CropLife AUSTRALIA

SUBMISSION IN RESPONSE TO

ADELAIDE HILLS COUNCIL

DRAFT GENETICALLY MODIFIED CROPS POLICY

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INTRODUCTION

CropLife Australia (CropLife) is the peak industry organisation representing the agricultural chemical and biotechnology (plant science) sector in Australia. CropLife represents the innovators, developers, manufacturers and formulators of crop protection and agricultural biotechnology products. 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 $1.5 billion a year to the Australian economy and directly employs thousands of people across the country.

The world's population is predicted to increase to 9.2 billion by 2050, requiring an increase in global food production of 70 per cent.[1] Providing enough food in the context of production constraints, volatile consumption patterns and a changing climate will be an unprecedented scientific, political and financial challenge.

The situation presents an imperative to act, along with an opportunity for South Australian farmers to both assist in the global food security effort and also to capitalise on increased demand for their agricultural products, securing their economic future. By adopting innovative farming practices, such as the sustainable and efficient use of crop protection products and genetically modified (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.

OVERALL POSITION

CropLife commends the Adelaide Hills Council for having the foresight to engage in discussion on the future of agricultural biotechnology in the municipality; however we are seriously concerned with the lack of depth of research and erroneous assumptions that form the foundations of this policy.

This submission clarifies some of the facts surrounding the application of agricultural biotechnology in Australia; it then addresses some of the erroneous assumptions upon which the Adelaide Hills Council policy has been based.

South Australia is uniquely placed to play a humble but important role on the international stage of sustainable food security. Policies like that currently under discussion act to inhibit that role, along with the economic and environmental well-being of the region. CropLife recommends that the Adelaide Hills Council reconsider and retract its proposed policy in order to allow the South Australian Government to make its own policy decisions as to the future of agricultural biotechnology in the state according to science-based evidence.

BIOTECHNOLOGY IN AUSTRALIA

The importance of biotechnology in Australia

GM crops, an application of modern biotechnology, are just another step along the same path of technological innovation that led to Australian agricultural inventions such as the combine harvester and Federation wheat varieties. The utilisation of these innovations has delivered safe and affordable food to the nation and the world.

GM crops have demonstrated their environmental credentials over a period of 16 years, through reduction in overall pesticide use and assisting the substitution of older pesticides with pesticides that are better targeted, more efficient and have a reduced environmental impact. GM crops have also aided in the reduction of tillage; on-farm fuel use; CO_2 emissions; pesticide run-off into waterways; as well as increasing soil carbon storage; and water-use efficiency. GM crops under development in Australia will help Australian farmers combat environmental stresses such as drought, acid soils and salinity that are being caused by the changing climate.

[1] United Nations Food and Agriculture Organisation 2009 'How to Feed the World in 2050', Rome.

Regulation of Biotechnology in Australia

For many years, Australia has had in place a robust regulatory framework for gene technology. The regulatory system is focused on a rigorous process of identifying and managing risks to human health, safety and the environment based on scientific evidence.

Live and viable GM organisms in Australia are regulated by the Gene Technology Regulator under the Gene Technology Act 2000 (Cth) and corresponding state and territory legislation. Food Standards Australia New Zealand (FSANZ) is responsible for examining the safety of GM foods; and the Australian Pesticides and Veterinary Medicines Authority (APVMA) is responsible for assessing and registering GM products used as pesticides, including live GM organisms used for these purposes (for example GM insect resistant crop plants).

It is important to note that all GM foods or food ingredients sold in Australia are approved and proven safe. The Australia New Zealand Food Standards Code requires that all GM ingredients undergo a thorough scientific safety assessment before they enter the food chain. Currently, under Standard 1.5.2 (Food Produced using Gene Technology) all approved GM foods or food ingredients must be labelled with the words 'genetically modified' if novel DNA and/or novel protein is present in the final food.

One threat to the potential success of this important agricultural innovation is the lack of a nationally consistent scheme for gene technology regulation in Australia. Unnecessary and overly stringent regulation brings with it an equally unnecessary burden on innovation. CropLife believes that all regulation should be commensurate with the associated risk, cost and benefit to the community. The current gene technology regulatory system in Australia already imposes a much greater level of regulatory burden on the industry than occurs in some other countries, and this burden is exacerbated by unclear and inconsistent market interventions by state governments.

If South Australia fails to acknowledge the opportunities that are offered by agricultural biotechnology, the results will be profound. ABARE modelling in 2008 indicated that the estimated economic benefit to South Australian farmers from adopting GM canola from 2008-09 for the following ten years would be equivalent to $115 million in 2006-07 dollars[2]. The South Australian agricultural industry has a unique opportunity to exploit the many opportunities offered by crop biotechnology. In light of this, the local governments of South Australia should be acting to encourage the State Government to invest in research and development in agricultural innovation. There is a need for a paradigm shift in thinking from regulating the science (as it has been proven safe) to facilitating the sustainability of South Australian agriculture by allowing agricultural biotechnology to reach its full potential.

