

chapter |

5.

Economic and
strategic issues

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Key question:

Will genetic modification technology enhance or damage New Zealand's economic and strategic prospects in terms of:

- international competitiveness
- the knowledge economy
- trade?

Purpose of this chapter

1. The Warrant states that the Commission may investigate and receive representations about (among other things):

... economic matters (including research and innovation, business development, primary production, and exports).

2. The broad macroeconomic issues and the future strategic direction of New Zealand have pervaded the discussions of the impact of genetic modification. In chapter 2 (A shared framework of values) we looked at the values we consider relevant in the debate about genetic modification. Of those values, those most relevant to this chapter are “being part of a global family”, “the well-being of all” and “freedom of choice”. In this chapter we discuss and attempt to balance the many perspectives we heard on economic and strategic issues.

3. This chapter contains points made by submitters that we consider important and on which we will draw in making our major conclusions in chapter 13.

4. Some submitters contended that to have no genetic modification technology in New Zealand would have negative net effects on the New Zealand economy. Others stressed that New Zealand's organic economy should be allowed to fulfill its potential, and that New Zealand's “clean green” image should be enhanced rather than undermined. We are aware that all systems of agriculture are currently evolving and interacting positively with each other. The question of international consumer preferences in our export markets is important to New Zealand's future. We consider that they cannot be accurately predicted at this time and we want all

sectors of the economy to be able to grow to meet export demand, whatever it may turn out to be.

5. The table below shows New Zealand's commodity exports as a percentage of total exports, and the percentage growth in each export sector from the year ended February 2000 to the year ended February 2001. Major commodity exports dominate, with "milk and milk products" the largest of these.

New Zealand: Exports of Main Commodities

Commodities fob, including re-exports, data for 12 months ended February*		
Commodity	% of total, year to Feb 2001	% increase, year ended Feb 2000 to year ended Feb 2001
Milk and milk products	20.1	33.7
Meat and meat products	12.7	22.7
Wood and wood products	9.5	27.2
Mechanical & electrical machinery and equipment	7.7	26.7
Wool, leather and textiles	7.0	19.0
Fish and seafood	4.4	9.4
Aluminium and aluminium articles	4.2	26.3
Fruit and nuts	3.7	0.6
Petroleum and petroleum products	2.0	61.6
Iron and steel and articles	1.7	8.1
Other commodities	26.8	3.8
Total merchandise exports	100.0	
Average % increase, 2000 to 2001		24.0

*Data for December 2000, January 2001 and February 2001 are provisional.
Source: Statistics New Zealand. fob = free on board.

Will genetic modification technology enhance or damage New Zealand's economic and strategic prospects?

International competitiveness

Likelihood of enhancement

6. Some submitters, particularly producer boards and some private companies, believed that genetic modification technology would be important for New Zealand in maintaining its international competitiveness. The Association of Crown Research Institutes [IP22] considered in its written submission that:

New Zealand's future can only be assured if it can develop new competitive products and services able to capture premium prices because of the nation's capacity to innovate. ... genetic modification technologies provide a rare opportunity for New Zealand to position itself in the global competitive economy. The key to a bright future is for New Zealand to capture the benefits of research, science and technological innovation.¹

7. Many submitters said New Zealand's international competitiveness would be enhanced by use of genetic modification technology. The New Zealand Forest Industries Council [IP9] and Carter Holt Harvey/Fletcher Challenge Forests [IP17] both said in their submissions that biotechnology can make an already sustainable industry even more sustainable by improving profitability and environmental performance and enhancing international competitiveness.

8. New Zealand Biotechnology Association [IP47] considered in its submission that genetic modification had the potential to "lift New Zealand's economic performance and quality of life",² while New Zealand Vegetable and Potato Growers' Federation/New Zealand Fruitgrowers' Federation/New Zealand Berryfruit Growers' Federation (Vegfed, Fruitgrowers, Berryfed) [IP75] told us that genetic modification offers the potential to reduce production costs through a reduction in inputs. These lower production costs are likely to improve New Zealand's international competitiveness and result in a higher level of investment, giving higher production, employment and export opportunities.

9. In its written submission, Genesis Research and Development Corporation [IP11] explored the matter of international competitiveness in some depth in examining the possible benefits of genetic modification technology to New Zealand. Genesis Research and Development considered these to be:

- Immediate job creation as part of the knowledge economy. Almost all these positions were new jobs to the economy, and most staff were well qualified

and well paid. There would also be downstream employment effects from these new jobs.

- Expansion of the highly skilled workforce. The average age of the workforce in a start-up biotechnology company was typically young, and many new or recent graduates were employed. According to the 1999 World Competitiveness Report, well-qualified New Zealanders were twice as likely to emigrate as those in the United States. Technology companies such as those in the biotechnology sector would help limit this brain drain of science graduates.
- Attraction of foreign investment and shareholder wealth. New biotechnology companies often traded at a loss in their early years until they could make income from royalties or sales. During this time they might be financed by investment from overseas partners. Successful products would create wealth for New Zealand shareholders and also contribute directly to the New Zealand economy through the payment of tax and other effects.
- Maintenance of a competitive economy. Genetic modification technology was research and development intensive. Investment of this type was being made in various parts of the world. The prerequisite to enter this growing economic sector was venture capital, an innovative research idea and a skilled workforce. All of these elements, not least the skilled workforce, were very mobile between developed nations.

