Pioneer Hi-Bred has invested significantly in infrastructure within New South Wales when compared to its investments in other states. It has established regional sales office locations, together with its South Eastern Australian Research Centre being based at Wagga Wagga and its seed cleaning and treatment facility based at Narromine. This infrastructure supports an Australia-wide network of field staff and agronomists, each of whom provide in-field support to seed distributors and growers: In Australia, Pioneer Hi-Bred sells seed of proprietary Pioneer® brand corn, grain sorghum, and forage sorghum hybrids, as well as hybrids and varieties of canola.

Yours sincerely



Mr Keith Glasson
Managing Director
Pioneer Hi-Bred Australia Pty Ltd

Submission Overview

Pioneer Hi-Bred currently markets Roundup Ready canola under license from Monsanto in Canada and the USA. In addition it has the license rights to develop and introduce Roundup Ready canola into Australia. Pioneer Hi-Bred commenced field trials of Roundup Ready canola in 1997 with the expectation of commercial release in 2003. As part of its business strategy for the introduction and adoption by Australian canola growers Pioneer Hi-Bred downsized its conventional canola breeding program and was actively investing in the resources and infrastructure that would be required to support the introduction of Roundup Ready canola and future GM crops in Australia and New South Wales in particular.

Following the imposition of the various GM canola and GM crop moratoriums in 2004 by respective state and territory governments Pioneer Hi-Bred was forced to immediately halt its activities in Australia and accept a significant loss on its investment in Australia and in particular New South Wales. As a result Pioneer Hi-Bred was not only forced to pull back its investment in canola breeding but was also forced to shelve plans for introducing future GM crops into Australian agriculture. GM crops it must be stated that are either already available to Australia's major export grain competitors or are well advanced in the product development pipeline and will be available to its competitors in the near future.

Pioneer Hi-Bred believes that Roundup Ready canola can offer significant economic and efficiency benefits to stakeholders within the New South Wales canola supply chain through increased productivity, continuity of canola grain supply, improved export market competitiveness and environmental benefits through the reduction in use and application of currently applied residual herbicides.

Since 1997 Pioneer has successfully undertaken in New South Wales a total of eleven (11) research trial sites at all times in compliance with either the OGTR and/or the New South Wales Gene Technology Act. Across the New South Wales trials sites and across years in addition to the superior weed control offered by the herbicide tolerant Roundup Ready trait, the Pioneer GM Canola hybrid varieties delivered on average an incremental yield benefit of fifteen percent (+15%) when compared to non-GM canola conventional standards.

Roundup Ready canola has been grown by Canadian farmers since 1996 and now constitutes in excess of 50% of the total GM canola planted area with a further 30% of the area being grown with alternate GM canola varieties. Canada is Australia's major competitor for export markets for canola and during this time has moved forward and gained significant competitive advantage both domestically and internationally through its adoption of GM canola.

Pioneer Hi-Bred supports the rigorous and transparent national framework for the regulation of GMOs in Australia. This includes the Office of the Gene Technology Regulator (OGTR), Australian Pesticides and Veterinary Medicines Authority (APVMA) and Food Standards Australia New Zealand (FSANZ).

Pioneer Hi-Bred believes that given its history of developing, stewarding and marketing agricultural products globally, including GM, non-GM and speciality crops we are very well placed to responsibly manage the introduction of Roundup Ready canola and future GM crops within the Australian grains industry.

Pioneer Hi-Bred appreciate that the respective state and territory moratoriums were introduced because of stakeholder and government concerns relating to market access and the lack of unity and consistency in the position of industry stakeholders. However, since the introduction of the various GM canola and GM crop moratoriums supply chain stakeholders and respective governments have recognised and acted to resolve the issues that led to the moratoriums.

Pioneer Hi-Bred believes that resolution to the issues for the introduction of the moratoriums has been achieved through a number of initiatives and activities undertaken by government and industry stakeholders, including but not limited to the following:

- The establishment by the South Australian, New South Wales and Western Australian state governments of GM crop advisory committee's with membership being drawn from across supply chain stakeholders with appropriate sector expertise.
- The commissioning in 2006 by the Federal Minister of Primary Industry under the auspices of the National Biotechnology Strategy of a range of reports the outcomes of which have significantly improved the level of knowledge and understanding of the issues and the drivers for the issues.
- The establishment of the "Pathway to Market" initiative by Single Vision Australia which canvassed and engaged Australian grains industry stakeholders in a process which focused on providing a platform for stakeholder engagement and the establishment of a unified industry position on the introduction and adoption of GM canola and future GM crops.
- The development by Single Vision Australia of an agreed grains industry stakeholder position on the introduction and adoption of GM canola. Supported by the mapping of the supply chain management systems that will enable and ensure the delivery of market choice within an environment where GM, non-GM and specialty crops coexist.
- The development of a recommended industry managed national framework for the management of market access issues for GM crops via its inclusion within the operational charter of the National Agricultural Commodity and Marketing Association (NACMA) for facilitating standards and contracts for trade of Australian grain.
- The development of industry standards for adventitious presence of GM canola seed (Australian Seed Federation) and grain (Australian Oilseeds Federation) which have assisted in facilitating trade and market choice in an environment where GM, non-GM and specialty production systems and products coexist.
- The development and adoption by the Queensland Government of a Coexistence framework for GM crops which has the potential to be developed and provide a national approach to coexistence of GM, non-GM and Specialty crops.
- The establishment of and/or the updating of GM crop policies within key industry stakeholder groups which reflects a combination of the following:
 - a recognition of the need for such policies in light of the impacts of the moratoriums if stakeholders are to participate in a supply chain where GM crops coexist with non-GM and specialty crops,
 - an increased level of stakeholder engagement in internal and external GM crop related activities,
 - an increasing awareness of stakeholder issues relating to market access and the need for these to be addressed in advance of the release of GM canola and/or future GM crops,
 - an increase in access to and dissemination of fact based information available from a range of credible information sources relating to GM crops and market access related issues, and
 - an overall increase in the awareness and knowledge of the stakeholder benefits that will be delivered from the introduction and adoption of GM canola and future GM crops.
- The successful implementation in 2006 and 2007 of stakeholder education and communication programs in New South Wales including but not limited to the following examples, the community, grain growers (NSWFF) and dairy farmers (ADF).

Pioneer Hi-Bred would like to provide some general comments prior to addressing the specific questions raised within the scope of the review.

- Pioneer Hi-Bred contends that the Act, in and of itself unfairly stigmatises GM crops and in particular GM canola. For a period in excess of 10 years across an increasing range of countries and GM crops it has been established that these crops have been proven safe for human health and the environment.
- Pioneer Hi-Bred contends that based on the current adoption of GM crops across a growing number of countries with which Australian grain growers compete that the introduction of these crops has not impacted on the ability of GM crops to coexist with non-GM or speciality crops. Nor has it impacted on the ability of the stakeholders to facilitate trade and provide market choice for these products in domestic and/or export markets.
- Consistent with our support of a national regulatory framework for GM crops, Pioneer Hi-Bred supports a unified approach to the introduction and management of GM canola across the various states and territories. Pioneer Hi-Bred does not support the current situation of non aligned regulations and/or policy positions on GM canola and GM crops across the various states and territories. It is unjustified and unnecessarily complicated in terms of impact on interstate trade under the National Competition Policy. Stakeholders in the grains supply, chain and specifically canola growers are being treated with prejudice when not permitted consistent access to GM crops and their benefits across Australia.
- Pioneer Hi-Bred does not believe that the Act is necessary to ensure the successful coexistence of GM, non-GM and specialty crops in New South Wales Markets and industry self-regulation are more appropriate mechanisms to ensure the integrity of all grain and affiliated industries. The existing New South Wales grain management systems for managing malting barley, wheat grades and canola are excellent working examples of a whole of industry approach and successful industry self-regulation negating the requirement for state government intervention.
- Pioneer Hi-Bred contends that the original claims of significant market impact which led to the introduction of the moratorium have been addressed through the various stakeholder initiatives previously outlined and we believe a significant body of credible, independent data and international case studies supports this position.
- In order to address the market access issues that pertain to the introduction of future GM crops, Pioneer Hi-Bred supports the establishment of an industry managed (i.e. NACMA) framework and process which will focus on and assess market access requirements to enable the commercialisation and the facilitation of trade for approved GM grain crops within an environment where GM, non-GM and specialty crops coexist and market choice is delivered. The process must deliver stakeholder confidence, particularly to supply chain participants, consumers and governments. Therefore, such a process must:
 - Maintain or enhance trade in Australian grains and their products.
 - Enable market choice along the supply chain.
 - Be open and transparent.
- In order to facilitate the trade of future GM crops and products Pioneer Hi-Bred supports the established grains industry standards for the unintended adventitious presence of GM material in planting seed and grain in a manner that demonstrates 'appropriate and effective supply chain management systems' for coexistence. It is important that government, industry stakeholders and the community acknowledge and understand the standards and the associated supply chain management systems that underpin market access and deliver market choice. These standards should be developed by industry participants based on the requirements of the market (buyers/customers), and be overseen and implemented within a fair and transparent process.
- The New South Wales state government should respect and preserve the rights of all industry stakeholders and their need for market choice within an environment where GM, non-GM and specialty production systems and supply chains co-exist.
- The continuance of the current Act in its current format will have a number of negative impacts on New South Wales including:

- reduction in the conduct of basic research and field trials of GM crops that have the potential to provide real benefits to growers,
 - reduction and potential loss of investment in research and innovation,
 - reduced ability for New South Wales growers to compete successfully with other states and in international markets, and/or
 - loss of potential stakeholder benefits relating to farm productivity, market access, terms of trade, continuity of grain supply and environmental sustainability and stewardship.
- Under the current Act, all decisions relating to markets and market access must be justified by factual and evidence assessments, therefore continuance of the Act in its current format would be inconsistent with the facts and evidence put before the review by Pioneer Hi-Bred.
 - Supply chain stakeholders, including Pioneer Hi-Bred require a clear, timely, economical and practical regulatory environment in which to operate, such as the national regulatory framework. The current Act and the discretionary powers of the government does not provide stakeholders with confidence that New South Wales is a suitable environment in which to invest in innovation and conduct business. If the New South Wales government via its policies as reflected in the Act supports the concept and principle of market choice, including grower choice of which crops to grow (i.e. GM, non-GM or speciality) and that such choice is underpinned by the principles of coexistence then there is no need for such powers to continue within the Act.
 - The industry has demonstrated that based on an increasing customer need for diversified products and knowledge relating to product integrity it has a proven track record of delivering market choice and that it will continue to invest in supply chain management systems irrespective of whether the product are derived from a GM, non-GM or a speciality supply chain.
 - The government together with industry stakeholders should allocate and direct resources to the development and implementation of a responsible, balanced community education campaign to address the misunderstandings and misconceptions that lie behind the need for market choice in an environment where GM crops coexist with non-GM and speciality crops.

In conclusion Pioneer Hi-Bred would urge the New South Wales state government to respect and preserve the rights of all industry stakeholders and their need for market choice within an environment where GM, non-GM and speciality production systems and supply chains co-exist.

