6

Australia

Better Communication Through Better Understanding of the Target Audience

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Australia, as a strong agricultural producing nation, is an investor in innovation in the farming sector. The country has usually been a quick adopter of new technologies that might lead to increased productivity and profitability. However, this has not proven the case with crop biotechnology; while there has been significant research undertaken in this area, adoption by the agricultural sector has been complicated by social and political issues – often driven by divergent value-based information campaigns. This has, in turn, led to a strong focus on the need for more effective communication on crop biotechnology.

COUNTRY PROFILE

Australia has a geographic size of 7,600,00 square kilometers, and a population of roughly 22 million people, which means while it is the sixth largest country in the world, it is the 51st by population, and has one of the lowest population densities in the world.

Australia's current Gross Domestic Product is estimated at $1 trillion, with a per capita measurement of $46,824. While agriculture accounts for only 3% of GDP Australia it makes up a significant proportion of exports.

Geographically, Australia lies in several zones from equatorial through to temperate, with agricultural production occurring in all of these except the desert zones.

Australia's system of Government is Federal Parliamentary Democracy, under a constitutional monarch, the Queen of England, represented by a Governor General. The head of Government is the Prime Minister and there are three levels of Government:

- Federal
- Eight States and Territories
- Over 600 local governments

English is the national language of Australia, although many community languages are spoken by the large migrant population.

Science and Technology Environment

The Science and Technology (S&T) environment in Australia is dominated by public sector funding, primarily through universities and the Commonwealth Scientific and Industrial Research Organization (CSIRO). The CSIRO's Division of Plant Industry is one of the world's leading research centers for plant science, with an annual budget of around A$85 million and around 700 staff.

Crop Biotechnology in Australia

The development of genetically modified (GM) crops in Australia has been dominated by legislation and regulations. While the Federal Government introduced the Gene Technology Act (2000) to regulate GM crops and brought in GM food labeling laws, many states ban GM crops from being grown in their states.

In 2003, six of the eight states in Australia declared moratorium and banned the growing of GM crops (often based on market and trade issues), although there were allowances for crop trials in many states. By 2010, only two state bans remain, in South Australia and Tasmania (Western Australia still has a ban in place, but has allowed exemptions to grow GM cotton and GM canola). Much of this period was marked by strong campaigns by non-governmental organizations (NGO) against the introduction of GM foods and crops and equally strong campaigns by industry in support of them.

Only four species have GM lines approved for commercial production in Australia:

1. cotton, modified for herbicide tolerance, insect resistance or a combination of the two;
2. canola, modified for herbicide resistance;
3. carnations, modified for flower color, and
4. roses, modified for flower color.

Cotton tends to be grown in the northern part of Australia and canola and GM carnations tend to be grown in the southern part.

The Future

Current field trials of GM crops in Australia include:

- cotton and sugarcane with improved water-use efficiency;
- cotton tolerant to water-logging;
- sugarcane with improved nitrogen-use efficiency;
- wheat with improved drought tolerance;
- forage grasses with improved forage qualities; and
- bananas with enhanced nutrition and disease resistance.

Crop Biotechnology Timeline

1995	The first GM crops, carnations with novel flower colors (blue, violet or purple) are approved for commercial release in Australia.
1996	GM Bt cotton is grown commercially in the states of New South Wales (NSW) and Queensland after six years of field trials.
2000	*The Gene Technology Act* is introduced, establishing the Office of Gene Technology Regulator.
	The Australia New Zealand Food Standards Council (ANZFSC) agrees to new labelling rules for GM foods. Foods must be labelled if they are GM, with exemptions for highly refined foods with no novel DNA, flavorings at less than 0.1%, unintentional presence of less than 1% per ingredient, and restaurant or take away foods. Approved GM foods are soybeans, sugar, cotton, canola, potatoes, and corn products.
2001	Roundup Ready cotton and Roundup Ready/Bt cotton are commercially available.
2002	Trials of Bolgard II cotton approved in Australia.
2003	Bolgard II cotton approved for commercial release.
2003	GM herbicide-tolerant canola is approved for commercial release in Australia.
2003/4	Those states growing canola crops (New South Wales, Victoria, Tasmania, South Australia and Western Australia) enacted legislation to prevent the commercial planting of GM crops.
2004	Review of GM food labelling undertaken.
2005	The Primary Industries Ministerial Council agrees to a nationally consistent definition of threshold levels in canola grain and seed for traces of GMOs (0.9% for GM canola in non-GM canola grain, and 0.5% for GM canola in non-GM canola seed-for-sowing.
2008	Following reviews of their bans, Victoria and NSW allow GM canola to be grown commercially.
	Western Australia lifts its ban on the commercial production of GM cotton in the Ord River Irrigation Area, in the north-west of the state.
	Thirty-five GM foods/food ingredients from seven crops (soy, canola, corn (maize), potato, sugar beet, lucerne and cotton) are approved in Australia. Most of these come from crops which have been grown and processed overseas.
2009	Commercial-scale GM canola trials in 2009 are allowed in Western Australia.
	GM canola uptake in New South Wales and Victoria increased four-fold.
	GM rose approved for commercial release.
2010	Two states, South Australia and Tasmania, continue their bans on GM canola.
	More than 90% of Australia's cotton is now GM, either insect-resistant, herbicide-tolerant or both.