10. New Zealand Biotechnology Association considered in its written submission that genetic modification technology would benefit all New Zealanders because of its positive impact on the national economy, and the resultant increase in our standard of living. Conversely, if we turned away from genetic modification our country would lose ground to the developed nations of the world, and we would all be subjected to a decline in our quality of life.

11. At hui, public meetings and in the formal process, some Maori groups expressed a willingness to consider the use of genetic modification technology on their land. The Federation of Maori Authorities (FoMA) [IP69] said in its written submission that, while there was much that was not yet understood about biotechnology, theoretically at least, it could be of great use to Maori. It was potentially a means of managing the commercial operations of Maori authorities in a sustainable and ecologically sound way; reducing production costs and improving product quality, thereby increasing earnings.

12. FoMA made other points about the potential economic benefits of genetic modification to Maori, saying that those Maori landowners who were in a position to do so could invest in and undertake joint ventures with biotechnological

research and development companies. It also considered biotechnology should be recognised as a potential catalyst for further productivity throughout the primary production industries and for greater economic growth in the domestic New Zealand economy.

13. In its public submission, Te Puni Kokiri noted possible economic benefits for Maori from genetic modification:

Maori could possibly gain some economic benefits from the genetic modification of plant and animal stocks. For example, some Maori corporates and landowners could benefit from genetic modification, research and development, and as users of resulting genetically modified organisms.³

Chances of damage to New Zealand’s economic prospects

14. A range of submitters, in particular those from the organics sector, expressed deep concerns to the Commission about the possible negative economic impacts of genetic modification in primary production on the future of New Zealand’s export industries. The Organic Product Exporters Group (OPEG) [IP53] represents nearly all companies currently exporting organic products from New Zealand and includes all organic certifiers.

15. OPEG, in its written submission, said consideration should be given to the negative implications for organic producers of the commercial use of genetic modification technologies in primary production. OPEG foresaw potential damage from genetically modified organisms being released into the environment: contamination of organic products, the reputation of New Zealand’s organics industry and the erosion of the “clean green” image of New Zealand, so important for marketing New Zealand’s products and services. OPEG stated that, if organic products were contaminated by genetically modified elements, organic certification for the product would be lost as no current organic production standards in New Zealand allow for such contamination. It also believed that companies’ reputations, brand values, and the market reputation of the whole organics sector, would suffer if contamination were to occur. OPEG considered the negative effects would extend to other sectors similar to organics. These included Integrated Pest Management (IPM) systems, conventional producers not using genetic modification and the tourism sector.

16. Dr Caroline Saunders, Associate Professor of Commerce at Lincoln University, and a witness called by OPEG, told us that an economic analysis of the performance of genetic modification in primary production in New Zealand could not be carried out as genetically modified organisms had not been commercially released here.

17. Looking at overseas evidence, Dr Saunders noted: “Despite current commercial release of genetic modification benefiting producers in reducing costs and/or increasing yield, how far this has translated into actual increased producer returns is questionable”.⁴ She also noted the definite shift in consumer preference away from genetically modified food and the increased demand for genetic modification-free food, particularly in the Japanese markets and the key retail outlets in Europe. Dr Saunders said economic impacts of genetic modification included some benefits, such as the patents developers of technology might be able to obtain. However, she commented that these benefits might be less certain for New Zealand as most of the marketing and developers of technology were overseas.

18. The written submission from ZESPRI International [IP46], the marketing organisation for New Zealand kiwifruit, expressed concern about the potentially negative impact that commercial genetic modification production might have on New Zealand’s kiwifruit industry, particularly on exports to Europe, Japan and Southern Asia.

19. The written submission from the New Zealand Council of Trade Unions [IP95] stated “New Zealand should not allow the release and commercial application of genetically modified organisms as the damage to our trade could be of great significance”.⁵ The Council of Trade Unions noted that 70% of New Zealand exports were currently based on primary production and were principally exported to developed country markets. The Council was concerned that continued access to these markets might be compromised by a genetic modification-based exporting strategy “unless there is a startling turnaround in consumer perceptions of the acceptability of genetic modification foods at the niche end of the market”.⁶

20. Similarly, the Royal Society of New Zealand [IP77b] stated in its written submission that current economic analysis of the use of genetically modified organisms in commercial land-based production of food, fibre and nutraceuticals suggested “there may be benefits if New Zealand delays a decision on commercial release”.⁷ The Royal Society noted that the first wave of genetically modified food products had performed poorly in global markets and that this situation was unlikely to improve in the medium term.