[2] Acworth W, Yainshet A and Curtotti R 2008, 'Economic impacts of GM crops in Australia'. Prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, May

RESPONSE TO ASSUMPTIONS

Assumption: *That there is an inadequate scientific understanding of likely long-term physiological and health impacts of GM technology on humans and surrounding crops, ecologies and related human and other food chains.*

Response: *Over 25 years*[3] *of credible, peer-reviewed research indicates that GM technology is not only safe; it presents significant opportunities for improving nutritional health for both the global and Australian populations.*

Despite a proven record of safety, every GM crop is subjected to intense global scrutiny. Government regulators worldwide have independently reached the same conclusion – that cultivation of GM crops poses no greater risk to human health or the environment than cultivation of conventional (non-GM) varieties.

It takes at least ten years to develop a new GM trait, during which time a very detailed investigation is undertaken in both laboratory and field trials of the equivalence of the GM plant and its conventional counterpart: they are compared with respect to phenotype, growth and nutritional properties, and chemical composition. Trials with thousands of animals have shown GM products to be harmless.[4]

Further, for some 16 years, GM food products have been part of the human diet in the US and a number of other countries. It is estimated that 60-70% of the processed foods on US supermarket shelves contain GM components. There have accordingly been trillions of GM meals eaten without any credible, peer-reviewed evidence to indicate a single health hazard. [5]

Finally, allergy tests are mandatory for GM products. The World Health Organisation has a well-established protocol for detailed GMO allergen tests. Not one allergenic GM product has been introduced onto the market. Moreover, intensive gene technology research is already under way with a view to removing allergens from conventional peanuts, wheat and rice. [6]

Potential nutritional benefits

Agricultural biotechnology presents promising, cost-effective solutions for reducing health problems associated with nutritional deficiencies, both in Australia and in countries less fortunate than our own.

Bowel cancer is the second most common cancer in Australia with about 14,000 new cases diagnosed annually. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is currently using genetic engineering to develop wheat varieties that are high in resistant starch which aids in the prevention of bowel cancer in order to reduce the risk in the Australian population.[7]

Vitamin A deficiency causes serious health problems for millions of people globally. Golden Rice, which has been genetically engineered to produce β-carotene, is being proposed as a remedy.

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[3] DG Research, European Commission, 2004 'EC-Sponsored research on safety the genetically modified organisms (1985-2000)' http://www.europabio.org/are-gm-crops-safe-human-and-animal-health-and-environment accessed 25 July 2012.

[4] Prof. Hans-Walter Heldt, Universität Göttingen, Union of the German Academies of Science and Humanities, InterAcademy Panel Initiative on Genetically Modified Organisms, 2006 'Are there health hazards for the consumer from eating genetically modified food?'

[5] *Ibid.*

[6] *Ibid.*

[7] CSIRO (Media Release: 26 April 2012) 'Resistant starch may offer potential to help protect against bowel cancer', at http://www.csiro.au/Portals/Media/resistant-starch-may-offer-potential-to-help-protect-against-bowel-cancer.aspx accessed 25 July 2012.

Golden Rice could more than halve the disease burden of Vitamin A deficiency. Juxtaposing health benefits and overall costs suggests that Golden Rice could be very cost-effective.[8]

Without policies that acknowledge not only the safety of GM products, but also the importance of the technology in the fight against food and nutrition insecurity, increasing numbers of people each year will face sickness and fatality that could have been easily prevented.

Assumption: *That claims of increased yields resulting from use of GM technology are unfounded.*

Response: *Widespread and rapid adoption illustrates the fact that GM technology benefits farmers in very real and diverse ways.*

The benefits of GM crops for farmers are diverse and are evidenced by the rapid adoption of GM technology across the globe, particularly in developing countries. In 2011, developing countries adopted GM crops at twice the rate of developed countries, giving a clear indication that GM crops are proving to be a critical tool for farmers worldwide as the fight against climate change, poverty and food insecurity intensifies.[9]

During 2011, an additional 12 million hectares of GM crops were planted representing an annual growth rate of 8 per cent over 2010. The unprecedented adoption rates are testimony to trust and confidence in biotech crops by millions of farmers worldwide. During 2011, 160 million hectares were planted (up from 148 million in 2010) by 16.7 million farmers in 29 countries, including 19 developing countries and 10 industrial countries. Farmers are discerning businesspeople who make decisions to use the tools that will best help them produce more food, feed and fibre efficiently. A 94-fold increase in hectares of GM crops planted since 1996 makes biotech crops the fastest adopted crop technology in recent history.[10]