A Selection of Current Australian Research on GM Plants

Characteristic	Research
Healthier oils	CSIRO is developing oilseed crops that produce healthier, more stable cooking oils. CSIRO is also undertaking research to produce oilseed crops with beneficial omega-3 and omega-6 oils, which are currently mostly derived from fish sources.
Allergy free ryegrass	The majority of hay fever-causing pollen in Australia is from ryegrass. Researchers at the Molecular Plant Breeding Cooperative Research Center (CRC) are working to produce ryegrass with pollen lacking the protein that causes hay fever. The GM allergy-free ryegrass is currently undergoing field trials in the USA.
Biofuels from sugarcane	Farmacule BioIndustries, Syngenta and the Queensland University of Technology have established a Sugarcane Development Center which aims to develop and commercialize cellulosic ethanol and biofuels produced from sugarcane biomass.
Bioplastics from sugarcane	The Cooperative Research Center for Sugar Industry Innovation through Biotechnology is investigating the production of polyhydroxyalkanoates (PHAs) in sugarcane. PHAs are used to make biodegradable plastics.
Frost tolerant wheat	Scientists from the Victorian Department of Primary Industries have discovered a gene from a grass species (Antarctic Hairgrass) responsible for inhibiting ice crystal growth in tissues, enabling the plant to tolerate freezing. This gene may be used to develop wheat with enhanced frost tolerance.
Water use efficient crops	Scientists from a number of organizations are doing research and developing crops with improved water use efficiency or drought tolerance. Crops include sugarcane, cotton and wheat.
Ornamental plants	GM roses and *Torenia X hybrida* ('wishbone flowers') have been trialled in Australia, modified with geranium and snapdragon genes to produce a range of flower colors, including white, blue, pink, and pale yellow. Pansy and iris genes have also been used to make light purple or violet roses.

Source: Bureau of Rural Sciences, 2009.

Public attitude to GM food and crops

Tracking research into public attitude towards GM food and crops has been documented in Australia since 1999 by the former Government agency Biotechnology Australia. Results show changes in attitude over time, and help define drivers of attitude change as well as determine what factors are most likely to influence public acceptance or rejection of GM food.

The simplified overview is that support for GM food and crops dropped between 1999 and 2005, but rose sharply in 2007. This situation was described in the United Kingdom (UK) *Guardian* of 17 September 2007, as:

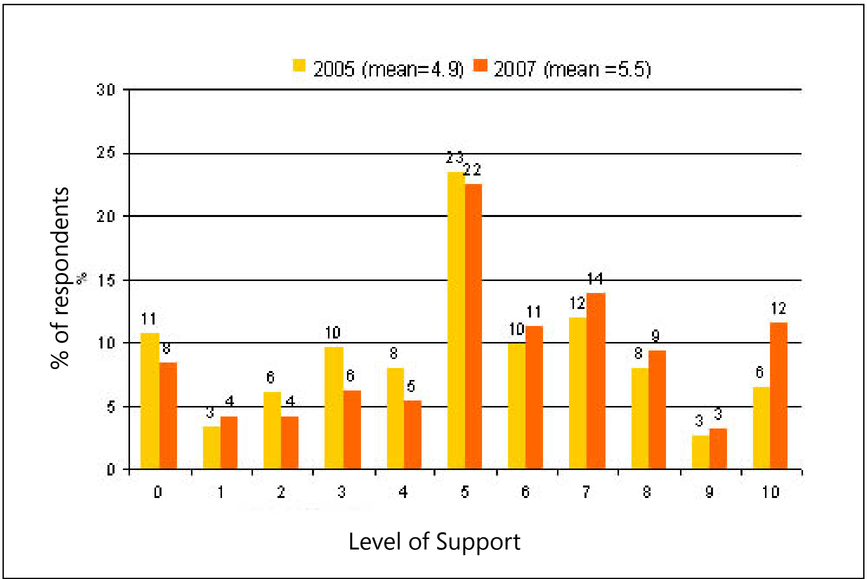
> *"We have absolutely every confidence that GM will be used in the UK," said Julian Little, chairman of the Agricultural Biotechnology Council, which represents several major biotechnology companies that produce GM crops. ... He pointed to Australia as a place where public opinion on GM technology was turned around.*
>
> *"There's a country that has gone through the moratorium, has gone through the we're-not-sure, the NGOs have been in there and caused mayhem, and come out the other end saying this is a useful technology and the public support it."*

The fact is there were multiple factors that led to this attitudinal change, which in-depth analysis of survey data has been able to provide. Many polls simply seek a Yes, No or Unsure response to GM foods or crops, which can provide results such as these from a 2009 poll in Australia: Positive towards GM foods, 27%; Negative, 68%; and Neither, 6% (MARS, 2009). But more complex questions provide more complex answers.

When a similar question was asked across a ten-fold scale for support, ranging from high support down to no support, the spread of results showed that there were minorities who were either strongly for (12%) or strongly against (8%) GM foods. But the majority of the population lies in the middle rankings, spread between 3 and 7 (Eureka, 2007). Thus, simple "For" and "Against" questions tend not to reflect the actual divide in attitude.

Figure 1. Spread of support for the use of gene technology in food and agriculture
[0 = strongly against, and 10 = strongly for] (Eureka, 2007).

The question asked to generate the graph in Figure 1 was: "How would you rate your level of support for the use of gene technology in food and agriculture applications today? Please use a scale of 0 to 10, where 10 is fully supportive and 0 is completely against it". (Figures have been rounded off)



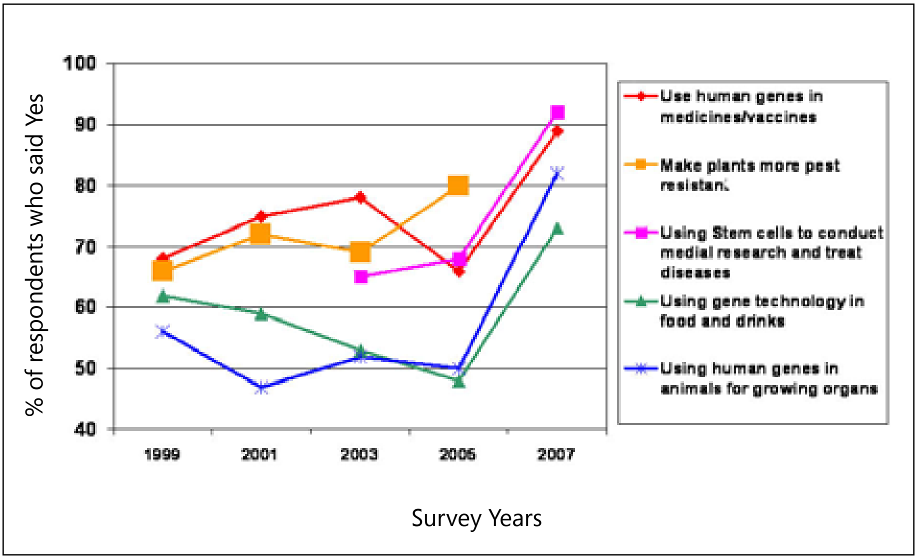
Framing of questions impacts upon the answers received. For instance the question "Would you or wouldn't you eat GM foods?" will receive different responses if the question is framed differently, to address the following:

- What benefits people might obtain from eating these food;
- Whether the final food type is a health food or a snack food;
- How distant or closely related is the organism that the gene transfer is being made from;
- Who regulates for food safety;
- Who developed the food – a company or a public research organization; and
- What is the price of the final product.