21. Dr Hugh Campbell, a social geographer called as a witness by OPEG, introduced to the Commission the term “the greening trajectory” which encompasses organic production and IPM. Dr Campbell told the Commission that the comparative advantages for New Zealand from the use of these techniques were “moderately good” because of the high natural endowment of its growing

environment, its established international linkages and its early market position, but that for genetic modification techniques there were few comparative advantages for New Zealand.

22. Dr Campbell said that the introduction of genetic modification organisms into the environment would have several impacts at the level of the individual grower:

Organic producers already face costs resulting from a variety of testing procedures to prove the purity of their product. However, the extent and cost of testing for possible genetic modification contamination is not known. Some current testing regimes cost organic growers up to \$1000 per annum, but it is speculative as to whether genetic modification tests would cost a similar amount.

It is important to note that a limited genetic modification industry operating as a minority aspect of some sectors would not destroy organic production through physical contamination by genetic modification crops and no members of the organic industry make such a claim. There are clearly extra costs that would be imposed but these would not be overwhelming to the majority of organic growers. The threats posed to organics only escalate dramatically if genetic modification production becomes widespread.⁸

... the emergence of pest resistance cannot at this stage be calculated without knowing the extent and nature of potential genetic modification horticultural crops. Any impacts that might eventuate, however, would have considerably larger economic implications for IPM crops than for organic due to the mere scope of these developments.⁹

Being technologically ready

23. Many producers significant to the New Zealand economy told us they wanted to keep their options open by being ready for changing international market demand and not lose ground in comparison with their international competitors. For example, New Zealand's producer boards would like to be able to carry out research that would enable them to have the technology ready to apply, if in the future the international market demand shifted in favour of tolerance of genetic modification. Vegefed, Fruitgrowers, Berryfed told us that:

The organisations we represent have in the past two or three years been through ... a detailed foresighting process ... and, probably one of the overall issues that's come out of that whole process is this concept of being technology ready. The Industry needs the people, it needs the science, and it needs the capability to maintain those so they are there to use when we're ready ... the industries haven't specifically referred to genetic modification and gene technology in that area, but it is one of a number of areas where we believe we need to be technology ready.

So, able to service the market at short notice, rather than having to build capability to be able to service the market. By the time we build the capability to get there, someone is likely to have beaten us to the market. So, we need to be technology ready, we need to be able to deliver these products very quickly into international markets.¹⁰

24. Warren Larsen, Chief Executive Officer and a witness for the New Zealand Dairy Board [IP67], told us under cross-examination that the Board would like to be able to use the technology:

... tomorrow, or today, because the opposition are clearly moving fast down this path. And what's happening is that unlike in the past few years where a big multinational corporation would try to spread its efforts over all of the categories, we observe now where they are specialising in particular areas. One in processed cheese, another in ice cream, another in fats and oils, another in liquid milk and another one in chilled dairy desserts and yoghurt. Now, we are trying to carve out a niche for ourselves globally as well, and these players are getting bigger, they are occupying these segments in depth, their knowledge capability unashamedly is their key objective, and we cannot afford to not be in that race. So, all of this knowledge and capability, we really need now. And I... think we ... have been slow to really grasp the nettle in a biotechnology area.¹¹

25. Dr Kevin Marshall, Group Director for Global Research and Development, added that:

Our competitors are moving very rapidly. We have been told that Nestle, one of our big competitors, has something like 100 people working in this area of gene technology. We will rapidly get behind if we don't move quickly.¹²

26. John Yeabsley, a Senior Fellow of the Institute of Economic Research and a witness for the Dairy Board, expanded on this issue in his witness brief:

Competitors are continually looking for new ways to replicate success so as to transfer the value in existing NZDB business to themselves.

So looking closely at all the future options for development is an important part of ensuring that the New Zealand dairy industry fully capitalises on the present advantageous position it has reached. Biotechnology, poised as it is on the verge of changing the workings of many markets, is an obvious avenue to pursue; and one in which it would be expected that the NZDB would have a relative advantage.

... there seem to be degrees of concern among potential consumers as to where the products fit into their preferences. A reasonable presumption might be that there would be fluidity in people's views for some time. In the meantime, there will also be additions to knowledge about the potential and actual modes of employment, as well as the risks of, biotechnology. So the businesses with prospects in this field have to remain in a position to react to rapidly evolving science, which may offer bright prospects, and equally to shifts in consumer sentiment, which could also be radical.¹³

27. The New Zealand Wool Board [IP30] said in its submission that New Zealand should have a strategy that:

... allows farmers and companies to pursue GM opportunities where they offer advantages, ... the successful producers will be those that are responsive to the trends in world markets – which will all be moving, but in unpredictable directions and at unpredictable speeds.¹⁴

28. The Commission fully endorses these views and agrees that New Zealand should be in a position to take advantage of emerging international trends and have every opportunity to maintain and enhance its competitiveness.

Commodity or niche products?

