



appendix 3

Outcomes of Consultation: Submissions from the Public

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3.2 Strategic outcomes, issues and options

Background

Information about strategic issues and outcomes is sought from Warrant items under “Relevant matters”. Warrant items (k) and (m) request information on, respectively:

- the key strategic issues drawing on ethical, cultural, environmental, social, and economic risks and benefits arising from the use of genetic modification, genetically modified organisms, and products
- the range of strategic outcomes for the future application or avoidance of genetic modification, genetically modified organisms, and products in New Zealand

With reference to strategic options, the Warrant asks the Commission to receive representations upon, inquire into, investigate, and report upon:

- the strategic options available to enable New Zealand to address, now and in the future, genetic modification, genetically modified organisms, and products

Outline of this section

To present the views of public submitters, this section is divided into three parts:

- The first, addressing Warrant item (m), outlines the range of *strategic outcomes* public submitters identified as desirable for the main areas of public interest identified in the Warrant. These include human health (including biomedical, food safety and consumer choice); environmental matters (including biodiversity, biosecurity issues and the health of ecosystems); and economic matters (including research and innovation, business development, primary production and exports).
- The second addresses Warrant item (k) by describing the *strategic issues* raised by public submitters relating to the ethical, cultural, environmental, social, and economic risks and benefits arising from genetic modification. The issues they raised focused on acceptability, choice and risk assessment and management.

- The third part addresses Warrant item (1) by reporting public submitters' views about the *strategic options* available to enable New Zealand to respond to genetic modification, given their desired social, environmental and economic outcomes and the issues they raised about acceptability, choice and risk assessment and management.

Strategic outcomes

The vast majority (92 %) of public submitters were opposed to genetic modification (this is discussed further below and demonstrated in Table 3.2). The sort of social, environmental and economic world that public submitters sought could be inferred from their comments about why they generally rejected genetic modification. This section of the report summarises these desired outcomes, which relate to avoidance rather than application of genetic modification, with reference to human health, social matters (both nationally and internationally), environmental matters and the economy. Where possible, the ways that public submitters defined health, social matters, the environment and the economy are also included. In general, submitters opposed genetic modification and, therefore, only rarely outlined strategic options that would include use of genetic modification.

Health outcomes

Public submitters focused on two dimensions of health: treatment and prevention. While they identified both these dimensions as important, they tended to place slightly more emphasis on prevention. Thus, they tended to focus on factors that they considered as having an effect on their health. These included the environment in which they, and their children, lived and the food they ate. A smaller proportion of public submitters also wrote about the diagnosis and treatment of disease and other health-related conditions.

If submitters specified the sorts of health outcomes they considered desirable, they most often referred to the following:

- being allergy free
- being disease free or being exposed to fewer diseases
- living in a healthy environment, often defined as a natural environment
- having healthy children
- ensuring the health of the next generation
- ensuring that the next generation has the same access to, and choices about, health

- survival of the human species and the ecosystem in which humans live
- equal opportunity to health both within New Zealand and between nations. This covered both access to health care and affordability of healthy options (eg access to genetic modification-free food). Many public submitters were also concerned about health within developing nations and their equitable access to health outcomes
- having spiritual wellbeing and cultural health.

Environment outcomes

Environmental quality was of great concern to submitters, who mostly wrote about the indigenous flora and fauna of New Zealand and the physical landscape. Some referred to the environment in more ecological terms, with a minority including humans as part of the wider ecosystem or ecosystems.

In general, public submitters expressed a positive, often idealised, view of the New Zealand environment. Many described the natural and physical environment as pristine and clean and green and described that purity as enhanced by New Zealand’s nuclear-free stance. If public submitters doubted the pureness of the current New Zealand environment, they indicated the belief that, as one submitter wrote, “... it is still within our control to make this country a safe, clean, green Paradise!” Encapsulated in their concept of environmental virtue, was an assumption of New Zealand remaining genetic modification-free. Some people equated being genetic modification-free with embracing organic production while others argued that New Zealand could work towards fully organic production.

Social outcomes

The characteristics of public submitters’ desired social environment could be inferred from their comments about the aspects that would be lost through the application of genetic modification. These characteristics included:

- equity, within New Zealand, between nations and between generations. The aspects of equity most commonly raised included equal access to resources, acceptance of diversity (including ethnicity, culture, religious belief, ethical belief) and lack of discrimination (particularly relating to physical differences such as disability). Often those discussing equity issues did not elaborate further than their demand for equity and fairness
- individual and national self-determination, achieved through individual choice, individual or collective control over, or consent about, some important matters, recognition of human rights, individual or collective

feelings of safety, individual and collective (group or national) pride and acceptance of difference

- stability. Public submitters' desire for stability in the social environment to some extent equated with the concept of equilibrium in ecosystems. They wrote about harmony and certainty
- democracy, described as public input into decision-making and consumer choice.