Going back to the finding that there was large increase of support for GM foods and crops in 2007, public attitude studies showed that while in 2005, those who would and those who would not eat GM foods was roughly 50:50, by 2007 those who were accepting GM food crops (a slightly different question) had risen to 73%. Those who would not accept them had dropped to 24%. Also, of that 24%, about a third would more likely accept GM food crops if they were labelled, regulated, and developed by government-funded research (Eureka, 2007).

Figure 2. Acceptability of biotechnology applications from 1999 to 2007

For Figure 2 graph, the question asked was: "I'd like you to tell me whether these applications would be acceptable to you."



The key reasons for this major change in attitude were summarized by the research company as follows:

- Genetic modification was no longer an exotic or futuristic concept.
- Greater familiarity appeared to have had a positive effect on acceptability.

- Concern over the state of the environment had been a major factor in changing people's perception towards gene technology (Eureka, 2007).

In-depth research conducted in focus groups (small groups selected from a particular segment of the population who were engaged in discussions on a particular GM topic) has revealed more insight into a discord between attitude and behavior. For instance, in 2005 it was not uncommon for group participants to say, after discussing the risks and benefits of GM foods and crops, that they would prefer not to eat them (Eureka, 2005). But when a cake was placed on the table and participants were told that it most likely contained GM ingredients, an overwhelming number of group participants said they would eat it. Reasons given for this difference between attitude and behavior included:

- they did not expect the food to be healthy in the first place; and
- the amount of GM ingredient was probably small and wouldn't pose much of a health risk.

A study conducted by Swinburne University in Melbourne contested the major finding of the Biotechnology Australia. It claimed that in their own Swinburne National Technology and Society monitor, they had seen little change in public attitude towards GM foods over five years, and found that the key determinant of attitude was trust.

Key findings

Pooling all the data obtained from Biotechnology Australia's qualitative and quantitative surveys and the overseas studies, six key principles relating to public attitude towards GM foods have been developed:

1. **There is a poor understanding of what GM actually means, and what foods is GM with wide-belief that many fruits and vegetables in supermarkets may be GM.**

Only 31% of the Australian population claim to know enough about genetic modification to be able to explain genetic engineering to a friend, and a significant percentage of people consider that almost any change in food is a genetic modification (Eureka, 2005).

In a 2003 study (Table 1) conducted for Biotechnology Australia, people were asked which modifications were genetic modifications of food (Millward Brown, 2003):

Table 1. Australian public perceptions of what constitutes GM food (Millward Brown, 2003)

Modification	% who view the modification as GM
The change of grain crops to make them pest resistant	78%
Foods produced using gene technology processes	74%
Food made from animals fed with GM stock feed	66%
The change of flavor in food	52%
Flavor or nutritional enhancements in food	52%
Colors in food	35%
Food with preservatives	32%
Food grown with the use of pesticides	30%
Food grown using fertilizers	26%

That about 30% of the population believed any modification in food makes it genetically modified may come as no surprise. Our largely urbanized society has little experience and understanding of how food is produced and processed. Yet this also raises the question that if so many people view common food processing as genetic modification, why isn't there more consumer backlash against such products?

2. **What consumers say in surveys is not always how consumers actually behave.**

As a direct indicator of behavior, public concerns are not as strong as is often assumed. Biotechnology Australia surveys have shown that while 75% of consumers in Australia stated they had concerns about eating GM foods, about half were still willing to eat GM foods (Millward Brown, 2003; Eureka, 2005).

Many studies have shown that consumers tend to have an idealized view of how they shop, whether in relation to shopping 'green' or buying 'healthy' foods or avoiding some modern food processing techniques. This leads to poor correlation between what people say they will buy and what they will actually buy (Edelman Trust Barometer, 2005).

Likewise, a study of public purchasing behavior at roadside fruit stalls conducted in six different countries (New Zealand, France, Germany, Sweden, United Kingdom and Belgium) found that despite stated consumer concerns about buying GM foods, these concerns did not translate well into purchasing behavior. Over 2,700 consumers were involved in the study that asked people to choose between organic fruit, fruit produced with chemical sprays and spray-free GM fruit. Up to 60% of purchasers chose the GM fruit in New Zealand, 43% in Sweden, and 36% in Germany – all of which represented GM as the majority choice (Knight et al., 2007). However, price premiums for organic fruit over GM and conventional fruit may have been a factor in choice.