29. Some submitters suggested that as a country New Zealand should move the focus of its exports away from commodity products, which tend to be produced in large quantities and are sold in a relatively undeveloped state. They favoured the production of a wider range of value-added products targeted towards niche markets, where higher prices could be obtained because of the specialised nature of the products.

30. We note from the written submission of AgResearch [IP13] that returns from many of New Zealand's commodity exports have dropped because of a steady decline in commodity prices for the last several decades. This has forced New Zealand to look for new opportunities from which to gain leverage from its primary production base, to develop new niche products with high added-value returns, many of which could be based on genetic modification and other biotechnologies. Veterinary and human medicines are included among new high added-value niche products generated by genetically modified animals or crops. In the opinion of AgResearch, opportunities like these are vital to a competitive agricultural sector, besides allowing a reduction in chemical inputs to high-volume food and commodity crops. HortResearch [IP5] made similar points in its submission, saying that New Zealand could not base its future on commodity production.

31. The perception of commodities and niche products as mutually exclusive alternatives was seen as a “red herring” in Dr Janice Wright's background paper on the economics of genetic modification.¹⁵ Dr Wright said that New Zealand already had a mixed economy in which both commodity and niche products are important. The Green Party of Aotearoa/New Zealand [IP83] took this view in its submission also, saying that the choice was not a black and white one.

32. Similarly, Dr Wright said that to see the adoption of genetic modification technology and a national commitment to organic agriculture and horticulture as alternatives was another “red herring” choice. In reality a decision to refrain from

genetic modification was very different from a decision to “go organic”. Currently we had a mixed economy that included non-genetically modified, land-based conventional production, IPM production and an organics sector.

33. However, Dr Alex Sundakov, a witness called by the Wool Board, commented that:

Over time all niche businesses become commodities. For example, one of the cheapest commodities in the world today is the personal computer. Moreover, as particular product features become widespread, they tend to turn from an advantage to a liability. For example, being able to trace product origin back to the farm initially offered some producers a competitive advantage, and attracted a price premium. However, since traceability has become a general requirement, it no longer confers any premium, but continues to impose costs ...

In competitive agricultural markets, commodity prices generally tend to reflect production costs. For example, as production costs of “organic” foods decline, so do their prices. The increased availability of such foods also reduces their profitability. To the extent that world markets do not require their products to be genetic modification free, reduced costs arising from genetic modification will lead to lower prices.¹⁶

34. Dr Sundakov suggested that, from an economic point of view, the best strategy would be to allow producers to make their own assessments of market trends and opportunities, thereby “taking a large number of bets” and enabling New Zealand to adapt to changing market situations:

In the face of uncertainty over demand patterns, supply patterns and prices in world markets, economic analysis suggests that it would be a high cost strategy to ban the release of genetic modifications. New Zealand needs to be able to pursue all opportunities for selling products at the best prices whether genetic modification or not; so long as producers using genetic modifications do not contaminate the production of genetic modification free producers. New Zealand will make the greatest gains from investing in lots of innovations aimed at all the world markets as they evolve, rather than by restricting itself from the new techniques when possible harmful effects on other parties and the environment can be contained or managed in other ways.¹⁷

Costs of avoiding genetic modification technology

35. We heard evidence that New Zealand faces significant economic risk from complete avoidance of genetic modification technology. Avoidance would impact particularly heavily on industries focused on research, on research institutes and on universities.

36. The Dairy Board expressed concern in its submission, echoed by others, that: The major social and economic risk to New Zealand (and to the New Zealand dairy industry in particular) is that the New Zealand dairy industry will be prevented from developing

and using genetic modification, while its competitors are not. The New Zealand dairy industry is uniquely placed to benefit from research and development into, and possible commercial use of, genetic modification technologies. These are essential tools to the New Zealand dairy industry in maintaining its competitive position. If the New Zealand dairy industry is prevented from using these tools, they will be locked up by the very type of multinational corporation seen as posing a threat. The threat to New Zealand from such corporations will be increased, not decreased, by a ban on genetic modification use.¹⁸

37. The Association of Crown Research Institutes said in its submission that “the economic risks in avoiding genetic modification were significant as the technology offered significant strategic opportunities for New Zealand. The benefits from niche genetic modification products flowed on to all New Zealanders.”¹⁹ HortResearch said in its submission that it believed it had a responsibility to maintain its research in this area to keep strategic options open for New Zealand horticultural industries in the future.

38. New Zealand Forest Research Institute [IP2] told us that “if New Zealand wishes to play a role in international forestry science, it needs to be researching at the forefront of technology. Similarly, New Zealand’s forest industry will suffer a loss to its competitive advantage if it is prevented from applying state of the art technology.”²⁰

39. Lincoln University [IP8] considered in its written submission that denying access to genetic modification techniques would deny researchers access to valuable research information and reduce significantly the ability of individuals to develop their research to a high intellectual standard, and of industries to develop their products and markets.