Economic outcomes

The part of the economy most commonly discussed by public submitters was food production, particularly primary production and food processing. To a lesser extent, they also referred to other industries such as forestry, tourism, and fishing (both for food and recreation and tourism). Only rarely did they refer to biotechnology, including research and production.

Public submitters often talked about the economy as a dichotomy between locally owned industry (generally perceived as small and good), and multinationals (generally seen as large and bad). One submitter's comments summed up views of many, by describing multinationals as "... self-seeking commercial interests posing as world benefactors [who] apply seductive or threatening pressures. We must close our eyes and ears to them." They also tended to characterise New Zealand products, particularly from primary production, as high-quality and clean and green. This image of New Zealand's purity was seen as an important competitive advantage for New Zealand businesses that submitters worried could be threatened by the adoption of genetic modification. In general, however, submitters indicated that economic considerations are still of less importance than human health, environmental quality and social equity.

Public submitters' comments about the economy of the future and the economic outcomes New Zealand currently seeks, or should seek, reflected their widespread confidence in the future. Their views about the current state of the environment were similarly positive. A common view was that, with a genetic modification-free future, New Zealand would experience economic growth leading to national wealth and increased employment. As other countries adopted genetic modification they would necessarily be seen as "contaminated". New Zealand, because of its geographic isolation, would be the only producer able to guarantee a pure product and demand for New Zealand produce would be phenomenal. New Zealand's competitive advantage lay in the fact that "... as an island country we have every opportunity to be fully organic which carries no risk and is better for farmers, will feed people and not kowtow to large corps". This economic growth would be

based on small-scale production, particularly food production using organic processes, through locally owned industries. Such economic activity would enable New Zealand to be more self-sufficient, thus freeing the country from dependence on multinationals, the United States and other outside influences perceived as having unwelcome control over New Zealand's environment and economy.

Only a very small number of public submitters felt that genetic modification could prove an actual benefit to New Zealand's future, and many of those felt resigned to it rather than enthusiastic. These submitters felt that it is "... better to be carving our own destiny than to be impotent when one is imposed on us". Knowing that genetic modification is here to stay, these submitters would prefer to see New Zealand at the forefront of the technology rather than left behind.

Strategic issues

Public submitters raised a number of strategic issues around the use of genetic modification with respect to human health and environmental, social and economic matters. These include issues around consumer or public choice, risk and risk management, and acceptability.

Issues of choice

Whatever the area under consideration, public submitters were concerned about choice. These concerns related to personal and national self-determination and sovereignty. For many submitters this was the key issue, arguing that "... the cornerstone of any advanced society is that of an individual's freedom to make choices ...". For instance, public submitters argued their right to have choice over the state of the environment in which they lived (that is, whether it remained genetic modification-free), whether they would consume genetically modified or genetic modification-free food or whether they would accept genetic modification-based medical treatments. Thus, they considered strict labelling requirements for food and medical products an imperative.

Public submitters were also concerned about the impact of some people's actions on the ability of others to have a choice. For instance, they argued that any release of genetically modified organisms would preclude others from having a choice to produce or consume locally produced organic food. Many of the concerns raised about genetic modification in food were expressed in these terms. Public submitters expressed a desire to have non-genetically modified food available, accessible and affordable and many felt that the introduction of genetic modification would necessarily impair their choice.

Closely linked to submitter notions of choice was the ethical issue of consent. A substantial number of submitters concerned about issues of personal choice also discussed their right to consent to genetic modification in their environment. These submitters feared that they would be subjected to “the genetic modification experiment” without their consent. This issue was most often discussed in relation to food, but also in relation to medical applications. Submitters expressed a desire to know details of their medical treatment or what they were eating with the right to “opt-out” of anything involving genetic modification. A number of submitters saw evidence of this right being eroded in the cases of genetically modified insulin and the lack of a stringent food labelling regime.