3. **General attitude towards foods is a major predictor of attitude towards GM foods.**

Attitudes towards food can be complex, but general attitudes towards food can be an accurate predicter of public attitudes towards GM foods.

Attitude towards GM foods is driven by the general attitude towards all foods. So that if a person prefers organic or 'healthy lifestyle' foods, he or she will most probably reject GM foods, but if a person is a large consumer of processed foods, he or she will more likely accept GM foods.

An explanation of these predictors has been provided by Environics International (Environics International, 2000), a Canadian company that examines cluster graphs on consumer attitude to food across 10,000 people in ten countries (USA, Mexico, Japan, India, Great Britain, Germany, China, Australia, Brazil and Canada). The study defined six distinct consumer segments:

- *Food elites* – prefer to eat organics and the 'best' foods and will pay for them (about 8% of the population);
- *Naturalists* – prefer to buy from markets rather than supermarkets (about 16%);
- *Fearful shoppers* – have concerns about most foods – predominantly older consumers (about 28%);
- *Nutrition seekers* – treat food as fuel for the body (about 20%);
- *Date code diligent* – read labels, but generally only look at the use by date and fat content; predominantly younger women (about 13%); and
- *Unconcerned* – don't really care too much what they eat; predominantly younger men (about 13%).

The top three segments are concerned about many food issues including the consumption of GM foods. The bottom three segments have specific concerns only, or aren't overly concerned about foods generally or consuming GM foods. Understanding the different nature of consumer segments and that there is not a single 'public' is vital to understanding consumer behavior.

Examining those products that are labelled GM on supermarket shelves and are being consumed in Australia, it is apparent that they are predominantly snack foods and processed foods, the type of foods most commonly consumed by the bottom three categories of consumers. However, if GM soy milk is introduced to the market, the nature of the product might have a higher appeal to the first three consumer segments and would therefore most likely receive a higher consumer rejection, due to the product being consumed mostly by food elites and naturalists.

4. **As a relative concern, GM food concerns are comparable to concerns about artificial food preservatives and additives.**

A study looking into food concerns conducted for Biotechnology Australia in 2000 sought ratings across a four-fold scale of very concerned, quite concerned, slightly concerned and not concerned. While 39% of the public had high concern about GM food, GM food was the smallest high concern category compared with 45% having high concern about the pesticide residues in food, 46% having high concern about human tampering of food and 58% having high concern about food poisoning (MARS, 2004). Similar results were obtained from studies conducted in the UK (UK Food Safety Agency, 2001), and in the USA (Wirthlin Group Quorum Surveys, 2001).

Similarly, asking about GM food concerns relative to environmental concerns has shown that GM food concerns rated at 11%, which is lower than concerns about pollution (35%), nuclear waste (26%), the greenhouse effect (17%) and cloning at 12% (Eureka, 2005). Also a study into GM food attitude undertaken by the Grains Research and Development Corporation, in which 120 consumers in Sydney were surveyed, found five food concerns that rated higher than consuming GM foods (Owen, et al. 2005):

1. diseases in beef that could be passed on to humans (23.7%);
2. bacteria and disease in foods (12.7%);
3. hormones to accelerate animal growth residing in meat (8.8%);
4. antibiotics in meat (3.4%);
5. pesticide residue on fruit and vegetables (3.3%);
6. using genetically modified ingredients in food (2.1%)
7. fruits and vegetables that have been genetically engineered (2%); and
8. chemical preservatives and food additives (0.7%).

5. Attitude to GM foods is also influenced by a hierarchy of values.

Values that influence attitude positively towards GM foods include trust, consumer consultation, regulation, and consumer benefit (Eureka, 2005); and the negative values that drive attitude against GM foods are those that pertain to things that are perceived to be unnatural, unnecessary, and unknown (Eureka, 2005).

In general, people who view all new technologies positively tend to support gene technology and those who are concerned about the impact of new technologies tend to be concerned about gene technology (Eureka, 2005).