40. Some submitters such as Biotenz [IP25] expressed concern that, if there were increased levels of regulation of research involving genetic modification, this would ultimately be paid for by the taxpayer through higher research costs, and by the consumer through higher prices. These increases in cost had to be balanced by a comparable increase in the level of safety provided by the increased degree of regulation. A comparable point was made by Matthew Kent, a PhD student and witness appearing for Lincoln University, who claimed that additional regulation would manifest as reduced scientific productivity, the suppression of scientific inquiry, the migration of professional scientists overseas and a reduction in student quality and performance within New Zealand. Mr Kent considered that both in the long and short term any additional restrictive changes in legislation would adversely affect the image and quality of science, and would result in a significant economic and social loss to New Zealand.

“GE-Free” and exclusively organic farming options

41. Many submitters suggested the best strategic direction for New Zealand was to be free of genetic modification. For example, Commonsense Organics [IP66] considered that “New Zealand has the opportunity to ‘brand’ itself as genetic modification-free with particular benefits to the expanding organic industry”.²¹ The Royal Forest and Bird Protection Society, Marlborough Branch [IP40] agreed that “New Zealand could obtain a global economic advantage from maintaining GE free agricultural and horticultural crops”.²²

42. The Bio Dynamic Farming and Gardening Association in New Zealand [IP61] considered in its written submission that strategic outcomes and opportunities would arise from New Zealand being an organic nation. It believed New Zealand should be exploiting its natural resources in a sustainable manner and that, although not in a position to be able to feed the world, New Zealand was in a perfect position to be able to offer to the world the world’s “best holistic food quality”.

43. In her public submission, Ute Bassermann said the demand for organically grown, genetic modification-free products in Europe was big: “Here I see a good chance for New Zealand to better its negative trade balance. Organic food production offers great opportunities for many healthy, worthwhile workspaces. New Zealand can finally live up to its clean green image by becoming an organic nation by 2020,” she said.

44. The Pesticide Action Network New Zealand [IP87] believes that New Zealand should become genetic modification-free, not allowing any outdoor genetic modification technology or commercial developments, and that instead we should channel our energies towards becoming an organic nation.

45. The Green Party said: “Given the trend in the demand for organic products, the Green Party believes that releasing genetic modifications into our environment would squander a great opportunity to develop a perfect niche for New Zealand.”²³

46. Dr Saunders considered that New Zealand had a unique position. As an island nation without the threat of cross-pollination from genetically modified crops it could maintain a genetic modification-free status, unlike many continental countries. Even countries like the United Kingdom had problems with the cross-pollination of canola and other crops. New Zealand was thus uniquely placed to take advantage of any shift in consumer preferences towards genetic modification-free food. In accepting genetic modification there was a risk of losing this genetic modification-free status.

47. In his public submission, Andrew Hubbard stated that because of its geographic isolation and consequent ease in applying strict biosecurity, New Zealand was one of few countries that would be able to guarantee genetic modification-free food.

48. Some Maori expressed a preference for organic methods. Toko Te Kani (Ngai Tamanuhiri), Chair of the Turanganui-a-Kiwa Kaumatua Council, speaking at the Gisborne regional hui, told us:

If I had my way, I'd totally ban all herbicides and the use of sprays in that form and encourage everyone to go into organic farming. Since the advent of organic farming through the likes of Watties and those sorts of firms ... with sweet corn locally, the returns have been much higher than ordinary sweet corn. Same with tomatoes.²⁴

49. At the Ngaruawahia national hui, Teremoana Jones (Nga Puhī) represented Te Tai Tokerau Organic Producers Incorporated Society (TOPIS). She told us that:

TOPIS opposes absolutely any activities that modify or assist in modifying in any way the gene compositions of flora and fauna either native or introduced ... TOPIS was formed over several years ago by a group of concerned citizens, both Maori and Pakeha in the Tai Tokerau who are concerned enough to want to grow a clean uncontaminated food.

The members of TOPIS represent a diverse range of interests, namely fruit growers, livestock farmers, honey producers, forest growers, agriculture, both salt and fresh water [fisheries], aroma therapy, essential oils, poultry farmers, earth worm farmers, flower growers, compost processors, organic producers, dairy producers and animal breeders. TOPIS policy: we oppose the field testing or production of any genetically modified food, food produce or food product.²⁵

50. At the Rotorua regional hui, Poihaere Morris (Ngati Awa) said:

That is where the Maori can lead the way because we have a lot of whenua that is just sitting there. Part of my project is gathering all the resources, the networks out there that can teach us how to turn our whenua to BIO-GRO certification. There's an opportunity there for anyone who wants to look at organics for the export market.²⁶

51. Te Runanga o Ngai Tahu [IP41] expressed its abhorrence of genetic modification and said it believed the benefits and control of this technology would accrue to "national and multinational companies, universities and researchers".²⁷ It stated that this loss of control would mitigate against its ability and desire "to act as kaitiaki for Te Runanga's taonga".²⁸

52. The Commission heard considerable emphatic evidence in favour of organic agriculture. Zelka Grammer, a tamarillo orchardist and nursery owner called by the Bio Dynamic Farming and Gardening Association, told us about her target market: "We seek the high end of the market for our exports, the

wealthy people with the means to buy the best food. Are they going to pay a premium for GE tamarillos?”²⁹

International obligations

53. Some submitters advised the Commission that a ban on genetic modification foods, crops, seeds, or imports of these or other genetically modified goods may put New Zealand in breach of its commitments under the World Trade Organization (WTO) and invite retaliatory actions by our trading partners.