Issues of risk and risk management

For most public submitters, the risks associated with genetic modification were perceived as too difficult to identify and potentially too great to contemplate. Benefits claimed by scientists and companies involved in genetic modification were seen as too few, obtainable by other means, and benefiting too few people (mainly multinational corporations) to justify an “... experiment, the consequences of which are unpredictable, uncontrollable, and potentially irreversible”. Information about risks associated with genetic modification is poor. Therefore, submitters argued, the concept of risk management is inherently flawed, and they:

... would like to see the dubious science of ‘risk management’ explained and debated thoroughly by the public. Risk management assessments are constantly used as a justification for genetically engineered experimental and commercial cropping yet many of us find the reasoning and application of risk management bizarre, insane, incorrect and collusive with the interests of big business.

The majority of commentators argued that risk avoidance, through the rejection of genetic modification, was the only responsible way forward.

Public submitters perceived risk assessment as difficult because the contexts (for instance, ecosystems, human bodies) within which direct and indirect impacts potentially occur are complex. Therefore, the types of impacts, their location, timing and cumulative effect cannot be predicted with any certainty. Given these difficulties, some submitters questioned the ability of agencies responsible for assessing risk to assess that risk. In particular, submitters were concerned about the assessment of food and the capability of the American Food and Drug Administration (FDA) and the Australia New Zealand Food Authority (ANZFA) to assess food safety adequately.

Submitters expressed concern that regulatory agencies were too lax in their risk assessment techniques, accepting the safety studies produced by companies at face

value without conducting their own independent trials, and focusing too narrowly on the tests in question. Submitters were concerned that wider environmental impacts of genetic modification were being ignored, citing, for example, a study initially passed by the Environmental Risk Management Authority (ERMA) that later needed closer scrutiny when it was discovered that genetic modification waste products were being ejected without treatment into the sewer system. A few submitters likened the situation to the introduction of possum and ferrets into New Zealand without consideration of the wider impact on indigenous flora and fauna.

However, submitters also argued that, regardless of the difficulties of assessing risk, these agencies and others need to continue assessment processes and pursue approaches to improve their assessment techniques. The submitters' comments demonstrate a conundrum. On the one hand, they want a 100% guarantee that current or potential use of genetic modification technologies (eg, for health care and food production) are safe. But on the other hand, they believe that current assessment skills and techniques cannot provide certainty around safety and many do not trust the organisations concerned. Many submitters view company research as biased and regulatory agencies as compromised by links to industry, citing the "revolving door" as evidence of a biased system:

Many of us like to think we are living in a democracy, not a dictatorship run by Multinational Corporations and large Food Manufacturing Companies, who manipulate governments and their appointed agencies including the FDA, ANZFA and ERMA. People with a long history of employment in these Multinational companies are too often found in these agencies and I do not believe that they are therefore capable of making unbiased decisions for the people's good.

Given this conundrum, public submitters recommended caution. A high number of submitters suggested applying a form of the precautionary principle emphasising safety, in which the onus is on the producer to guarantee safety, rather than on others to prove risk. "When in doubt, don't" is a submitter's quote that sums up this view, emphasising that genetic modification should not go ahead until and unless it is first proven safe.

Submitters outlined core principles required of any risk management approaches adopted. These included corporate responsibility and liability with regards to unintended consequences (the 'polluter pays' principle), the independence of risk assessment and risk management agencies, giving priority to considerations such as safety over profit and a strong regulatory framework.

Issues of acceptability

For the small proportion of public submitters who discussed the use of genetic modification to achieve particular outcomes, its acceptability depended on a range of factors, particularly the cultural, ethical, religious and/or value stance of themselves or identified groups. For instance, the use or manipulation of human genes would be unacceptable for Maori, given human beings' tapu status, as would the inclusion of pig genes in food for Jewish and Muslim people and the inclusion of any animal genes (including dairy products, eggs and so on) in food for vegans. One vegetarian submitter described her concern that:

... many vegetarians feel threatened by GM because genes taken from animals are being copied and used in vegetables. Despite the fact that scientists argue that the genes which are being used are only exact copies of animal genes, most vegetarians, including myself, would never consider this sort of reasoning to be acceptable.

Other factors also identified, but less frequently, as influencing the acceptability of genetic modification included:

- the nature of benefits gained, to people, the environment or the economy
- submitters' personal health status or that of close relatives or friends
- submitters' occupations or involvement in particular economic activities.