6. GM foods have become a focus for various ideologies.

When talking to people in focus groups and community meetings, those with high concerns about GM foods rarely articulate their concern as being about the food itself, rather they identify with strong ideologies. Their stance against GM foods includes (Eureka, 2005):

- concern about multinational companies controlling the food chain;
- concern over governments dictating public choice;
- fear of new technologies;
- a perception that science is going too far, too fast, and is not regulated strongly enough;
- concern over all 'industrialization' of foods; and
- a 'green' philosophy pertaining to humans not seeking to dominate nature.

By contrast, attitude that tends to predict a favorable stance towards GM foods include (Eureka, 2005):

- High trust in science and regulators,
- Support for commercial development of new technologies; and
- A philosophy that supports humans dominating their environment.

Many anti-GM protests are not about the science of genetic modification but about issues of corporate control, public involvement in new technologies, and ideologies based on defending nature from perceived harm.

Understanding these six key principles that govern public attitude outlined above shows that it is very difficult, if not meaningless, to derive a single statistic for consumer attitude towards GM foods, as any statistic will be related to many diverse factors. To obtain accurate data, a new poll would need to be conducted for every different type of GM food or crop under consideration. However, by analyzing all the data, it is possible to suggest some general principles that predict public acceptance or rejection of GM foods that policy makers can refer to.

The Australian public are **least likely to approve** of GM food crops that:

- benefit a company over the public;
- involve gene transfer from species that are not closely related;
- do not provide a societal benefit;
- are perceived as being possibly harmful to people or the environment;
- were not developed with perceived consultation or regulation; and
- are present in foods that align with ‘health conscious’ consumers.

And GM food crops that the Australian public are **most likely to approve** are those that will:

- Have direct consumer benefits;
- Have a gene modification within the organism, or from an organism that is closely related, with plants being preferred over animals;
- Have direct societal benefits or align with societal values;
- Be perceived as being not harmful to people or the environment;
- Be developed with some perceived consultation and regulation; and
- Be present in foods consumed by those who are less ‘health conscious’.

Farmers’ attitude to growing GM crops

Several studies of farmer’s attitude towards growing GM crops have also been conducted in Australia, and while not always as robust in their tracking data and samples sizes as some of the larger surveys of the general public, they clearly show a trend of increasing support for GM crops. For example, a study of 500 farmers in 2003 conducted for Biotechnology Australia found that a majority of crop growers would consider growing GM crops if a number of perceived problems were addressed.

The survey found that while 49% of farmers were opposed to GM crops and 74% were not considering them at that time, 57% of growers would consider planting them if three main problems were resolved. These were:

- crop performance needing to be proven;
- market access limitations; and
- consumer concerns.

The study also found that 21% of farmers would consider growing GM crops because of expected production benefits such as increased yield and reduced chemical use (MARS, 2003).

A postal survey of South Australian Farmers Federation members conducted in 2002, found that 80% of the 1000 respondents (25% of SAFF members) indicated they wanted a moratorium on the introduction of GM crops. However, a more recent study of farmers who participated in GM information sessions at six regional centers in South Australia in 2006 (Baldock, 2006), found that of the 315 attendees (93% were either farmers, their advisers, or in agribusiness), 87% felt that GM crops would have the potential to deliver benefits. Of these, 42% believed the benefits would be agronomic; 24% considered they would provide increased yields and economic returns; 14% considered benefits would lead to reduced use of farm chemicals; and 10% identified on-farm health benefits. Also, while 80% were in favor of gaining access to GM crops, there were still a significant number (64% of the total) who stated that there were still unresolved issues relating to GM crops. These issues included:

- market and consumer demand for GM products (32%);
- health issues (17%);
- cross contamination between GM and non-GM crops (12%); and
- requirements for segregating GM and non-GM crops (9%).

Majority of respondents (up to 81%) also indicated they would purchase food products made from GM crops (Baldock, 2006). Another independent national survey conducted in 2006 by the Kondinin Group of 600 farmers found that support for GM crops more than doubled from 2002 to 2006. (19% support in 2002; 32% support in 2004 and 49% support in 2006). Those farmers against GM crops dropped from 45% to 29% in this same period (Kondinin Group, 2007).

Also a 2007 study of 142 Australian canola growers, conducted for the Grains Research and Development Corporation, found 82% or respondents would consider or might consider growing GM herbicide-resistant canola to improve weed control and help manage herbicide resistance in weeds (GRDC, 2007).