Supply chain stakeholders, including Pioneer Hi-Bred require a clear, timely, economical and practical environment in which to operate. The current New South Wales moratorium and the discretionary powers of the government to impose similar actions that impact on the freedom of the market to operate, does not provide stakeholders with confidence that New South Wales is a suitable environment in which to invest in innovation and conduct business.

If the New South Wales government supports the concept and principle of market choice, including grower choice of which crops to grow and that such choice is underpinned by the principles of coexistence then there is no need for such powers or the GM canola moratorium to continue.

The suspension and dismantling of the legislation enabling the current GM canola moratorium will deliver a significant win-win for government, New South Wales farmers and supply chain stakeholders for the reasons previously outlined. Perhaps even more importantly such a decision will provide Pioneer with the confidence to pursue its development and investment in GM canola and future GM crops in New South Wales.

Introduction

The review is considering the current NSW Gene Technology Act 2003 (GM Crop Moratorium) which expires in March 2008 with respect to the following terms of reference:

1. assess the expected impacts on marketing, trade and investment for NSW of:
 - a. extending the Act and maintaining the moratorium orders on the cultivation of GM canola;
 - b. amending the Act and removing the moratorium orders on the cultivation of GM canola; or
 - c. allowing the Act to expire.
2. on the basis of the above assessments, make recommendations to Government on the most appropriate option to adopt; and
3. in the event that the panel recommends extension of the legislation, recommend appropriate amendments to the legislation.

As background to Pioneer Hi-Bred Australia's response to the specific terms of reference, an overview of the Global and Australian oilseed and canola markets has been prepared and presented for consideration by the review a list recommended references which are attached to the end of the document..

Pioneer Response to the Terms of Reference:

Assess the expected impacts on marketing, trade and investment for NSW of:

Terms of Reference One (a):

- **extending the Act and maintaining the moratorium orders on the cultivation of GM canola;**

Pioneer Hi-Bred contends that the demand outlook for oilseeds, led by canola globally, is very strong as consumers become more aware of their health and what products are required to deliver a healthy lifestyle.

To meet the growing demand for canola is a major challenge for New South Wales farmers in an environment where there is:

- the reducing areas available to grow crops because of environmental decline (e.g. salting) or human encroachment,
- the increasing competition between crops for planted areas,
- the increase in abiotic and biotic stress placed on the crops, (e.g. droughts, blackleg disease)
- the loss of management tools due to breakdown, (e.g. herbicide and insecticide resistance)
- the lack of access to new technology which is available to competitors.

The canola industry is increasingly looking to biotechnology to provide it with the answers of production sustainability and meeting customer choice. To this end Australia's major canola competitor Canada has derived a significant market advantage for over ten years since the introduction of the first GM canola variety in 2006.

Apart from the impact of market competition driven by technology advantage in Canada, another significant threat to Australian canola market and perhaps the main constraint to expansion of the Australian canola industry is its dependence on "old" inefficient and environmentally unsustainable technology (i.e. Triazine Tolerant Canola = 80 % of Australian canola production). This situation is not sustainable and puts at risk converting Australia from a net exporter to a net importer in future if access to modern technologies to significantly increase production capacity are unable to be readily accessed because of GM crop moratoria. To this end current government legislation and regulations such as the Act favour Australia's international competitors and while still in place damage Australia's trading position in global markets.

Apted, McDonald and Rodgers (2005) suggest that the continued globalisation and adoption of GM crops will have a significant impact for Australia both locally and overseas. In international markets, GM crops with productivity enhancing traits can be expected to exert downward pressure on the prices for those crops.

Furthermore Lloyd (2003) suggests that lower costs of production in Canada are a potential threat to the continued viability of Australian exports of canola grain and that there was an apparent threat to Australian canola grain exports if the commercialisation of GM canola did not proceed in Australia.

Given that Australian grain producers are price takers in these competitive world markets, preventing the commercialisation of GM crops in Australia means that Australia producers receive a reduced benefit from their crops. This will manifest itself as reduced market share and reduced profitability for Australian grain producers, compared with the outcome if Australian grain producers were permitted to grow GM crops commercially. Apted, McDonald and Rodgers (2005) concluded:

“There is no apparent economic justification for Australia to delay the commercialisation of transgenic [GM] canola. Australian canola seed producers compete with transgenic [GM] canola seed in their main export markets. Those markets willingly accept transgenic [GM] canola.

In the absence of a defined market and a price premium for non transgenic [GM] canola, the moratoria are generating an economic loss for Australia.

Australian canola producers are prevented from sharing the economic benefits of transgenic [GM] canola that are being enjoyed by the other major supplier of Australia’s canola export markets, Canada.

Likely future developments in markets, in Asia in particular, and in transgenic [GM] crops will result in expanding opportunities for broad acre transgenic [GM] crops in Australia. There is evidence that the transgenic [GM] canola moratorium threatens Australia’s capacity to react to emerging opportunities in the field of crop development.”

Modelling of the impacts on Australian and New South Wales agriculture suggests that if it fails to access and adopt plant biotechnology and GM crops it could lose some opportunities to expand or even maintain its market share over time both in terms of primary crop markets and down stream commodity markets. (Stone, Matysek, and Dolling, 2002)

Additional modelling undertaken by Apted, McDonald and Rodgers (2005) predicts that a failure to commercialise GM crops, now and in the near future, could cost Australians between \$1.5 and \$5.8 billion in forgone gross national product by 2015.

As a result of the moratoria established by New South Wales, stakeholders recognised that the outcome of these bans will have and would continue to have a much broader impact (AusBiotech 2004; Timbs, Adams, Rogers, 2006; Hudson, 2005)

Impacts identified within these studies include:

- halting the path to market for GM food crops, which have been approved through the OGTR process, by imposing a prohibition on commercial release;
- creating regulatory uncertainty, as under the moratoria legislation there is lack of transparency in the process (including the criteria that would allow the approval of commercial releases);
- stopping further investment in food crop Genetically Modified Organisms (GMOs);
- undermining the Regulator’s science-based decision in relation to health and safety and the environment;
- denying Australian farmers the ability to grow GM food crops, leaving them at a disadvantage in a competitive global marketplace;
- an inability to respond to rapid changes in the market; and
- diminishing confidence in the nation’s ability to capture the benefits of biotechnology, as outlined in the National Biotechnology Strategy.

Pioneer Hi-Bred contends that if the New South Wales government retained the current GM canola moratoria despite the substantial independent research reports indicating that Australia’s domestic and export markets would not be disadvantaged by the introduction of GM canola.(Stone, Matysek, and Dolling 2002; Norton, 2003; Foster, 2003; Lloyd, 2003; Apted, McDonald and Rodgers.2005; Foster, 2006.)

The authors suggest that it would be anticipated that the current canola industry would continue to decline either through the reduction in farmers’ terms of trade and competitiveness in export market or because of the agronomic and environmental breakdown of current canola production systems due to the growing impact of biotic and abiotic stress.

The Australian Oilseeds Federation (AOF) has also examined market and trade issues for canola - the key findings of the research were:

1. There is no evidence that Australia will lose access to markets
2. There is no evidence of premiums for non-GM canola outside of niche markets
3. There is no evidence that non-GM market access will be lost if GM canola is grown
4. There is evidence of economic gains for Australia from adoption of GM canola

In addition to the projected impact on New South Wales canola farmers and downstream supply chain participants Pioneer Hi-Bred contends that the continuance of the current GM canola moratorium in its current format will have a number of additional negative impacts on New South Wales including:

- reduction in the conduct of basic research and field trials of GM crops that have the potential to provide real benefits to growers,
- reduction and potential loss of investment in research and innovation,
- reduction and potential loss of investment in infrastructure in regional New South Wales,
- reduced ability for New South Wales growers to compete successfully with other states and in international markets, and/or
- loss of potential stakeholder benefits relating to farm productivity, market access, terms of trade, continuity of grain supply and environmental sustainability and stewardship.

In the “*Creating Our Future: Agriculture and Food Policy for the Next Generation*”, Report, Corish et al (2006), provided the following commentary relating to the impact of the moratoriums on Australian and by implication New South Wales agriculture:

“The wisdom of banning the release of GM canola, and potentially other GM crops, on marketing grounds is questionable. Given the lack of evidence of any price premiums to be gained from segregating GM and non-GM canola, and the recent detections of GM canola plants in apparently non-GM crops, there seems little to be gained from the state and territory government moratoriums.

Given the number of new traits in development, it is only a matter of time until more are commercialised and adopted in countries such as the United States, Canada, China, Argentina and Brazil. The danger for Australia is that, with continued bans or restrictions on growing GM crops, our farmers’ capacity to remain globally competitive will be threatened as these competitors continue to make use of GM technology to increase productivity, reduce costs and produce varieties with new value adding characteristics.

Given the importance of access to the potential of GM and other biotechnologies to the future competitiveness of agriculture and food, and the detrimental effect of state and territory moratoriums on biotechnology development and investment, the moratoriums should be lifted.”

Pioneer Hi-Bred concurs with the preceding statement and contend that in combination with the extensive evidence presented that extending the current moratorium on the growing of GM canola the Government of New South Wales will not only impact on the livelihood and competitive capability of growers and the grain supply chain but more importantly it will lead to an overall lack of confidence and investment in New South Wales both in terms of research and development but also in regional infrastructure.

Supply chain stakeholders, including Pioneer Hi-Bred, require the confidence that a clear, timely, economical and practical environment exists in which to operate.

The current New South Wales moratorium and the discretionary powers of the government to impose similar actions that impact on the freedom of the market to operate, does not provide stakeholders with confidence that New South Wales is a suitable environment in which to invest in innovation and conduct business.

The continuance of the current Act in its current format will have a number of negative impacts on New South Wales including:

- reduction in the conduct of basic research and field trials of GM crops that have the potential to provide real benefits to growers,
- reduction and potential loss of investment in research and innovation,
- reduced ability for New South Wales growers to compete successfully with other states and in international markets, and/or
- loss of potential stakeholder benefits relating to farm productivity, market access, terms of trade, continuity of grain supply and environmental sustainability and stewardship.

If the New South Wales government supports the concept and principle of market choice, including grower choice of which crops to grow and that such choice is underpinned by the principles of coexistence then there is no need for such powers or the GM canola moratorium to continue.