Given these factors, genetic modification technologies may be acceptable if they enhanced environmental quality, but unacceptable if there is risk of developing pests such as "super-weeds", increasing herbicide resistance or cross-species gene transfer. They may also be unacceptable if they interfered with, or undermined, the integrity of the environment. For many submitters, any interventions to the environment that altered its original state were perceived as unacceptable. They used terms like "as God intended" and "as Nature intended" to explain their valuing of the environment in its natural state. Often these submitters were concerned that "... human beings behave as if we are outside Nature instead of realising we are part of it." These submitters included people arguing from a generic ethical perspective, a Maori perspective, a Jewish perspective, vegetarian and vegan perspectives and an economic perspective (particularly as organic farmers).

Some submitters were very concerned with animal rights, writing that "... many people prefer to live in a world which is moving away from the cruel treatment of animals and will oppose genetic engineering ..." and refused to sanction any uses of genetic modification in which animals were exploited. This included the production of animals genetically modified for xenotransplantation, the production of human health treatments and vaccines, and the use of animals in research. These concerns

transcended the genetic modification debate, with these submitters being:

... opposed to GM in medicine where animals are used, eg where it involves the inhumane use of animals, eg 'spare parts' animals. I believe that animals should have no role in the treatment of human diseases.

These submitters were adamant that human beings do not have the right to tamper with the genetic make-up of other animals merely to improve their own condition.

Strategic options for genetic modification

Public submitters were overwhelmingly opposed to genetic modification in New Zealand (see Table 3.2). They viewed the introduction of genetic modification as inconsistent with, or threatening to, their environmental, social and economic aspirations. Their anxieties about genetic modification were compounded by their doubts about its acceptability to various groups, their scepticism about the possibility of risk assessment and risk management and their concerns about loss of choice.

The strategic options available to enable New Zealand to address genetic modification, as identified by public submitters, reflected their general anxiety about the technology. Most submitters (9,695 of the total 10,861) made some references to how New Zealand should respond to genetic modification. Nevertheless, as Table 3.3 shows, some of these submitters did make exceptions to an overall rejection of all genetic modification activities. These related to their acceptance of New Zealand's pursuit of certain health, environmental and social outcomes (discussed previously), the achievement of which could be aided by the application of genetic modification.

Table 3.3 shows that over half the submitters who commented on New Zealand's strategic options clearly rejected any application of genetic modification. A significant number of these expressed two opinions, preferring a complete rejection of genetic modification, but also recognising that they might not be able to halt it. Therefore, they demand, at the minimum, a strict labelling regime to allow them the choice to avoid genetically modified products. A further 26.4% indicated a strong objection to genetic modification, but wrote predominantly about food. It was not clear from their comments whether they accepted other applications or not. Only small proportions of submitters were generally accepting of genetic modification, always well less than 1% suggesting strategic options that allowed for any widespread application. When considering risk assessment and risk management options, public submitters were far more likely to suggest a precautionary approach and most unlikely to suggest genetic modification application in the absence of firm controls.

Table 3.2 Public submitters’ general stance on genetic modification (n = 10,861)

Stance on genetic modification	Number	%
Strongly against	7035	64.8
Tends to be against	2963	27.3
Neither for or against	659	6.1
Tends to be for	132	1.2
Strongly for	72	0.7

Differences between public submitters were slight, with the vast majority indicating a preference for minimal genetic modification activity. However, there were some differences between organisations and individuals or groups of individuals. In particular, organisations were more likely to be accepting of application of genetic modification than individuals or groups of individuals, but also more likely to suggest the need for a strong regulatory framework. This is not surprising, however, as a regulatory framework would not be needed if genetic modification was rejected altogether — the preference of most submitters.

Some public submitters highlighted uses of genetic modification they would be willing to allow under certain conditions. The range of acceptable applications identified by public submitters is discussed below, under four headings:

- health-related options
- environment-related options
- social-related options
- economy-related options.

Health-related options

Most exceptions to a total ban on genetic modification related to the pursuit of health outcomes. Given their focus on both prevention and health treatment, the strategic options identified reflect public submitters’ interest in maximising both prevention and treatment opportunities. When commenting on health prevention, submitters focused mainly on environmental quality and food production and

Table 3.3 Strategic options for genetic modification in New Zealand (n=9,695)