Assumption: *That there are adverse economic impacts associated with the intellectual property rights associated with patented GM technology.*

Response: *The vast majority of applications for trials of new GM traits in Australia are on behalf of public bodies.*

The Policy document makes reference to private intellectual property rights in GM technology as a reason to adopt a negative policy position towards the technology. A quick glance at the website of the Office of the Gene Technology Regulator reveals that the number of applications for field trials is dominated by Australian public sector institutions – over half the applications come from CSIRO, Australian universities or state department of primary industries.[11]

Genetic improvements under development by the Australian public sector include wheat and barley with improved nutrition, yield, disease resistance and environment stress tolerance; nutritionally improved bananas that are also resistant to disease; forage grasses with improved nutritional quality; and sugarcane with enhanced water and nitrogen use efficiency.

To further illustrate this point, one CropLife member has recently announced that it has entered into a partnership with the CSIRO and the Australian Grains Research and Development Corporation (GRDC) to increase yield in wheat. The partnership will build on gene technology discovered by CSIRO which reportedly enables yield gains of up to 30%, with the company supporting the next stage of development. Public/private partnerships such as this enable the development of technology from path to market, rather than creating adverse economic impacts.

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[8] Stein, A.J., Sachdev, H.P.S., Qaim, M., 2007, 'Genetic Engineering for the Poor: Golden Rice and Public Health in India' *World Development* Vol. 36, No. 1.

[9] James, Clive 2011. 'Global Status of Commercialized Biotech/GM Crops: 2011'. *ISAAA Brief No. 43*. ISAAA: Ithaca, NY.

[10] *Ibid.*

[11] Office of the Gene Technology Regulator, at http://www.ogtr.gov.au/ accessed 20 July 2012.

Negative policies towards agricultural biotechnology affect the capacity of these publicly funded institutions to conduct research and trials, exacerbating the need for private investment in the technology.

Assumption: *That GM agriculture will necessarily result in lost opportunities for the Adelaide Hills Region or South Australia more generally.*

Response: *The use of agricultural biotechnology and sustainable agriculture are complementary.*

GM crops enable farmers to produce more with less sustainably. The first generation of GM crops, with productivity enhancing input traits such as insect resistance and herbicide tolerance have been rapidly adopted around the globe, providing clear agronomic, economic, environmental and social benefits to those 16.7 million farmers in 29 countries who have accessed the technology.[12]
GM crops in Australia: a snapshot of GM cotton and GM canola benefits to sustainable agriculture
In Australia, growing GM cotton varieties has seen environmental benefits resulting from decreased insecticide use and changes in the types of insecticides and herbicides used. First grown in 1996, now almost 100 per cent of Australia's cotton crop is grown to GM varieties[13]. Cultivation of GM insect resistant cotton varieties has enabled a reduction in the number of insecticide sprays by up to 75 per cent compared with conventional cotton, and the amount of insecticide active ingredient used has been reduced by up to 85 per cent[14, 15]. This, in conjunction with industry stewardship practices, has greatly reduced the potential for chemical runoff into rivers in cotton growing regions of Australia[16].

The types of chemicals being used have also changed, for example 'softer' insecticides with a lower environmental risk profile such as spinosad, indoxacarb and emamectin have replaced older higher-risk products[17]. 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, allowing beneficial (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. In-crop fuel use is also reduced as a result of fewer insecticide applications being needed.

GM herbicide tolerant cotton has increased the adoption of minimum tillage practices and the replacement of some 'harder' herbicides with herbicides that have a lower environmental risk profile. By facilitating minimum tillage, GM herbicide tolerant cotton has resulted in decreased 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 waterways[18].

Economic and social benefits have also been realised from the adoption of GM crops in Australia. For example, in GM cotton-growing regions, the incidence of on-farm Occupational Health and Safety incidents has decreased as a result of reduced insecticide spraying and also 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[19]. Cultivation of GM cotton

[12] James, C., Op. cit.
[13] Cotton Australia Cotton Fact File: Biotechnology, at http://cottonaustralia.com.au/cotton-library/fact-sheets/cotton-fact-file-biotechnology accessed 5 June 2012.
[14] 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.
[15] 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.
[16] *Ibid.*
[17] *Ibid.*
[18] Hattersley *et al*., Op. cit.
[19] Holtzapffel *et al.*, Op. cit.

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 also resulted in environmental benefits and increased environmental sustainability. For example, just as for those farmers growing GM herbicide tolerant cotton, cultivation of GM herbicide tolerant canola has allowed farmers in Western Australia, Victoria and New South Wales to replace the use of some higher-risk herbicides with those that are considered relatively more environmentally benign.