Terms of Reference One (b):

- amending the Act and removing the moratorium orders on the cultivation of GM canola;

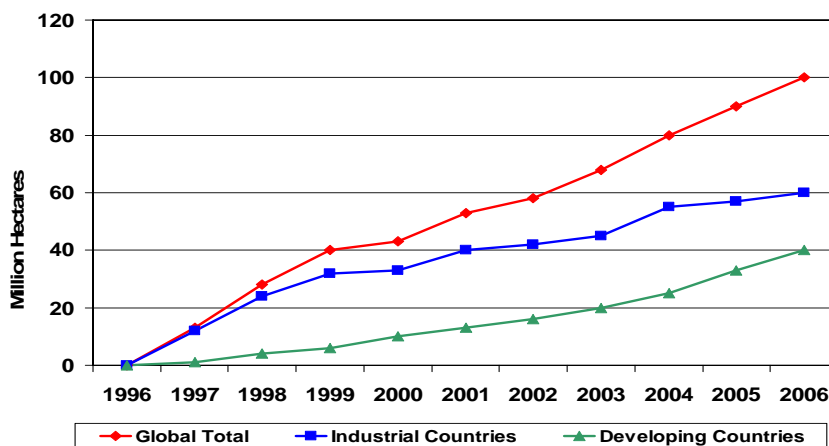
Currently the economic, social and environmental benefits derived from agricultural plant biotechnology are being captured by farmers and supply chain stakeholders across the globe and across a range of crops. Therefore as a means of assessing the impacts of removing the current GM canola moratorium it is proposed to look at the following, each of which demonstrate the beneficial impact of the adoption of GM technology and by implication the benefits that would be accessed by New South Wales farmers and the supply chain if the current moratorium orders on the cultivation of GM canola are removed:

1. The global status of GM crops,
2. The global status of GM canola, and
3. The global status of canola biotechnology research and development
4. The status of GM crops in Australia

1.0 Global Status of GM Crops

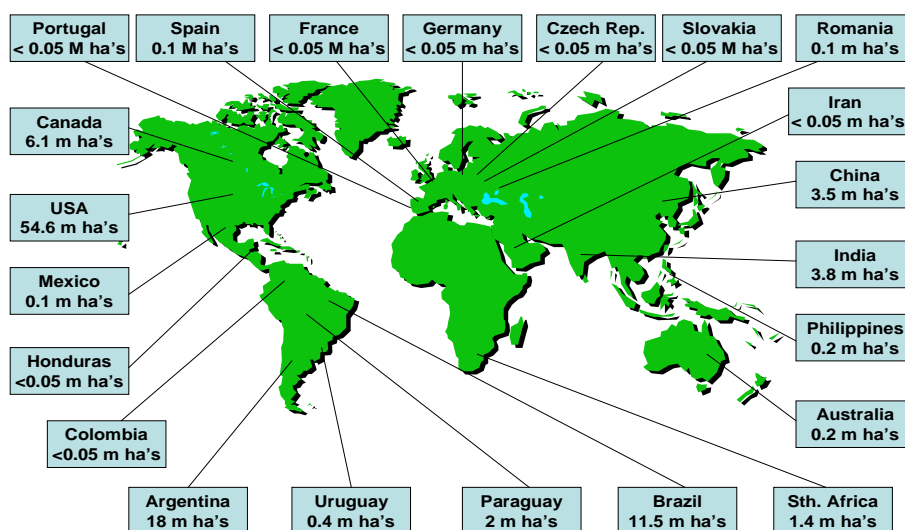
The global adoption of GM crops, both in terms of area (Figure 1), and the number of countries (Figure 2) continues to grow at a rapid rate. (James 2006)

Figure 1: Global Area of Biotech Crop Production, 2006.



Source: Reproduced from James (ISAAA Report, 2007)

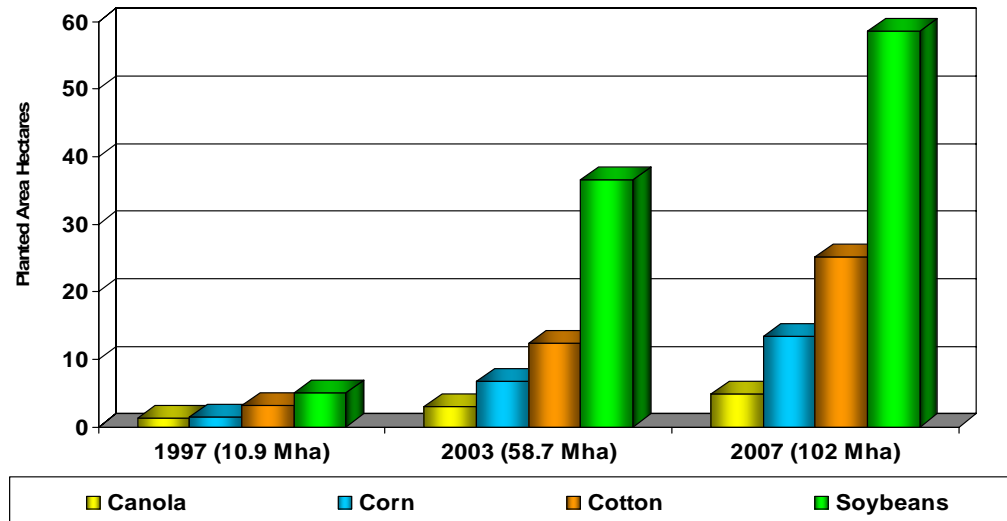
Figure 2 : Countries with Commercial Biotech Crop Production, 2006.



Source: Reproduced from James (ISAAA Report, 2007)

To date, the four major GM crops commercially introduced and adopted by farmers in various countries globally are soybean, corn, cotton and canola (Figure 3). In each of the countries where these GM crops have been commercially grown the adoption rate has been rapid, particularly in countries such as the United States of America (USA), Canada, India, South Africa and a range of South American countries. (James 1997; James 2002; James 2006; Foster 2006; Apted, McDonald and Rodgers.2005)

Figure 3: Global Area of Biotech Crop Production (1997 – 2007)



Source: Adapted from James (ISAAA Reports, 1997, 2002, 2007)

Sankula and Blumenthal (2004) studied the impact that transgenic GM crops have had in the USA. Based on a set of global comparisons, the authors established that American growers of GM crops in 2003 compared to 2001 had:

- increased crop production by 2.4 million tonnes;
- increased net returns by \$1.9 billion;
- increased production volume by 41%;
- increased net economic impact by 27%;
- decreased pesticide use by 21 million kg.

Across every US state that planted GM crops such as canola, corn, cotton, soybean, papaya, or squash, growers in each state realised production gains and economic benefits.

The developing world is also reaping the benefits of transgenic *Bt* cotton. In India in 2002 it was grown on only 29,415 hectares, increasing to 86,240 hectares in 2003 and 530,800 hectares in 2004. A nationwide survey in 2003 indicated that the *Bt*-cotton growers in India delivered, on average, a 29% yield increase, a reduction in chemical sprays by 60% and an increase in net profit by 78% as compared to their conventional cotton neighbours (Manjunath, 2004).

Bennett et al (2004) compared the performance of more than 9,000 *Bt* and non-*Bt* cotton farm plots in Maharashtra over the 2002 and 2003 growing seasons and concluded *Bt* cotton varieties have had a significant positive impact on average yields and on the economic performance of cotton growers. A similar story is emerging in all the countries where transgenic cotton has been introduced: Argentina, China, Colombia, India, Indonesia, Mexico and South Africa.

Brookes and Barfoot (2006) in a study of the global impact of biotech crops for the decade 1996 to 2005, estimates that the global net economic benefits to biotech crop farmers in 2005 was \$5.6 billion, and \$27 billion (\$13 billion for developing countries and \$14 billion for industrial countries) for the accumulated benefits during the period 1996 to 2005;

these estimates include the benefits associated with the double cropping of biotech soybean in Argentina.

The accumulative reduction in pesticides for the decade 1996 to 2005 was estimated at 224,300 MT of active ingredient, which is equivalent to a 15% reduction in the associated environmental impact of pesticide use on these crops, as measured by the Environmental Impact Quotient (EIQ) - a composite measure based on the various factors contributing to the net environmental impact of an individual active ingredient.

PG Economics, in its report entitled *Global Impact of Biotech Crops: Socio-Economic and Environmental Effects in the First Ten Years of Commercial Use*, notes that there has been significant positive environmental and economic impacts from GM crops including:

- Substantial net economic benefits at the farm level amounting to \$5 billion in 2005 and \$27billion for the ten year period.
- A reduction in pesticide spraying by 224 million kg (equivalent to about 40% of the annual volume of pesticide active ingredient applied to arable crops in the European Union) and as a result, decreased the environmental impact associated with pesticide use by more than 15%.
- A significant reduction in the release of greenhouse gas emissions from agriculture, which, in 2005, was equivalent to removing four million cars from the roads. (Further information: <http://www.agbioforum.org/v9n3/v9n3a02-brookes.htm>)

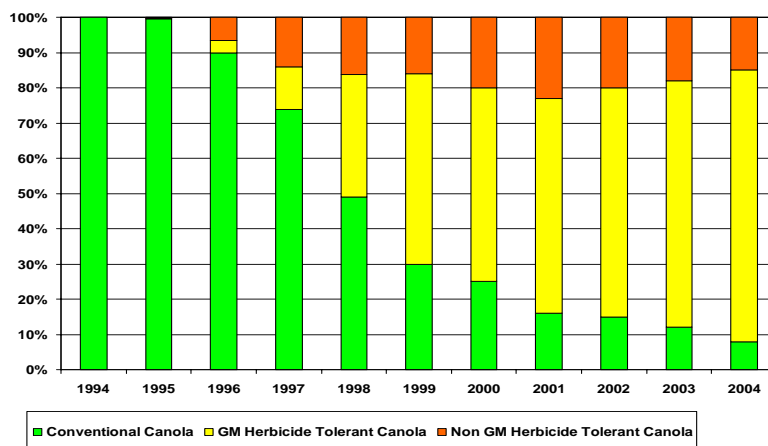
The current generation of GM crops commercialised worldwide mostly have production enhancing traits such as herbicide tolerance, insect resistance or a combination of each depending on the crop.

There continues to be significant investment into the development of further first, second and third generation traits. Of particular interest to Australia, is the development of drought tolerant technology that is expected to be available to farmers in the USA in crops such as corn and cotton by 2011. James (2006) predicts the future for GM crops looks encouraging. Between 2006 and 2015, the growth in the global area planted to GM crops will increase to up to 200 million hectares, with at least 20 million farmers growing GM crops in more than 40 countries.

2.0 Global Status of GM Canola

Since the introduction into commercial production in Canada in 1995, genetically modified herbicide tolerant canola has had a major impact. In 2004 GM canola captured 77% of the market (almost four million hectares), while herbicide-tolerant canola accounted for 92% of the market (4.7 million hectares). About 7.7 million tonnes of GM canola was produced in Canada in 2004 and this figure is forecast to rise to 10 million tonnes by 2015 (Dr V Ripley, Agriculture and Agri-Food Canada, 2005).

Herbicide Tolerant vs Conventional Canola in Canada 1994 - 2004



In 2001, the Canadian Canola Council commissioned a study to qualify and quantify the agronomic and economic impacts of GM canola. The study entitled *An Agronomic and Economic Assessment of Transgenic Canola* found that:

- Growers chose GM varieties for several reasons. The key benefit and motivator to adopting GM varieties was more efficient weed control and ease of herbicide management in preventing weed resistance.
- Other reasons, related to weed management, included cleaning up fields, reducing the number of passes to control weeds and perennial weed control.
- Some producers reported better yields, higher yields, the ability to reduce costs and generate most profits.
- Other reasons for choosing GM varieties were to reduce tillage, seed earlier, conserve
- Moisture and to compare GM varieties to conventional canola on a trial basis.

The Canadian Canola Council reports that the direct economic impact to growers of the adoption of GM canola from 1997 to 2000 is within the range of \$144 and \$249 million, varying between the farmer-based estimate and the value determined by the economic model.

Further, the Council noted that when a technology like GM canola is adopted, it can impact the whole community (examples include added investment in canola crushing capacity, impacts on local seed, herbicide and equipment industry investments and development, added shipping, handling, marketing etc). The total indirect impact from the 1997 to 2000 period is estimated to range between \$58 and \$215 million. The key results of the study are presented in the following table.