Strategic options orientation	Number	%
<i>Generally accepting of GM</i>		
Accept most GM uses but within a strongly controlled regulatory framework	42	0.4
GM use except for a limited and selected range of excluded activities	40	0.4
Embrace all aspects of GM	39	0.4
Accept most GM uses	25	0.3
Adopt GM because its use is an inevitable global phenomenon	22	0.2
Embrace all aspects of GM technology within minimalist regulatory framework	6	0.1
<i>Generally reject GM</i>		
No GM, no GMOs or GMPs permitted in New Zealand	5461	56.3
No GM for a specified use (often food-related), no comment on other uses	1546	15.9
No GM in food, no comment on other uses	1014	10.5
GM free except for a limited and selected range of uses	552	5.7
<i>Risk assessment and risk management options</i>		
Need strongly controlled regulatory framework (particularly for food labelling)	979	10.1
Continue moratorium (whether voluntary or compulsory) pending further research	777	8.0
Wait and see what happens overseas	404	4.2
No patenting of GM products	236	2.4
Case by case assessment balancing risk against benefit (taking cautious approach)	184	1.9
More consultation with the public	137	1.4
Need minimalist regulatory framework	6	0.1

Multiple response

processing. When commenting on health treatment, some submitters also commented on health research into treatments. The widespread demand for a ban on genetic modification of food and food products was usually argued on health grounds.

To achieve health outcomes through health treatments, submitters identified a range of exceptions to a total rejection of genetic modification. These ranged from general support for the use of genetic modification in health (in contained laboratory settings and with strong controls and risk management) and/or treatments to genetic modification technologies in the treatment of specific health problems, including multiple sclerosis, diabetes, arthritis, Attention Deficit Disorder, cancer, Huntingtons chorea and Parkinsons disease.

Submitters were more likely to support non-targeted genetic modification application for a range of health problems than targeted use for specific health problems. Examples of specifically defined exceptions to applications of genetic modification included:

- any intra-species uses (genetic modification within a species)
- any inter-species uses (genetic modification between species)
- any application to inheritable genes such as for Huntingtons chorea. A few submitters rejected such applications as undermining human diversity and denying the legitimacy of human imperfection.

Environment-related options

Exceptions to a total ban on genetic modification were also identified for the achievement of desired environmental outcomes. These environmental outcomes related to both environmental quality, for instance through pest control, and environmental enhancement, for instance through enhancing biodiversity and revegetation. Thus, for a very small number of submitters the application of genetic modification technologies may be acceptable for:

- eradicating pests such as possum, Old Man's Beard, gorse and rabbits
- treating pollution such as oil spills
- revegetation of indigenous species
- recovering extinct species or saving threatened species
- reducing the use of pesticides and insecticides.

Social-related options

A few submitters also identified exceptions to a total ban on genetic modification to achieve social outcomes. These social outcomes usually related to equity issues,

within New Zealand, between developed and developing nations, and between current and future generations. Thus, some submitters accepted the use of genetic modification to address particular equity issues such as a reduction in the costs of food. However, the vast majority of submitters who commented about equity issues in relation to food argued that the distribution of food was at the heart of problems around food supplies rather than the production of sufficient food. They were also distrustful of “miracle claims” surrounding genetically modified crops, highlighting studies in which promised benefits (‘super yields’ for genetically modified crops, and supposedly vitamin A-rich ‘Golden Rice’) failed to materialise. There were some submitters who had few qualms about genetic modification in itself but were worried about the economic and ethical framework in which it is occurring. Their primary concern was that private, corporate interests are exercising complete control over new developments, developing genetically modified products in areas of highest profit while simultaneously restricting independent research into other benefits. This concern was best expressed by submitters who felt that “... the profit motive has no place in GM-research.” For these submitters, the capitalist system and the market economy should have no place in such fundamental research. These submitters were happy to see more research and development of genetically modified products (usually in contained situations, but sometimes more widespread) if it was under strict public control and scientists were known to be working for the benefit of humanity.

Economy-related options

Public submitters were far less equivocal about the strategic use of genetic modification to achieve economic outcomes. Because most public submitters saw New Zealand’s economic future in organic and genetic modification-free primary production, they were less likely to accept any use of genetic modification technologies. While some accepted some laboratory-based research, very few could see field trials or release as consistent with their preferred economic future. A great number of submitters saw genetic modification as having the potential to destroy the New Zealand economy, for instance through massive crop failures, evaporating global demand for genetically modified products, or over-reliance on foreign corporations.

Although many submitters argued that genetic modification would lead to worsening public health, some argued that the use of genetic modification in health treatments would have economic benefits, given a reduction in health costs. Some public submitters argued for a continuation of what they assumed to be closely controlled use of genetic modification in laboratory settings, to achieve

economic outcomes and to enable New Zealand's participation in the global biotechnology sector. In extremely rare instances, public submitters argued for minimally controlled use of genetic modification to achieve economic outcomes.