Conclusion

Many factors impact upon consumer attitude and behavior towards GM technology and GM foods. Attitude varies depending on the types of foods being discussed, the type of gene transfer being undertaken, and the purpose of the transfer. Other factors include awareness of and trust in the regulatory system and perceived environmental benefits or harm from GM crops. Underpinning changes in attitude are overall paradigm changes driven by global events. Thus in 2001, following September 11 and the subsequent war on terror, concerns and risk perception rose in general, and in 2007, which saw large public support for alleviating global climate change, there was a trend towards supporting technologies that could contribute to this. It is expected that the impact of the Global Financial Crisis, and a concentration of values of 'family and finances' may see a change again in attitude towards new technologies including biotechnologies, throughout 2009 and 2010.

Biotechnology communication initiatives and case studies

One of the underlying success of biotechnology communication initiatives in Australia is a coordinated and strategic approach. Industry groups work closely together as do government agencies, coordinating the activities of many different sized agencies. There is also a unified approach and message, which ensures maximum effect with minimal duplication.

About 45 different industry organizations were engaged in the stewardship of GM canola in 2008 and 2009, which is continuing in 2010. About 80,000 hectares of GM canola are expected to be planted in the eastern states of Australia and about 30,000 hectares in Western Australia. An Industry Action Plan was developed, based around stewardship, education and capacity building, data collection, issues management and transparent communications. These allowed for issues to be addressed by relevant experts and for external people to become more involved.

Government agencies networked closely, sharing information and cooperating on activities and key initiatives discussed below.

1. **Agricultural communication strategy**
   Operating on two fronts, via government agencies and via industry, coordinated approaches to agricultural communication were developed, often based on input from farmers and consumers. At the government level, national meetings of communicators were held twice a year, involving relevant Australian government, state and territory government, and publicly-funded research institutions and agricultural bodies, at which cooperative project strategic directions were developed.
   Key success factors: Be widely inclusive and look for elements of commonality rather than elements of difference.

2. **Education**

Get into Genes workshop for students to learn about gene technology, developed by the Australian Center for Plant Functional Genomics and the Molecular Plant Breeding Co-operative Research Center.

The Australian Government funded the development of Biotechnology Online, an internet-based teaching resource for high schools. It was developed by science teachers, for science teachers. The resource was supplemented with professional development activities around Australia and Biotechnology Online became the number one school resource for teaching biotechnology in Australia.
Key success factors: Teachers support Biotechnology Online because they feel it has been developed by teachers. It is also important that it is relevant to their classroom curricula.

3. Public Forums

3.1. General Public Forums

Public forums on different biotechnology issues were held in capital cities and regional centers around Australia. The general format was to have a panel of expert speakers, who would explain the science, put the case for and put the case against the technology. Using hand-held digivote consoles all members of the audience were able to vote on questions asked of them by the speakers, as well as the audience being able to ask individual questions to the speakers.

Key success factors: Allow everyone a voice, but don't allow interest groups to hijack proceedings. Seek moderate speakers rather than extremists, and the success of the public forums generally hinges on having a strong independent moderator who could control the audience well.

3.2. Biotechnology 2020 Forums

These forums were slightly different in content from the general public forums in that they sought to address issues that would be relevant in the year 2020, looking at global warming, food shortages and environmental issues and then discussing how biotechnology might be used in the future. With a more speculative tone, these forums were less confrontational than the general public forums. Audience participation was similar to that in the General Public Forums.

Key success factors: Move the debate into the near future, allowing interest groups to look beyond the current debates and take part in less emotive discussions on the shape of the future and what technology choices will need to be made in addressing future issues.

3.3. BioFutures-BioSolutions Forums

These forums sought to redefine the public debate on biotechnology as a solution, not a problem, by addressing major issues that were raised in the Biotechnology 2020 Forums, but focusing on how biotechnologies could provide solutions to

these problems. Issues covered were water shortages, pandemics, food shortages, and pollution. Expert speakers outlined the research they were undertaking and the audience were able to ask them question, or suggest areas where they might target their research.
Key success factors: Link issues of high concern with biotechnology solutions and allow for upstream engagement.