Canadian GM Canola vs Non-GM Canola Impact Study (1997 – 2000) (Source: Canola Council of Canada)	
Benefit	Evaluation Parameters
Herbicide Use	<ul style="list-style-type: none"> ➤ 40 % reduction in herbicide costs ➤ Reduction of 6,000 tonnes of herbicide applied in 2000
Reduced Cultivation	<ul style="list-style-type: none"> ➤ Fewer cultivation passes, estimate of 50 % reduction ➤ 1.05 million hectares with fewer cultivation passes
Lower Fuel Use	<ul style="list-style-type: none"> ➤ Reduction in total field operations, resulted in a reduction of 31.5 million litres of fuel use in 2000 ➤ Fuel Cost saving of \$ 13.1 M (\$Can) @ 42c/lit (\$Can)
Improved Yield	<ul style="list-style-type: none"> ➤ 10 % increase in canola crop yield ➤ 1.5 % reduction in canola grain dockage
Improved Returns	<ul style="list-style-type: none"> ➤ \$14.36 / Ha (\$Can) increase in net return (yield x price – inputs, labour etc)

(Further information: http://www.canola-council.org/manual/GMO/gmo_main.htm)

3.0 Global Canola Biotechnology Research and Development

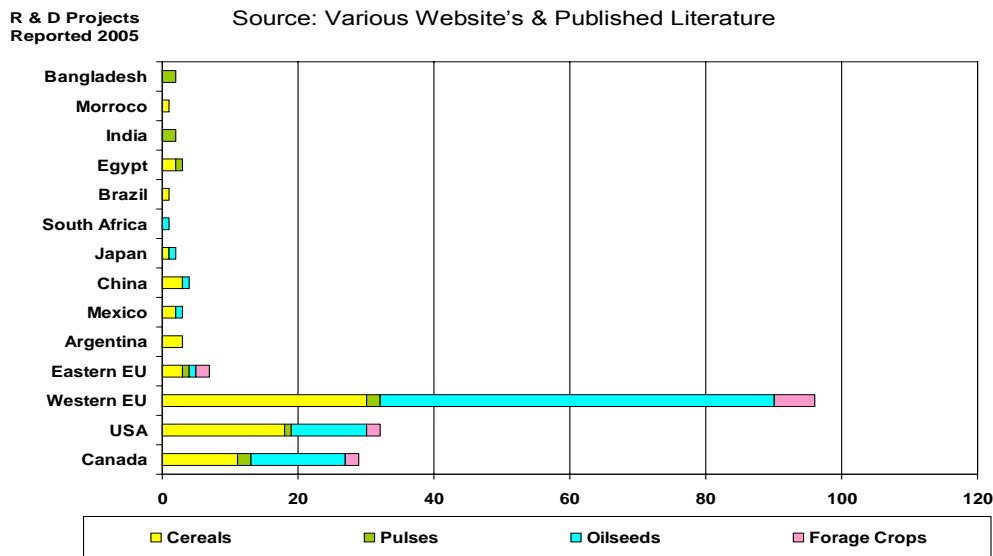
Countries of interest to the Australian canola industry undertaking activity within the agbiotech pipeline are those that are either:

- Countries that currently import products from Australia and have the potential to replace current imports with domestically produced crops and products derived from agbiotech. Or,

- Countries that are major export competitors of Australia and are seeking to gain an incremental market advantage through the introduction of agbiotech-derived traits into competitive export crops and products.

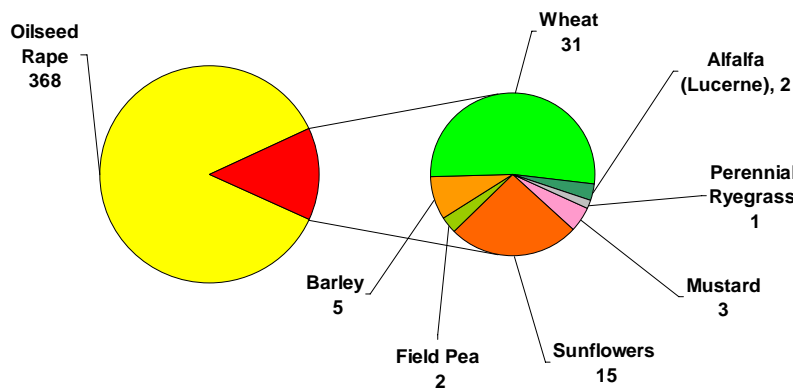
Following a review of the 2005-06 literature, it has been identified that there are fourteen countries currently undertaking agbiotech activity which is focused on crops such as canola, wheat and barley. Of these countries only Canada is undertaking commercial production of canola which is a major competitor to Australia in the canola grain and oil export market. The following chart provides a summary of all reported agbiotech activity by country and crop of interest.

Global Agbiotech Pipeline Research Projects x Country x Crop



Of the 429 field trials reported within Western Europe during the period 1991-2004, the majority (86%) of trials were related to the introduction of traits into oilseed rape. Of the remaining field trials undertaken the majority were related to wheat (7%) and sunflowers (3.5%).

Western EU Field Trials Approved for Crops of Interest to Australia 1991 – 2004 (429 Trials) (Source: Information Systems for Biotechnology (ISB))



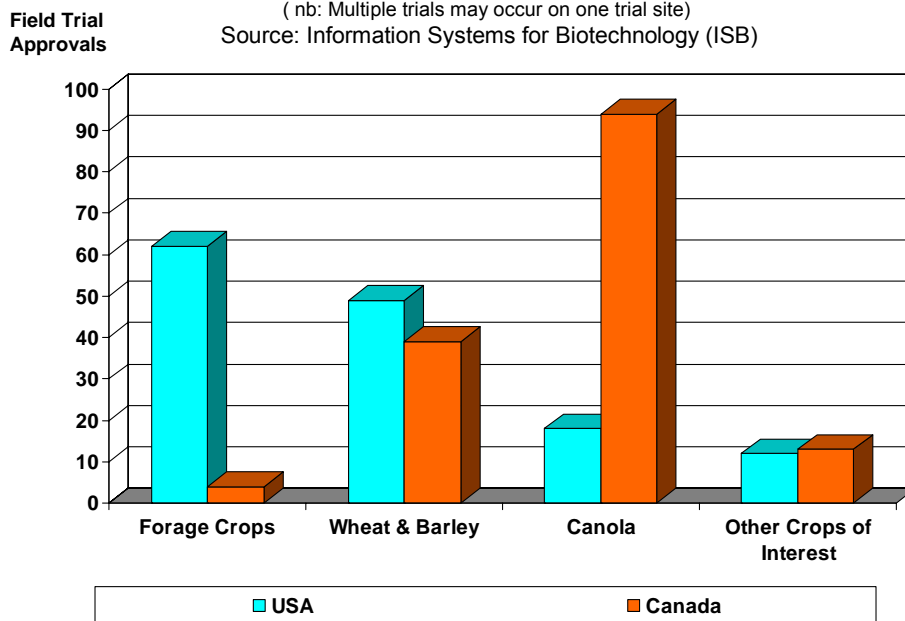
As the US and Canada continue to proceed with the rapid adoption and commercialisation of agricultural biotechnology derived crops the level of research and development activity, in particular at the field trial level within canola, continues to accelerate.

Of the individual agricultural biotechnology projects publicly reported, 65 of the projects are being undertaken on agbiotech applications in wheat and barley (43%), a further 49 (32%) are in oilseed crops, 21 (19%) in forage crops and 9 (6%) were in pulse crops.

US & Canadian Field Trial Approvals - 2004 for Crops of Interest to Australia

(nb: Multiple trials may occur on one trial site)

Source: Information Systems for Biotechnology (ISB)

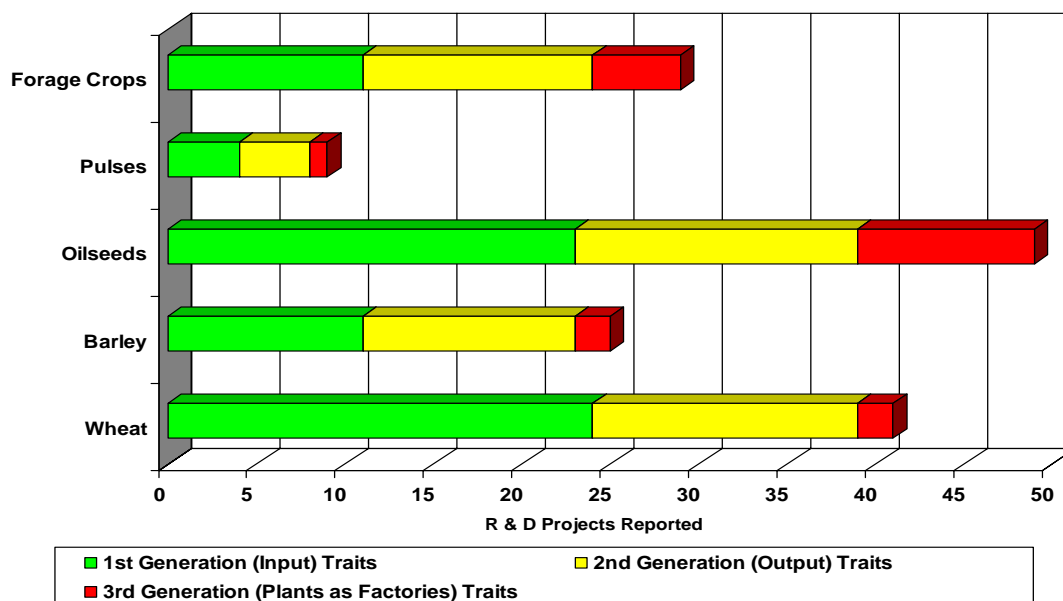


The following graph presents a summary of the research projects reported across all crops of interest to Australian agriculture and the generation of trait under development.

Global Agbiotech Pipeline Activity

Research Projects x Crop x 1st, 2nd & 3rd Generation Traits

Source: Various Website's & Published Literature

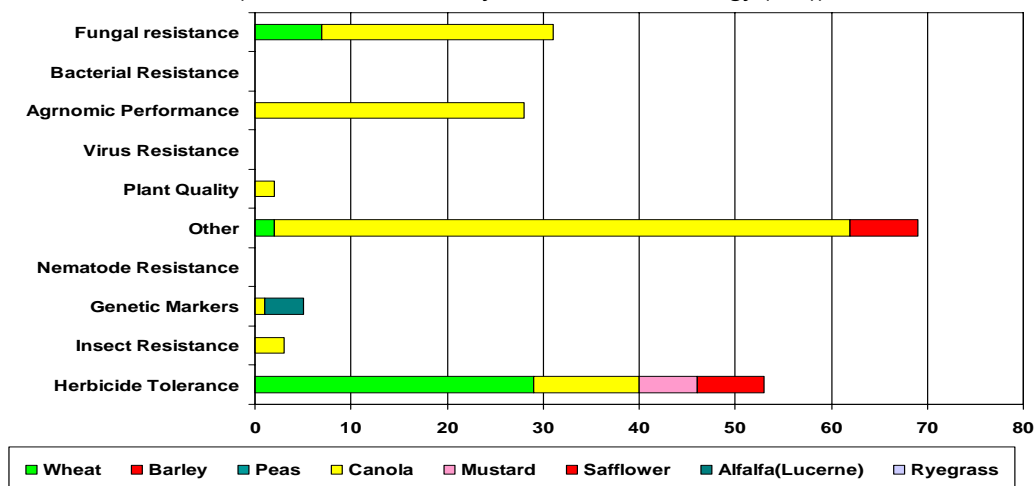


The breadth of trait development within canola compared to other major crops is demonstrated in the following graph which provides a summary of the field trials approved for planting in 2004 in Canada.