54. Dr Campbell summarised the measures other countries had taken to protect their domestic agricultural industries and to allay the fears of consumer groups in their countries:

The WTO in recent years has attempted to move towards tariff reduction, and avoid the development of technical barriers to trade (TBTs). However, since 1995 there has been a tendency for European Union and Japanese mechanisms of trade protection to move away from TBTs in the form of tariff and price support, towards what is termed “green protectionism”. Green protectionism involves the indirect support of domestic agricultural producers, and the political appeasement of urban consumer group fears, by slowly increasing “environmental” and “food safety” criteria used to penalise food imports ...³⁰

55. Submitters told us they feared that if New Zealand banned genetic modification technology in its imports from other countries, those countries would use measures such as “green protectionism” against New Zealand’s exports. Horticultural exporters from New Zealand had begun to identify green protectionist barriers as early as 1992, and the emergence of these barriers had intensified since then. The WTO had attempted to control these measures stringently by identifying them as TBTs. A significant current trend in market access was the emergence of green protectionist barriers against products such as genetically modified imports.

56. In its written submission the Meat Industry Association of New Zealand [IP32] said that although retaliatory barriers could be imposed against New Zealand’s exports, it would not be easy to do so. Any retaliatory steps by other countries to limit food imports from New Zealand must be justified by sound science and could not be of indefinite duration. The Meat Industry Association also said that New Zealand would imperil its trading future by reneging on its international trading commitments unless there was persuasive evidence that genetically modified organisms were injurious to animal, human or plant health. Similar points were made by the New Zealand Dairy Board in its closing submission, by Federated Farmers of New Zealand [IP34] and others.

57. ZESPRI made a different point related to New Zealand’s international obligations, saying in its submission that if New Zealand were to allow

commercial genetically modified food production, “adverse consumer opinion and retail trade action [in our export markets] could lead to non-tariff barriers to market access” which “would jeopardise over NZ\$700 million pa in kiwifruit export turnover, and \$400 million of export earnings”.³¹

58. In her background paper,³² Dr Wright made a third point about New Zealand’s international obligations. She explained that the Environmental Risk Management Authority (ERMA) was required to perform an economic analysis to take account of the economic and related benefits to be derived from the use of a hazardous substance or new organism. In addition it was also required to take New Zealand’s international obligations into account in assessing an application for the release of a genetically modified organism. If the economic analysis showed that the release of the genetically modified organism would not provide a net benefit to the New Zealand economy (a plausible scenario if the applicant was based overseas) and the application were rejected, there would possibly be grounds for a complaint to the WTO. Dr Wright submitted that the requirements for ERMA to consider economic benefit to New Zealand and to take international obligations into account might be in conflict.

59. A number of submitters drew attention to the point that, besides obligations under the WTO, New Zealand had commitments under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement). Article 27 of the TRIPS Agreement required members to recognise both product and patent processes without any discrimination as to the type of technology, including biotechnology. In biotechnology, product patents had been granted on, among other things, DNA sequences, genes (including human genes), microorganisms, transgenic animals and plants. Processes involving fundamental techniques in recombinant DNA technology had also been patented.

60. The Ministry of Foreign Affairs and Trade pointed out that Article 27.3 (b) [of TRIPS] stipulates that members may allow their national patenting system to exclude plants, animals and essentially biological processes from being patented. They must, however, provide patent protection for microorganisms and microbiological and non-biological (inventive) processes. The Pacific Institute of Resource Management [IP84] suggested that Article 27.3 (b) should be amended to prevent such exclusion. The Safe Food Campaign [IP86], on the other hand, said that the global flow of resource possible under TRIPS had the potential for the exploitation of New Zealand’s “biological, intellectual and cultural heritage”.

61. The Ministry of Foreign Affairs and Trade noted that the debate surrounding the patenting of life forms was contentious, and was continuing in the context of a current mandated review of Article 27.3 (b). Another issue arising from this

Article was “farmers’ rights”, or the ability of farmers to save seed where that seed was the subject of intellectual property rights. These themes had arisen in other international forums and discussions were continuing.

Consumer preferences

62. Perceptions and preferences among consumers in our major export markets will largely determine the degree to which New Zealand’s exports will be in demand on the international market. ZESPRI quoted in its written submission consumer research studies around the world that had shown a significant level of concern about genetically modified foods. Concern was greatest in Europe but existed in Japan and to a lesser degree in other Asian countries and the United States. ZESPRI’s marketing staff in Europe had confirmed the adverse reaction of consumers to genetically modified food.