Herbicide tolerant canola provides farmers with more effective weed control, particularly for those broad leaf weeds, such as wild radish, that are closely related to canola. Varieties of non-GM herbicide tolerant canola have been grown in Australia since 1993 (triazine tolerant) and 2000 (imidazolinone tolerant); and the introduction of glyphosate tolerant GM canola merely adds another weed management option to farmer's weed control toolbox. Both non-GM and GM herbicide tolerant canola have led the shift to no-till or conservation tillage systems, with associated environmental benefits such as reduced soil erosion and increased soil water retention.

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 carryover from the herbicides used in non-GM herbicide tolerant crops.

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

The global socio-economic and environmental impact of GM crops

The most recent annual report on the global socio-economic and environmental impact of GM crops from the British consultancy firm PG Economics indicated continued considerable economic and environmental benefits to the farmers and general public in countries where GM crops are grown[20].

The report indicated that the net benefit at the farm level in 2010 from growing GM crops was US$14 billion; for the 15 year period (1996-2010) covered by the report, the global farm income gain has been US$78.4 billion. Australian GM cotton and canola farmers have realised a benefit of over US$400 million in the 1996-2010 period[21].

If GM crops had not been available to the 15.4 million farmers growing them in 2010, maintaining global production at 2010 levels would have required additional plantings of 5.1 million ha of soybeans, 5.6 million ha of corn, 3 million ha of cotton and 0.35 million ha of canola. This total area requirement is equal to 8.6 per cent of the arable land in the United States[22].

The PG Economics report also notes that GM crops have contributed significantly to reducing the release of greenhouse gas emissions from agricultural practices. This results from less fuel use and additional soil carbon storage from reduced tillage associated with GM crops. In 2010, this was equivalent to removing 19.4 billion kg of carbon dioxide from the atmosphere, or 8.6 million cars from the road for one year[23].

[20] Brookes G and Barfoot P 2012. 'GM crops: global socio-economic and environmental impacts 1996-2010'. *PG Economics*, Dorchester, May.
[21] Australian GM cotton farm income benefit US$394 million 1996-2010; GM canola farm income benefit US$13.4 million 2008-2010.
[22] *Ibid*.
[23] *Ibid.*

The report notes that crop biotechnology has contributed to a significant reduction in the environmental impact associated with insecticide and herbicide use on the areas devoted to GM crops. From 1996-2010, the use of pesticides on the global GM crop area was reduced by 448 million kg of active ingredient (9 per cent total reduction); and the environmental impact associated with herbicide and insecticide use on GM crops, as measured by the Environmental Impact Quotient (EIQ) indicator, fell by 17.9 per cent[24].

A recent study reported in the science journal *Nature*, found that in China over the past 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 insects[25]. 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 crop[26].

Assumption: *That the use of agricultural biotechnology and sustainable agriculture are mutually exclusive.*

Response: *GM agriculture can provide real benefit for the Adelaide Hills Region and South Australia more generally.*

CropLife's biggest concern with the Adelaide Hills Council Policy is the potential effect it may have on the relevant industries based in the Adelaide Hills region, as well as the attitudes and lives of the people who live there.
In Adelaide itself, genetically modified grape vines that are resistant to mildew have been developed.[27] This technology has not reached field trial stage because of hesitance within the industry. Wet, warm summers, which may become increasingly prevalent in the current unpredictable climate, can lead to high prevalence of mildew and result in grapes being left to rot on the vine. Scientists have developed a technology that may prevent such losses, increasing the productivity of the wine industry and the Adelaide Hills Region in general. However, while policies such as that currently under discussion by the Adelaide Hills Council, as well as the Genetically Modified Crops Management Act (SA) continue to exist, it is likely that South Australia will be left behind –economically, agronomically, environmentally and, most relevantly, in terms of sustainability.

CONCLUSION

South Australia is uniquely placed to play an important role in achieving local and global food security sustainably. Policies like that currently under discussion act to inhibit that role, along with the economic and environmental well-being of the region. CropLife recommends that the Adelaide Hills Council reconsider and retract its proposed policy in order to allow the South Australian Government to make its own policy decisions as to the future of agricultural biotechnology in the state according to science-based evidence.

[24] *Ibid.*
[25] Lu Y, Wu K, Jiang Y, Guo Y and Desneux N 2012. 'Widespread adoption of Bt cotton and insecticide decrease promotes biocontrol services'. *Nature* doi: 10. 1038/nature11153 published online 13 June 2012.
[26] *Ibid.*
[27] Homer, Annabelle, *ABC Rural* (27 October 2011) 'Australian scientist develops GM grape vines' at http://www.abc.net.au/rural/news/content/201110/s3349425.htm, accessed 25 July 2012.