Canadian Field Trials Approved for Crops & Traits of Interest to Australia – 2004

(nb: Multiple trials may occur on one trial site)

(Source: Information Systems for Biotechnology (ISB))



As consumers become increasingly aware of food composition, especially trans-fatty acids in fats and oils, consumers are seeking alternative supply of healthier foods. The majority of 2nd generation trait research and field trial development in oilseeds is focused on the production and supply of modified oils for the growing health food market. It is anticipated that the first 2nd generation specialty oils produced from agbiotech for oilseeds, predominantly canola will be high oleic-low linolenic canola, high omega-3 canola and low saturate canola.

Of the 3rd generation traits for oilseeds, the major focus has been on the use of canola for the production of polymers for bio-plastic production and the production of oils for the industrial and bio-fuel market. The following table demonstrates the breadth of agricultural biotechnology research projects being undertaken in canola and mustard.

Glyphosate tolerance	Suppression of shade avoidance	Increased β -carotene biosynthesis
Glufosinate tolerance	Stimulation of growth rate	Increased amino acid content
Phosphinothricin tolerance	Seed size increased	Increased oleic acid content
Bromoxynil tolerance	Yield increased	Increased oil content
Sulfonylurea tolerance	Nitrogen metabolism	Increased laurate content
Lepidopteran resistance	Cold tolerance	Increased digestibility
Coleopteran resistance	Down regulation of granule bound starch synthase	Synthesis of Omega-3
Resistance to insects from <i>Vicia faba</i>	Reduction of shattering of mature pods	Synthesis of fructan
Phoma resistance	Oil profile altered	Synthesis of cowpea trypsin inhibitor
Cylindrosporium resistance	Reduction of antinutritional effect of phytic acid	Synthesis of fructosyl transferase
Sclerotinia resistance	Seed composition altered	Synthesis of asparagines
Fungal post-harvest resistance	Erucic acid altered	Synthesis of chitinase
Restoration of male sterility/fertility	Fatty acid metabolism altered	Synthesis of anti-microbial proteins
Salt tolerance	Lysine level increased	Industrial enzyme production
Increased Dwarf phenotype	Protein lysine level increased	Heavy metal bioremediation
	Animal feed quality improved	Pharmaceutical protein production
	Storage protein altered	Bio-polymer production
	Increased fatty acid content	

4.0 The Status of GM Crops in Australia

Australian agricultural plant biotechnology has, during the 1990s and the early part of the new millennium, attracted significant investment (> \$ 1 Billion) from both the private and public sectors.

The investment has been spread across all sectors of the industry ranging from grains, pastures, and horticulture through to the livestock industries including sheep, beef cattle, pigs, poultry, dairy and aquaculture. The majority of the investment in the “agricultural plant biotechnology pipeline” has been focused on the basic science of gene discovery and the development of platform capabilities.

Examples of investment in Australian plant biotechnology include the following:

- 1) In 2005 the Grains Research and Development Corporation (GRDC) and Commonwealth Scientific and Industrial Research Organisation (CSIRO) launched a joint 'Crop Biofactories Initiative' to research the use of grains to produce new sources of chemicals that could potentially replace non-renewable and increasingly costly petrochemicals. The two research partners have initially invested \$13 million over four years. (Logan, 2005)
- 2) BASF Plant Science and the Molecular Plant Breeding Co-operative Research Center (MPBCRC) announced in 2006 the expansion of a joint research and development program designed to achieve genetically optimised wheat. The multimillion-dollar agreement is focused on developing high yielding wheat that is more resistant to drought and fungal diseases. The € 17 million joint program has been scheduled for seven years and involves 25 scientists based at MPBCRC. (Events Australia 2006)
- 3) The Australian Centre for Plant Functional Genomics (ACPFPG) was established in December 2002 after being granted \$27 million from the [Australian Research Council \(ARC\)](#), the [GRDC](#) and the [South Australian Government](#). The ACPFG also received \$30 million from the University of Adelaide, the University of Melbourne, Department of Primary Industries (Vic) and the University of Queensland. The ACPFG is charged with undertaking excellent original research, focused primarily on wheat and barley, and to seek commercial partners in Australia and internationally to ensure a return on this investment. (Australian Centre for Plan Functional Genomics Annual Report 2003)
- 4) CSIRO's biotechnology research and development capability spans more than 600 projects across eleven Divisions and three Flagships, with annual investment of more than \$110 million AUD. The Food Futures Flagship aims to transform Australia's international competitiveness in the agrifood sector through the application of frontier technologies to high potential industries. (CSIRO 2006)

A small number of targeted technologies have progressed to initial “Proof of Concept”, however very few have progressed into the pathway for “Commercialisation” (BRS 2006).

Glover, Mewett, Tifan, Cunningham, Ritman and Morrice (2005) in a Bureau of Rural Science (BRS) review of the Australian plant biotechnology pipeline commented:

“There is huge breadth of ongoing high quality research and development in Australia that could lead to GM crop outputs. However what this BRS review shows is that the current regulatory and marketing environment in Australia has stalled many crops in the pipeline. Unless this environment changes, the capacity of breeding programs to quickly develop GM varieties suitable for Australian agriculture is becoming questionable.”

Currently, there are three products which have completed their path through the “pipeline” and are currently marketed within Australia these are carnations, Bt cotton (insect resistant) and herbicide tolerant cotton.

From a domestic perspective it is important to contrast the impact of the current GM canola moratorium with that of the impact that the introduction of GM cotton has had on the New South Wales and Queensland cotton industry and communities within which the industry operates.

The outcome of the cotton industry experience has been the adoption of GM cotton technology, which has delivered significant agronomic, economic and environmental benefits to the Australian cotton industry. (Higgins and Constable, 2004; Crossan and Kennedy 2004; Larkin 2005)

Under the leadership of Cotton Australia, stakeholders continue to work collaboratively within an established industry framework to manage the entry and adoption of GM cotton technology.

“Australia’s cotton growers have a reputation for enthusiastically taking up technologies that help them grow a better crop. Without doubt, biotechnology has been an incredible success story. It’s a farming tool that has allowed us to drastically decrease our use of chemicals and, as an industry, we’re looking forward to new cotton varieties coming on line with traits that will help us tackle other farming challenges in the future, such as moisture stress in times of drought and issues of fibre quality.”

Bernie George, Chairman (Cotton Australia 2006)

Following the introduction of GM cotton in 1996 the Australian cotton industry has not experienced any threats or changes in its ability to internationally market cotton. (Cotton Australia 2006)

“We’ve been selling Australian cotton produced using transgenic varieties into major international markets for almost 10 years. During that time we have had no market access issues and there appears to be widespread acceptance of this technology in the world’s textile sector. Transgenic cotton has helped growers continue to supply a high quality product, by controlling the insects that can seriously damage cotton crops and fibre quality.”

Hilton Lobb (Chairman, Australian Cotton Shippers Association)

The impacts of the current GM canola moratorium are much wider than already stated as they also include the following:

1. Australian and New South Wales grain producers have fallen further behind in the adoption of technology which is being rapidly adopted by their international competitors. (refer 2006 ISSA Report). Hence, Australian agriculture’s ability to remain competitive in export markets, both in the near and long terms is further diminishing.
2. The failure of GM canola to be commercially launched in Australia has resulted in the failure to establish a platform on which future agricultural plant biotechnology products can be introduced into the grains industry and the food supply chain.

3. A number of current projects which are either in the commercialisation pathway or about to enter have been put on hold pending further review of return on investment rationale, timelines to market and the costs necessary to obtain freedom to operate.
4. Due to the “apparent” difficulty in establishing a path to market which has become evident during the failed commercial introduction of GM canola, many of Australia’s future biotech products and platform technologies will potentially be exported following “Proof of Concept”. Rather than being introduced in Australia they will be established in other proven markets where these products can be introduced in a timely manner.
5. It would be anticipated that as a result of technology platforms etc being exported prior to entering the commercialisation pathway, many scientists will also follow these programs leading to a “brain drain” for agricultural plant biotechnology in Australia.
6. Due to the perceived lack of opportunity for agricultural plant biotechnology in Australia it is anticipated by leading academics, that students contemplating a future in agricultural plant biotechnology when entering universities will choose to seek alternate career pathways.
7. A significant level of investment in Australian has now been put on hold by major international investors and developers of both products and platform technologies. This investment opportunity is being diverted to other countries where there is greater certainty in the pathway to market.

Pioneer Hi-Bred would urge the New South Wales State Government to respect and preserve the rights of all industry stakeholders and their need for market choice within an environment where GM, non-GM and specialty production systems and supply chains co-exist.

The suspension and dismantling of the legislation enabling the current GM canola moratorium will deliver a significant win-win for government, New South Wales farmers and supply chain stakeholders for the reasons previously outlined. Perhaps even more importantly such a decision will provide Pioneer with the confidence to pursue its development and investment in GM canola and future GM crops in New South Wales.

Terms of Reference One (c):

- **Allowing the Act to expire;**

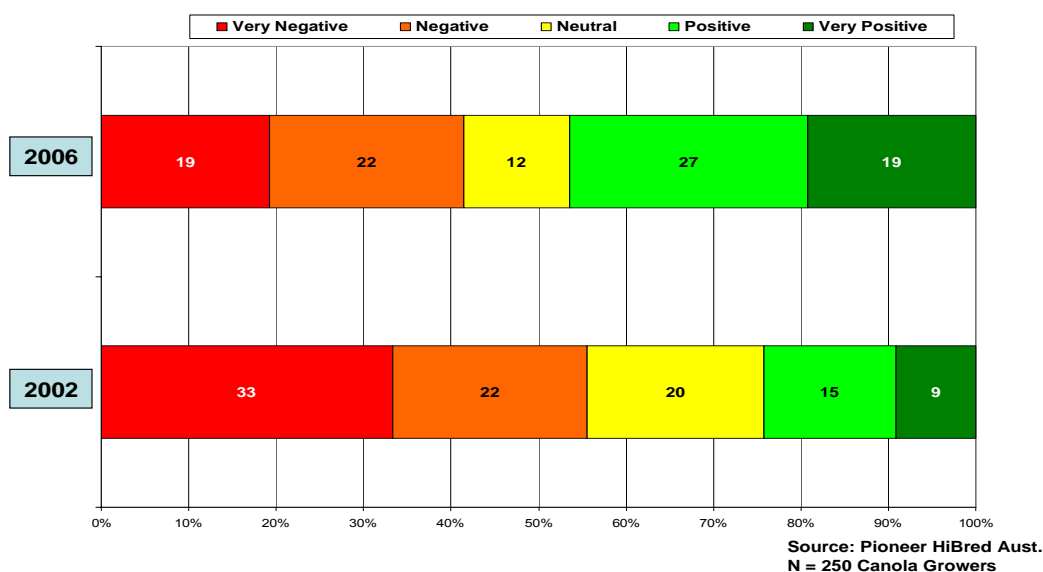
Core to Pioneer Hi-Bred's assessment of the economic impacts of the New South Wales government allowing the GM canola moratorium to expire are the following assumptions:

1. GM canola offers significant economic and efficiency benefits to stakeholders within the New South Wales canola supply chain through increased productivity, continuity of canola grain supply, improved export market competitiveness and environmental benefits through the reduction in use and application of currently applied residual herbicides.
2. The original claims of significant market impact which led to the introduction of the moratorium have been addressed through various stakeholder initiatives and that a significant body of credible, independent data and international case studies supports this position.
3. The New South Wales government respects and will preserve the rights of all industry stakeholders and their need for market choice within an environment where GM, non-GM and specialty production systems and supply chains co-exist.
4. The New South Wales government supports the concept and principle of market choice, including grower choice of which crops to grow and that such choice is underpinned by the principles of coexistence.