4. **Public Attitude Research**
   The Federal Government funded major public attitude studies from 1999 to 2007 (being repeated in 2010), examining and tracking changes in public attitude towards biotechnology. Such data were crucial in best understanding not just what public attitude actually was but what were the drivers of attitude. This was particularly relevant to monitoring and understanding major changes in support for biotechnology applications in 2007, as outlined in the public attitude research section.
   Key success factor: Properly funded research that allows for more complex analysis of the public provides a more complex understanding of public attitudes.

5. **Media Monitoring and Management**
   In an attempt to move away from being reactive to media coverage on biotechnology issues, both government and industry groups sought to better educate the media by sponsoring journalists to attend gene technology workshops to seek a broader and better understanding of the technology, its uses and regulation. Scientists were also trained in media skills to provide a broader spectrum of media commentators, who were viewed as trusted and informed. Media monitoring also allowed for a better understanding of the types of issues being raised in the public domain, which could then be correlated with awareness and attitudes in surveys of the public.
   Key success factors: Treat the media as a potential partner, and understand the needs of the media, rather than expect the media to run the news you want it to run.

6. **Public Outreach Activities**
   Through exhibitions at rural shows and shopping centers, publications and fact sheets, agencies were able to proactively provide effective community outreach and education to targeted members of the public.
   Key success factor: Best match the information with the audience.

Key principles for successful public engagement and communication

Ten key principles for Public Engagement and Communication were developed by evaluating the success factors for the above activities. These were:

1. Establish a position of trust.
2. Define the public debate – don't wait for it to be defined for you.
3. Establish strong partner networks.
4. Raise awareness over understanding.
5. Best understand drivers of public concerns and aspirations.
6. Continue dialogue with all players in the public debate.
7. Manage the media debate, don't be reactive.
8. Understand the diversity and nature of target audiences.
9. Capture the best key data available and package it in the most effective way for key audiences.
10. Use best-practice social research in developing strategies.

Communication about GM – Key lessons learned

"To progress in knowledge and action means to doubt what conventional wisdom suggests." – Aristotle

1. **Attitude towards GM foods is based on values, not knowledge or lack of knowledge, and attempting to change knowledge will do little to change attitude.**

   Facts and scientific logic cannot change ideas that were not formed by facts and logic in the first place.

2. **General attitude towards food is among the biggest predictor of attitude towards GM foods, with GM food concerns being comparable to concerns about artificial preservatives and chemical use in food.**

   Those segments of the population most concerned about artificial preservatives and chemicals and modern food processes are most concerned about GM foods.

3. **Public perception is more important than reality.**

   If the public perceives that their interests and preferences are not being addressed in the development of GM foods, then they are NOT being addressed.

4. **A large amount of people have a small concern about GM foods and a small amount of people have a large concern about GM foods.**

   Key values that underpin concerns are:
   - ***Unnecessary** – the same aims are attainable via other production methods.*
   - ***Unnatural** – GM is fiddling with nature and*
   - ***Unknown** – health risks are too high and we don't know enough about them.*

   Values that tend to predict a stance in favor of GM foods include:
   - *High **trust in science**;*
   - *High **trust in regulators**;*
   - ***Support for commercial development** of new technologies; and*
   - *A philosophy that supports **humans dominating their environment**.*

5. **To effectively communicate with the public(s), you need to think like the public(s) rather than expect the public(s) to think like you.**

   Scientific discussions are centered around questions such as: "What do we know?" and "What can we know?" – and tend to be science-based. Public *discussions focus around questions such as: "What don't we know?" and "What can't we know?" – and tend to be emotion-based.*

6. **There is a discord between what people say in surveys and how they actually behave.**

   People profess to shopping healthier and greener than they actually do, and despite saying they will not eat GM foods, will in fact eat them – and the longer they have been eating them the more likely they will continue to do so.

So…

In the Australian context, the values that predict the type of GM foods and crops that would be most likely to be accepted, are:

- have direct consumer benefits;
- have a modification of a gene that occurs in the organism, or from an organism that is closely related, with plants being preferred over animals;
- have direct societal benefits or align with societal values;
- be perceived as being not harmful to people or the environment;
- be developed with perceived consultation and regulation; and
- be present in food types consumed by those who are less 'health conscious'.

Which all means…

Aligning GM crops with public values, and then communicating that alignment, is the single most effective way to communicate about GM crops.

By framing the communication around the values (addressing environmental concerns, food security, etc.) and application (wheat modified to be more drought resistant) is more effective than framing the communication around the technology.

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