63. OPEG made a similar point in its written submission, saying that currently there is a high level of consumer resistance to the consumption of genetically modified food in many of our significant agricultural export markets. Research in 2000 by Dr Campbell suggests that this consumer resistance is increasing and has developed even to the level of a food scare that may take a considerable period of time, if ever, to change.

Economic modelling

64. We received a small number of submissions that included econometric models that attempted to show the perceived future effect of degrees of genetic modification entering the New Zealand economy. Dr Saunders used a partial equilibrium model to explore three different scenarios. These involved varying levels of consumer preferences in our international markets for genetically modified food, a drop in production costs for producers of genetically modified food, and farmers in New Zealand and certain other countries either converting to genetic modification to some extent or remaining genetic modification free. The results obtained by Dr Saunders from modelling these scenarios suggested that if international consumer preferences moved away from genetically modified food, producer returns would increase, and that New Zealand would not have a competitive advantage in genetic modification food production.

65. Dr Adolf Stroombergen, a witness called by the New Zealand Life Sciences Network [IP24], also presented results from an econometric model. Dr Stroombergen used a general equilibrium model to explore six alternative scenarios involving:

- increased productivity and lower production costs because of varying degrees of use of genetic modification techniques (two scenarios)

- sales from the genetic modification research industry stimulating the New Zealand economy
- agricultural benefits from genetically modified possum immuno-contraception
- the rejection of genetic modification in New Zealand to varying degrees concurrent with the rest of the world embracing it
- a complete genetic modification moratorium.

66. Dr Stroombergen's results suggested that if New Zealand embraced genetic modification there would be a positive effect on GDP, exports and employment, while the avoidance of genetic modification would lead to decreases in these variables.

67. Dr Stroombergen also pointed out that while organic products might always be more expensive because of higher production costs, economic principles suggested that any excessive profits associated with organic production would be short-lived:

Very high premiums of 50% or more for organic products only occur in very small markets. As soon as the market expands, the price premium declines. This is nothing more than standard supply economics. There may always be a price premium for organic products simply because they tend to be more expensive to produce, but any super-normal profits will eventually be eroded as new organic farmers enter the industry. It is not credible to believe that New Zealand can secure high net returns through supplying organic products to world markets whilst competing countries (such as Denmark and the Netherlands which have significant organic sectors) do nothing. An entirely organic farming sector in New Zealand is thus not a plausible scenario, even if there were no conversion delays and even if biotechnology delivers no benefits other than lower production costs – both extremely unlikely.³³

68. Similar points were made by Dr Sundakov, who gave evidence for the Wool Board and for the Meat Industry Association. He said that the New Zealand meat industry could maintain its “natural image” despite any presence of genetic modification research in the country and that, based on economic principles, a complete ban on genetic modification in New Zealand would enhance meat export markets to a very limited degree, mainly because competing markets would be able to offer the same guarantee. He also pointed out that there were historical instances in the United States where consumer resistance to a technologically enhanced food had decreased, such as to meat from animals that had been injected with bST growth hormones to enhance milk production.

69. The Commission notes that whether or not genetic modification may be of economic benefit to New Zealand will be largely determined by the degree to

which consumers in our export markets prefer, tolerate or reject genetic modification, and that witnesses who presented economic models made assumptions about this degree of acceptance, tolerance or rejection. We consider that it is too early to predict consumer reaction with any certainty.

70. We note, however, that economic reasoning suggests that it is not a realistic option for New Zealand to develop its organic sector at the expense of conventional farming and/or the use of genetic modification techniques, as in the long run it is unlikely that abnormal levels of profit would be made. We also note that while organic products may always sell at a price premium, one of the reasons for this is likely to be their higher production costs.

The knowledge economy

Intellectual capital issues

71. The effect of an avoidance of genetic modification technology on the skill levels of the New Zealand workforce was important to research institutes and universities. In considering New Zealand's strategic options, AgResearch said its experience indicated it was crucial to consider New Zealand's ability to recruit and retain the type of high-calibre scientists needed for leading edge research. It also believed that if New Zealand followed an option of excessive caution or restriction, its best and brightest young scientists seeking careers in the biological sciences would emigrate.

72. Landcare Research [IP12] told us it had about 10 staff directly using genetic modification and more than this again working on genetic modification-related research. If because of decisions on the use of genetic modification technology employment opportunities were foreclosed, these staff would leave New Zealand to further their careers overseas. This loss of talent would mean Landcare Research's ability to achieve its strategic intent, as agreed with the shareholders in its statement of corporate intent, would be markedly reduced. The Institute of Molecular BioSciences at Massey University [IP15] made the point that an avoidance of genetic manipulation technologies in New Zealand would make it more difficult to recruit well-qualified staff because support for research requiring genetic modification technologies could be limited.

73. Besides staff retention, Professor Marston Conder, Deputy Vice-Chancellor (Research) and witness for the University of Auckland [IP16], mentioned that skill and knowledge retention would be important issues. Under cross-examination, Professor Conder emphasised "the importance of genetic modification technology to higher education and research, and in particular to the training of the students".