Pioneer Hi-Bred contends that the Australian grains industry has a very positive attitude towards the role of GM canola and GM crops. Market research reported in the DAFF Report (date of release) 'A Path to Market for Genetically Modified (GM) Canola – Lessons Learned and the Way Forward'. showed that the majority of the respondents surveyed from across the supply chain saw that the introduction of GM canola (79%) and GM crops (70%) would have a positive impact on the Australian grains industry, whereas less than 15% (GM canola) and 22% (GM crops) believed that they would have a negative impact on the industry.

These results are consistent with Pioneer's internal market research which established that between 2002 and 2006 the number of canola growers who believed that the introduction of GM canola would have either a positive or very positive impact increased by 22%, conversely growers who thoughts its introduction would be negative or very negative decreased by 14%.

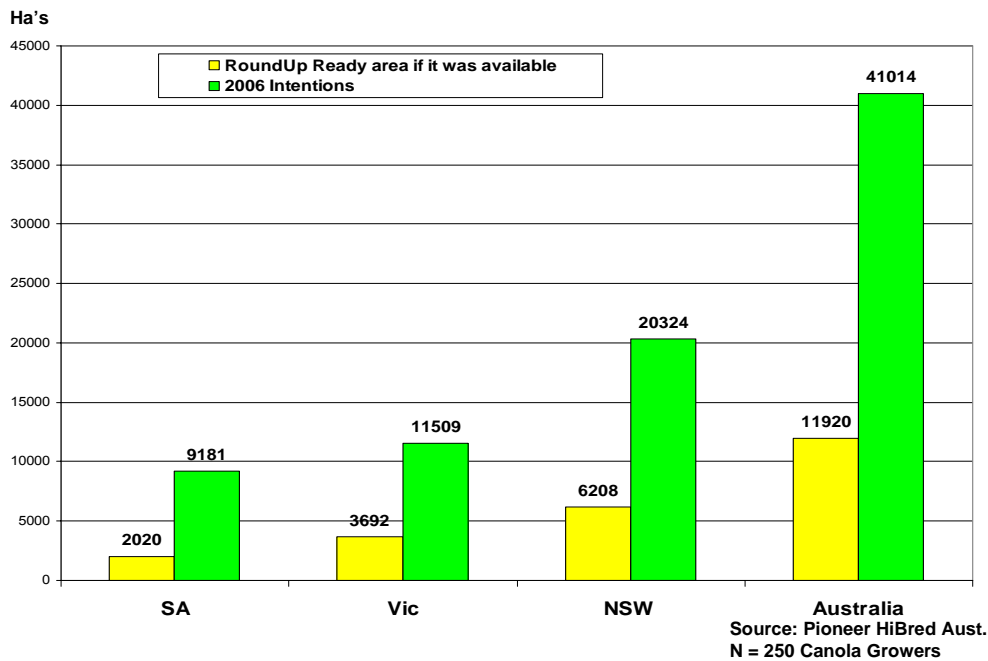
**Grower Response to the Introduction of GM canola
2002 vs 2006**



The same growers were asked if they would grow GM canola (i.e. Roundup Ready canola) in the first year of it being available and if so how much of their total canola area they would convert to GM canola. The following chart clearly indicates that growers would be prepared to grow GM canola in the first year of its release and that across the main canola growing states approximately 29% of the total canola area would be converted to GM canola if the varieties were available.

Grower Allocation x State of Total Canola Area planted to GM Canola in the first year of Access

N.B. GM Canola = Roundup Ready Canola

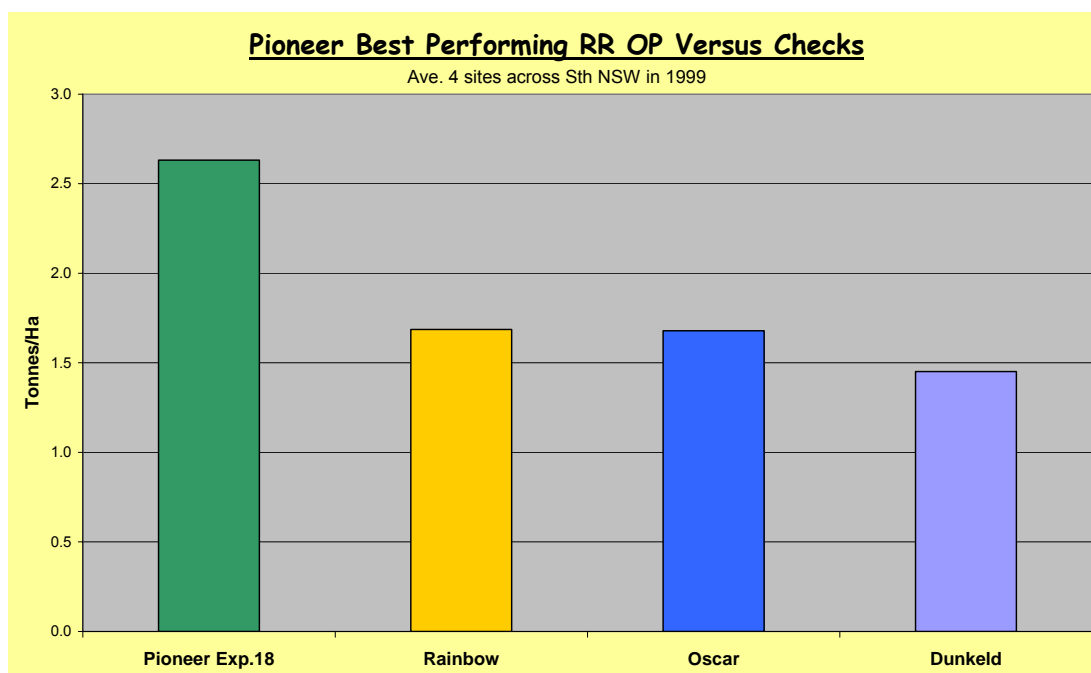


The DAFF Report ‘A Path to Market for Genetically Modified (GM) Canola – Lessons Learned and the Way Forward’ goes on to report that respondents when provided with the opportunity to nominate the potential impacts and benefits that would accrue from the introduction of GM canola identified the following:

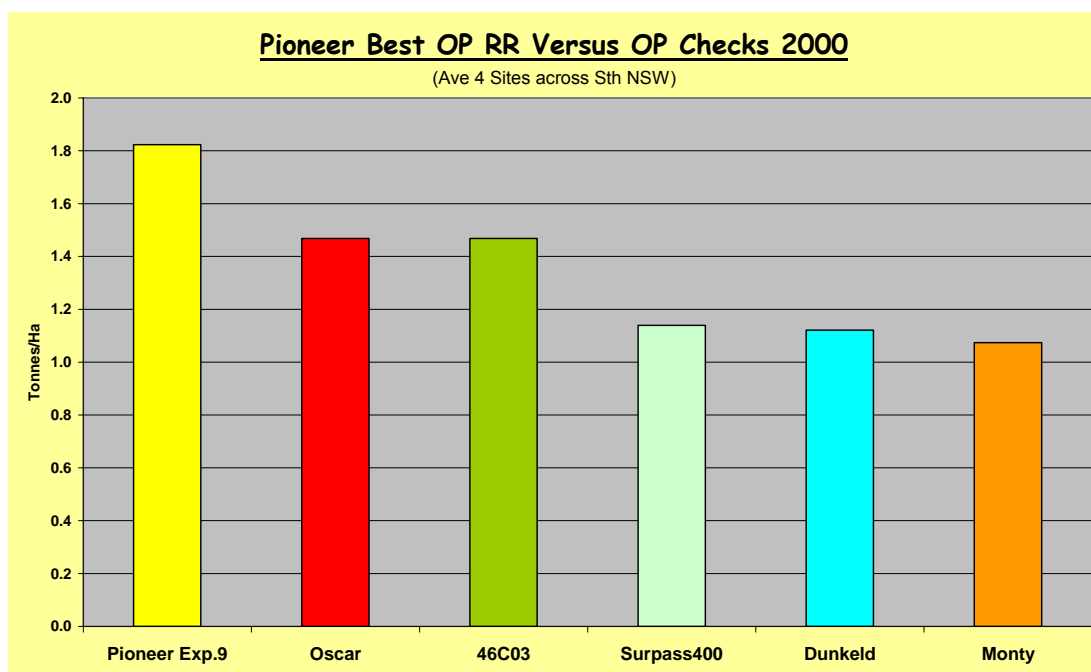
- Increased productivity – higher yields and lower input costs.
- Improved competitiveness.
- Improved flexibility and choice.
- An ability to manage stresses, for example frost, drought, disease and pests.
- Improved weed management.
- Improved environmental “foot print”
- Sustainable farming systems

In terms of the economic benefits that would be expected to accrue from the introduction of GM canola and the opportunities that would exist following the expiration of the current GM canola moratorium in New South Wales, the following provides an indicative estimate as to the potential economic benefits that Roundup Ready canola can deliver to farmers and the environment.

The yield figures presented in the following charts represent a comparison of Pioneer’s “open pollinated” Roundup Ready and their equivalent conventional canola varieties which were the standards for the market. The trial results are from trial sites established in New South Wales in 1999 and 2000 respectively.



In 2003 the superior performance of Pioneer's hybrid Roundup Ready hybrid canola varieties was emphasised across 5 trials sites in South Eastern Australia where Pioneer hybrids averaged across all sites a yield of 2.88 mt/ha compared to an average yield of 2.49 mt/ha from equivalent competitor Roundup Ready hybrids.



In trials during the period 1999-2003 Pioneer Hi-Bred's Roundup Ready canola hybrids yielded on average an incremental 15+ % when compared to the conventional canola varieties and a further 18-20+ % versus triazine tolerant (TT) canola varieties.

The projections for New South Wales are based on results from Pioneer Hi-Bred's field trials between 1997-2004 in New South Wales, Victoria and South Australia, together with market research of New South Wales farmer weed control and crop management practices.

The benefits demonstrated in the following table are based on a ten year average of canola plantings in New South Wales of 240 kha incorporating the following current canola weed management systems on a pro-rata basis of adoption:

- Triazine Tolerant canola = 170 kha
- Conventional canola = 46 kha
- Clearfield (IMI Tolerant) canola = 24 kha

The benefits calculated are based on a 50% adoption of the Roundup Ready canola technology by New South Wales farmers.

Roundup Ready Canola Benefit Vs Current Canola	Estimated Benefit @ 50 % Adoption of Roundup Ready Canola by New South Wales Farmers = 120 kha
Reduction in Soil Cultivations / Fuel Use	Minimum reduction of 1-2 cultivations @ 125 kha Fuel savings 1.5 cult @ 4 L/ha = 750 kL of diesel fuel
Savings in Spray Applications / Water Use	Minimum of 1.0-1.5 spray applications for pre-emergent herbicides 1.25 spray @ water rate of 50 L/ha = water savings of 7.5 million litres
Replacement of Soil Residual Herbicides	Trifluralin = 46 kL @ 0.48 kg/L = 22 kmt Triazines = 306 kL @ 0.5 kg/L = 153 kmt
Weed Control Costs	Herbicide Cost Reduction/ha = 20-30 %
Yield	Vs TT canola (+10% = 0.2 mt/ha) = 17 kmt Vs Conv./IMI canola (+5% = 0.1 mt/ha) = 3.5 kmt
Oil Content	Vs TT canola (+2% @ \$350/mt) = \$7.00/ha
Wheat Yield in the following crop	Vs TT/Conv./IMI (+5 % @ 4.5 mt/ha = 225 kg/ha) = 27 kmt

In addition to the economic value captured by the New South Wales farmer there are downstream benefits of GM canola which are captured by grain marketers and handlers. To demonstrate the scope and value of these benefits the following is an extract from a speech presented by Mr Terry James Vice-president, James Richardson International (JRI) to the Victorian Farmers federation Grains Group Annual Conference in 2002.

“To try to capture some essence of the effect this shift to biotech varieties has had, I have to revert to the table (see below) a trader relies on the most and that is the supply and demand table. On this chart I have looked at years in the early 80s through the mid 90s and currently the most recent years when biotech crops have surpassed the two-thirds of the acres plateau.

In Canada we survey producer acres, yields, productions and stocks at regular intervals during the year. Crushers are required to report their receipts and all export tonnes are weighed and reported accordingly. The residual number from production, usages and stock, is the feed, waste and dockage number.

In the 80s: 8, 9, 10 percent was the norm. In the first half of the 1990s seed quality and agronomics improve and it gets down to 7 percent consistently. The biotech varieties come on stream in small quantities in 1997 and the decline begins. Now I believe this reduction is primarily dockage category since raw canola is not fed in Canada.

A one percent reduction of FWD on an 8 million tonne crop at \$6.00 per bushel is more than \$21 million dollars or an extra Panamex and a half to sell into the export market.

Here is another way to look at the same thing, perhaps anecdotal but still practical

Handling 750,000 tonnes of canola at a JRI terminal certainly gives us an excellent viewpoint of exactly what the crop is looking like. Our experienced operators have noticed a drop in dockage of canola received from a range of 6-8% pre-1997 to 2-4% in the last two years. To us, a terminal operator this is not good news. We clean all our inbound products to export standard and that dockage represents a revenue stream in our terminal by-products "P& L"

We believe this to be occurring because the fields are cleaner and the plants mature more evenly hence the fines have perhaps become mature kernels. Our cleaner operators see a much more uniform seed size and for a crusher this is an easier product to crush. We feel our exports are leaving the country cleaner than in the years before the biotech varieties have become prevalent. As exporter supplying crushers this is a very positive event.

One more point. The rail freight rate from central Saskatchewan to Vancouver is currently \$35.00 and reduced dockage makes that freight \$2.00 to \$3.00 per tonne cheaper for the producer in the long run since he is paying the freight to the export position. In today's environment these efficiencies must be captured to remain in the business. Approximate value \$17 million dollars."

N.B. JRI operates 80 country elevators throughout Western Canada and 6 in Eastern Canada. JRI have terminals in the ports of Vancouver, Thunder Bay, Ontario, JRI employs 1250 people sourcing, handling and marketing grains and oilseeds to over 40 different countries from Canada. JRI operate a 1200 tonne per day canola crushing which is fully integrated with a refinery, packaging complex, and protein improvement plant for manufacturing high digestible canola meal.

Canadian Canola Seed Supply & Demand ('000 tonne)

Source: Mr. Terry James

Vice- President, James Richardson International

	1980-81	1981-82	1988-89	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Beginning Stocks	1,477	1,349	651	330	589	1,029	562	363	633	2,066
Production	2,483	1,849	4,288	7,233	6,434	5,062	6,393	7,643	8,798	7,119
Imports	1	1	13	42	97	103	141	157	122	160
Total Supply	3,961	3,199	4,952	7,604	7,120	6,194	7,096	8,163	9,553	9,345
Exports	1,372	1,359	1,949	3,912	2,804	2,519	2,964	3,900	3,892	4,855
Domestic Crush	1,003	947	1,362	2,513	2,753	2,712	3,239	3,062	2,983	3,100
Seed	13	13	21	39	26	35	40	40	35	35
FWD	224	164	449	562	508	366	492	538	577	476
FWD % Production	9.21	8.87	10.47	7.77	7.90	7.25	7.70	7.04	6.55	6.68
Total Demand	2,612	2,483	3,781	7,016	6,091	5,632	6,735	7,530	7,487	8,466
Ending Stocks	1,349	716	1,149	589	1,029	562	363	633	2,066	879

Pioneer Hi-Bred can appreciate that the respective state and territory moratoriums were introduced because of stakeholder and government concerns relating to market access and the lack of unity and consistency in the position of industry stakeholders. However, since the introduction of the various GM canola and GM crop moratoriums supply chain stakeholders and respective governments have recognised and acted to resolve the issues that led to the moratoriums.

Pioneer Hi-Bred does not believe that the Act is necessary to ensure the successful coexistence of GM, non-GM and specialty crops in New South Wales. Markets and industry self-regulation are more appropriate mechanisms to ensure the integrity of all grain and affiliated industries. The existing New South Wales grain management systems for managing malting barley, wheat grades and canola are excellent working examples of a whole of industry approach and successful industry self-regulation negating the requirement for state government intervention.

Pioneer Hi-Bred contends that the original claims of significant market impact which led to the introduction of the moratorium have been addressed through the various stakeholder initiatives previously outlined and we believe a significant body of credible, independent data and international case studies supports this position.

Terms of Reference Two:

- **on the basis of the above assessments, make recommendations to Government on the most appropriate option to adopt;**

Australian domestic and international consumers, through their individual purchases and through their representative governments, are demanding more specific and often new product attributes - sometimes related to changing dietary preferences or food safety and at other times related to production and processing methods or non-safety related traits. (Phillips, P., Smyth, S. 2003)

Demand for new product attributes is being driven by an increased demand for market choice based on the need and supply of:

- Food – for a growing domestic and global population;
 - » Food safety
 - » Traceability
 - » Dietary diversity
 - » Healthy food
- Fibre – replacement of traditional sources;
 - » Continuity and quality of supply
- Feed – increasing demand;
 - » Quantity & Quality
 - » Improved conversion
- Plants as Factories – alternate production sources;
 - Ethanol & biodiesel
 - Plastics
 - Nutraceuticals
 - Pharamceuticals

The authors of the Single Vision for the Australian Grains Industry Report GRDC (2004) suggested that underpinning the changing demand at a basic food level is:

- The level of population growth in the Asia Pacific region;
- Changing patterns of per capita food consumption with rising levels of income, and
- Changes in food production technology that can increase yield while responding to factors of taste, relative costs and preference.

For the New South Wales grains industry to continue to participate and meet the challenge of a changing market environment, the industry will need to grow the 'value' of their industry and the 'value' of their grain by (GRDC 2004):

- Adopting new grain technologies for new markets
- Adopting technologies developed to produce existing products via pant based processes
- By moving quickly into supplying new markets and new demand.

In addition to the changing demand for new product attributes, the rising concerns about food safety, diverging regulatory systems amongst trading countries and narrowing operating margins in the global agriculture are also contributing to the trend for increased supply chain information.

Phillips and Smyth (2003) suggested that the demand for market based information has increased since the 1990s in response to:

“.....a series of food safety failures (e.g. catastrophic contamination of the UK cattle herd with “mad cow” disease, which is linked to vCJD in humans, deliberate or inadvertent contamination of food with dioxins and anti-freeze and endemic outbreaks of listeria, e-Coli and salmonella) and introduction of new technologies, especially transgenically modified foodstuffs (especially corn, soybeans and canola).”

In response to this trend, stakeholders are meeting this challenge through the implementation of integrated supply chain management systems which deliver more specific assurances relating to the safety, provenance and quality of the products offered to the market.

The focus of integrated supply chain management systems in the grains industry is to ensure:

- supply chain process integrity as reflected in the quality of the final product;
- management of quality parameters to meet agreed standards and tolerances,
- minimisation and/or prevention of impurities in accordance with agreed thresholds and/or regulations;
- full traceability of products through the supply chain;
- sampling and testing regimes for process and product verification at appropriate points in the supply chain; and
- cost-effectiveness for all supply chain participants.

The New South Wales grains industry has embraced the development of differentiated supply chains that cater for a range of products in order to address the needs of consumers for choice. These different supply chain systems often operate concurrently, offering producers and consumers freedom of choice.

There are many examples across the New South Wales grains industry supply chain where stakeholders have implemented differentiated processes to supply new and/or differentiated products to the market. Examples of these products and processes are:

- the supply of malting barley based on varietal differentiation;
- the supply of different wheat grades for uses ranging from bread, udon noodles, organic wheat and stock feed;
- the supply of poly and mono unsaturated sunflower oil; and
- the supply of canola oil with different characteristics e.g. high oleic and/or low linoleic.

In recognition of the need to actively manage issues surrounding the introduction of GM crops, in mid-2001 the grains industry established the Gene Technology Grains Committee (GTGC). The GTGC included representatives from across the grains industry, including scientists, producers, bulk handlers, food processors, technology providers, the organics industry and Commonwealth and State Governments.

The role of the GTGC was to develop, and recommend to industry and government stakeholders, plans, based on a strategic framework for enabling the coexistence of different production systems and supply chains. In developing this strategic framework, the GTGC defined its scope and identified the objectives and the operating principles of what would be required within a “Strategic Framework for Co-existence”

Following the introduction of the New South Wales Moratorium Act and subsequently the corresponding GM crop moratorium the GTGC initiatives were “moth balled”. More recently via the Single Vision Grains Australia initiative the work undertaken by the GTGC was reviewed and incorporated into the recently released “Delivering market choice with GM canola” document. (For further information:

http://www.australianoilseeds.com/aof_trading_standards/industry_reports_-_delivering_market_choice_with_gm_canola)

The document represents the protocols and processes that the grains industry supply chain either has available or can implement to allow the commercialisation of GM canola, and meet marketplace, trade and regulatory requirements.

The information in the document has been compiled from extensive consultation with key stakeholders across the grains supply chain, from technology developers, through farmers and bulk handlers to marketers and industry representative organisations. Consultation revealed a wide and strong support for the commercialisation of GM canola for the benefits it can provide to Australian agriculture.

Behind this document sits the comprehensive 'Principles for process management of grain' report which states in detail the protocols, procedures and processes that are to be managed along the supply chain; which include standards, QA procedures, stewardship programs, codes of practice and commercial contractual arrangements. Within these documents the key elements include:

- acknowledgement that approved GM canola varieties were approved in 2003 by the Australian regulatory process providing assurance of food and environmental safety; and that GM canola has been grown and traded around the world for more than a decade
- The principles underpinning GM canola commercialisation are that:
 - trade in Australian canola is maintained or enhanced
 - market choice along the supply chain is enabled
 - it is open and transparent
 - confidence is provided to all stakeholders
- the fundamental tenet is that participants right along the supply chain to have the ability to exercise choice. (The industry recognises that not all supply chain participants may choose to adopt GM canola, and hence, the supply chain must be in a position to offer and provide choice at all times)
- in providing market choice, supply chain participants can source, supply and manage the production, processing, manufacturing and delivery of product to a pre-determined set of specifications
- recognition that the Australian grains industry's supply chains are flexible and have the required capacity for existing or new processes to: enable GM grains to co-exist, use a semi-integrated system, or provide separate supply chains and infrastructure
- five market access criteria have been developed to evaluate against and to provide assurance that the approved GM canola meets the requirements for market choice.

Key supply chain stakeholders have endorsed the document as a pathway for commercialisation and agree the Australian grain industry is ready to move ahead with approved GM canola.

Pioneer Hi-Bred contends that the Australian grain industry supply chain is well placed with its current supply chain management systems to deliver market choice to customers and stakeholders within an environment where GM, non-GM and specialty crops co-exist.

Pioneer Hi-Bred contends that the issues that predisposed the need for the New South Wales government to introduce the current GM canola moratorium either no longer exist or have been dealt with by industry in a manner where these issues no longer serve as barriers to the introduction of GM crops. Further that if the Act and the corresponding moratoria were to continue its presence would serve as a significant barrier to future investment by Pioneer in New South Wales agriculture and infrastructure.

Pioneer Hi-Bred contends that if the New South Wales government were to maintain the GM canola moratorium the government would be denying the fundamental right of farmers to choose the crops they grow, the appropriate production system and the markets into which they trade their grain. Thus it would be inconsistent with the principles of coexistence which allow for the cohabitation, production and trade of GM, non-GM and specialty canola in a supply chain where the appropriate customer driven supply chain management systems are allowed to and encouraged to operate in order to provide customer choice.

In summary, Pioneer Hi-Bred would contend that there is a significant volume of evidence (refer Recommended References at the end of the submission) to support the proposition that the conditions (as defined by Lloyd 2003) which predisposed the introduction and the objectives of the Act no longer exist and would recommend:

1. that the Act within and of itself be allowed to expire and struck from legislation, and
2. the GM canola moratoria be repealed as a matter of urgency.

Terms of Reference Three:

- **in the event that the panel recommends extension of the legislation, recommend appropriate amendments to the legislation.**

Pioneer Hi-Bred contends that it has been identified through a number of independent legislative and industry reviews that a national strategy and framework is required to resolve the current barriers to the introduction and adoption of GM canola and future GM crops. This national framework must address the marketing issues that are external to the current national regulatory framework, but at the same time form the basis of the introduction of the current Act. Statements from authors of the respective reviews are provided below.

“Given the range of views on GM crops, it is unlikely that all farmers will want to use this technology and industry and governments need to agree on a framework or strategy for coexistence. With the moratoriums in most jurisdictions due for review in 2007 or 2008, it would be timely for governments and industry to work together over the intervening period to develop such a framework. Any coexistence framework depends on having sensible levels of tolerance.” Corish et al (2006)

“The Review accepts that there is a need to achieve a nationally consistent scheme for the regulation of GMOs, including a mechanism external to the OGTR that will ensure consistency between States on aspects of regulation driven by economic and marketing considerations.” Williamson et al (2006)

“The Review concluded that a nationally consistent transparent approach to market considerations should be adopted.” Timbs et al (2006)

“The Government will also work with industry and interested state governments to develop appropriate arrangements to allow GM and non-GM producers to co-exist.” Federal Government (2006)

The success of Australian agriculture has been built on a spirit of determination and innovation. Innovation has come from both the development of Australia’s own technology and from the rapid adoption of world best practices, including the freedom to evaluate and adopt new technology.

The challenge to grains industry and government stakeholders is to develop a national framework which can focus on developing a pathway forward for the evaluation and sustainable adoption of GM canola and future GM crops that allows the Australian grains industry to maintain market choice by responding to changes in demand for existing and new uses of grain products.

For the stakeholders to move forward, there needs to be a unified market driven framework that provides not only a short term resolution to the market access issues that led to the introduction of the moratoriums, but more importantly the development of a defined and appropriate process for the introduction of GM Canola and future GM crops.

This can only be achieved by the process being defined and non political with commitment from industry and government stakeholders. The process should ensure that the grains industry maintains the capacity to manage the supply chain/s in a manner that maintains market choice.

The development of a unified stakeholder “market choice” driven framework for the introduction of GM canola and future GM crops has evolved from the previous development of a framework for co-existence which primarily focused on “on farm” production, to the development of an integrated supply chain based national market access framework which focus’s on three key elements:

1. **Market Choice:** The ability of a customer within a supply chain to **access product** which meets a pre-determined set of product specifications.
2. **Market Access:** The ability of a supply chain participant to **supply product** to a customer a product which meets a pre-determined set of product specifications.
3. **Supply Chain Management:** The ability of a participant and/or participants within the supply chain to **produce, process, manufacture and deliver a product** to a pre-determined set of product specifications.

Key elements of a National Market Access Framework should include the following components;

- the process is industry driven and managed
- it has grains industry and government imprimatur and endorsement
- it takes into account the impact on other industries (consultative mechanism)
- it takes into account and recognise's the need for stakeholder and consumer choice
- it is able to operate in all market environments and be robust over time
- it has alignment with the national regulatory framework operated by the OGTR, and other affiliated regulatory processes

The development and introduction of such an industry based market access model would provide the New South Wales government an alternate model and process which would meet the needs of government and industry.

The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) under the National Biotechnology Strategy commissioned SGA Solutions Pty. Ltd. to undertake the study '*A Path to Market for Genetically Modified (GM) Canola – Lessons Learned and the Way Forward*'.

Further Information: <http://www.maff.gov.au/releases/07/07122pm.html>

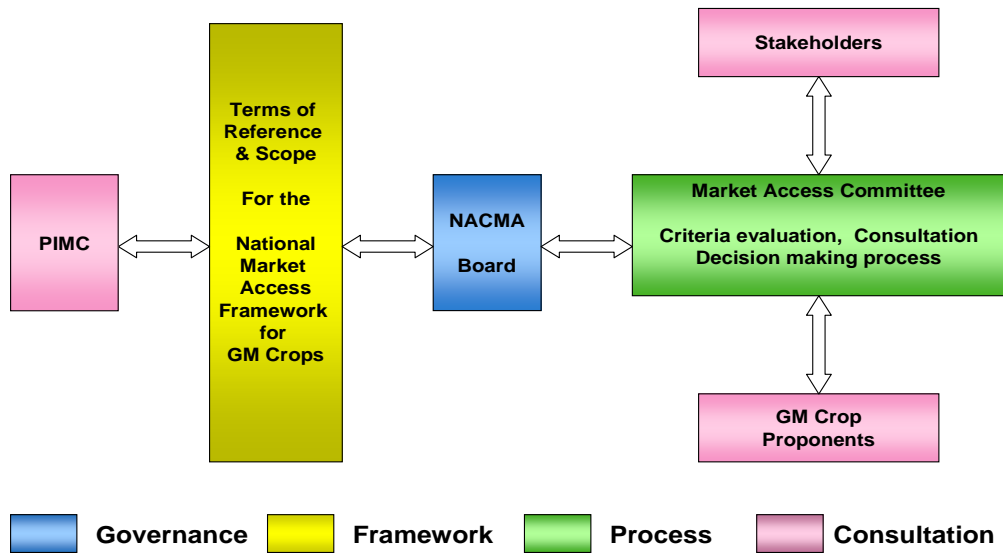
The outcomes from the report will help address concerns in rural and regional Australia about market impacts of gene technology, improve government and industry understanding of market related issues, and develop appropriate capabilities to respond to changing market developments.

The report proposes that a national market access framework be established and managed by the grains industry, with Government endorsement, and that its focus should be on providing a process by which market choice is delivered in an environment where products derived from GM crops co-exist with established and future grain based products.

Based on the extensive consultation process forming the basis of the report, the consensus of grains industry stakeholders was that the best placed organisation to oversee an industry managed framework is the National Agricultural Commodity Marketing Association (NACMA).

The report recommends that the next step is for industry in consultation with government to engage in a collaborative process that is focused on the evaluation and evolution of a national market access framework model. The outcome being a process that will deliver confidence and market choice to consumers and stakeholders, while providing certainty to grains industry supply chain participants.

**Proposed National Market Access Framework for GM Canola and Future GM Crops
in the Australian Grains Industry**



In conclusion Pioneer Hi-Bred would contend that the outcome of industry and government implementing the outcomes of the DAFF 'A Path to Market for Genetically Modified (GM) Canola – Lessons Learned and the Way Forward' report would enable the New South Wales government to retain its oversight on the introduction of future GM crops.

At the same time if the New South Wales government wished to retain the current Act it would allow the New South Wales government to "down regulate" the current Act in a manner which would see it operate if and when the proposed industry managed approach was unable to address market access issues for a specific GM crop technology. The Act in itself would become an enabling support mechanism for the proposed industry managed market access framework.

Summary

The Australian and New South Wales grains industry in 2004 was at a cross road in relation to the future role of agricultural plant biotechnology, it had to make a choice with regard to its future role in the industry. The choice was simple and can be summarized in the following questions:

- **Q1: Was the Australian grains industry prepared to let investment slip away?**
- **Q2: Was the Australian grains industry prepared to let innovation slip away?
Or,**
- **Q3: Can the Australian grains industry create an environment whose foundation is an objective, transparent and timely assessment and introduction of agricultural biotechnology?**
- **Q4: Can the Australian grains industry create an environment that has comprehensive engagement between the public, government, customers and the agricultural industry, which has well defined processes to sort fact from fiction, which has a sense of urgency and a clear “pipeline” pathway from R&D investment to commercialization for agricultural biotechnology to remain a commercial reality?**

Since the introduction of the GM canola moratorium in New South Wales the grains industry stakeholder’s choice unanimously has been to say “No” to questions 1 and 2 and “Yes” to questions 3 and 4.

The grains industry has stepped forward to take leadership in resolving the barriers and issues to the adoption of GM canola. In so doing it has provided a sustainable platform on which the entire grains industry supply chain has rallied and focused on developing a pathway forward for the sustainable adoption and use of GM canola and future GM crops within the New South Wales grains industry.

Clearly through the evidence presented within the submission from Pioneer Hi-Bred, the Australian and New South Wales grains industry supply chain and its stakeholders have stepped forward to address and resolve the condition’s that predisposed the introduction of the Act and the subsequent GM canola moratorium in New South Wales. Therefore, Pioneer Hi-Bred recommends to the government of New South Wales that it immediately rescind the GM canola moratorium and support the introduction of GM canola and the proposed industry based approach to managing market access issues for future GM crops.

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