74. Several universities, such as the University of Auckland and the University of Otago [IP19], commented that genetic modification technologies were now crucial for the successful conduct of research and teaching to international standards in various fields including biochemistry, clinical biochemistry, molecular biology, medicine and some areas of engineering.

75. Lincoln University and the University of Auckland made the further point that with the globalisation of universities there was an increasing expectation from international students that universities would undertake research from a global perspective. Technologies such as genetic modification were accepted in all modern, technologically-orientated countries.

76. Dr Martin Kennedy of the Christchurch School of Medicine, a witness appearing for the Human Genetics Society of Australasia [IP59] and New Zealand Transgenic Animal Users [IP45], said that even now, under regulations associated with implementation of the Hazardous Substances and New Organisms Act 1996 (HSNO), researchers were having difficulty developing the transgenic mice required for their research and for this among other reasons had gone to Australia where the approval process was easier.

Intellectual property

77. The economic aspects of intellectual property in the context of genetic modification are centred around the tension between the cost of access to patented knowledge in the form of licence fees and the desire of propagators of knowledge to recover their costs, and to protect their investment and put it to profitable use. The possible concentration of knowledge in a few hands is an extension of this argument. These issues are explored more fully in chapter 10 (Intellectual property).

78. The ability to patent is relevant to a knowledge economy in that it provides skilled employment and enhances the national infrastructure. On behalf of the A2 Corporation [IP26], David Parker said that:

If New Zealand can create ideas which have intellectual property protection, in the form of patent protection, then the potential revenues to New Zealand of commercialising those ideas internationally are often significant.³⁴

New Zealand's "clean green" image

79. BIO-GRO New Zealand [IP58] said that New Zealand would gain a very strong advantage from being able to brand all its food products as genetic modification free.

80. Many submitters told us that the introduction or release of genetic modification into New Zealand would have a negative effect on our “clean green” image which was used formally as a branding tool for international marketing, and which also contributed to New Zealand’s international reputation as a tourist destination.

81. For example, OPEG said the introduction of genetic modification technologies posed indirect risks by devaluing the market’s perception of New Zealand’s “clean green” image, an image of significant value in the positioning of New Zealand organic product exports. The Royal Forest and Bird Protection Society of New Zealand [IP79] considered that:

... in addition to our productive systems being underpinned by healthy ecosystems, our “clean and green” environment is a major selling point in itself and will reap increasing rewards in the 21st century. New Zealand primary producers target customers who enjoy high-quality products that come from a healthy and unpolluted environment. This is also the foundation of our tourism industry. However, our increasingly demanding international clients expect the green image to be backed up by reality.³⁵

82. The Nelson GE Free Awareness Group [IP100] said “many tourists are looking for the clean green image”.³⁶

83. There was concern that a change from New Zealand’s current position of no genetically modified organisms in open release would mean New Zealand’s export markets would suffer significantly. ZESPRI told us that its marketing research suggests that a perception of genetic modification status for New Zealand food production will influence the buying behaviour of consumers for all New Zealand products. Russell Simmons, an organic dairy farmer and a witness for Bio Dynamic Farming and Gardening Association, maintained that the customer perception of a “clean green” New Zealand will be dealt a devastating blow with any release of genetically modified organisms into our environment.

84. Te Runanga o Ngai Tahu said in its submission:

The world looks to New Zealand to be clean and green, its future must be based on that, niche marketing, adding value and providing to the world those things the rest of the world has lost.³⁷

Branding

85. We heard from several submitters that New Zealand’s “clean green” image is used internationally for branding and that it has considerable commercial value. Dr Sundakov told us that the New Zealand meat industry had invested heavily over the years to build a valuable international brand image, which included the perception by consumers that New Zealand meat is produced in

a natural environment, and that this branding generates premiums for New Zealand producers over similar products from other countries.

86. We also heard that if genetic modification were introduced into New Zealand this might have a negative effect on this image and branding. Vegefed, Fruitgrowers, Berryfed asked us to be conscious of the potential economic impact that the first commercialised genetically modified crops might have on New Zealand’s “clean green” image. While not meaning to imply that genetic modification was necessarily “un-clean and non-green”, it considered that “clean and green” was a real marketing tool which might be affected by association with genetically modified crops in New Zealand.

87. Dr Saunders said that New Zealand’s “clean green” image had enabled it to: ... target, maintain, and grow market share. The production of genetic modification food, given current attitudes, may well not be compatible with these markets and this image. This broader branding of New Zealand as clean and green provides benefits to a range of industries, not least of which is the growing organic food industry. While it is certainly possible that individual food production sectors could position themselves as genetic modification or genetic modification-free (with appropriate regulatory protocols to separate the two), this “mixed marketing” strategy may not work.³⁸

88. We also heard that New Zealand’s “clean green” image has a variety of meanings, and that its value in branding is as a perception, rather than a defined reality. For example, Colin Harvey of New Zealand Agritech [IP73] stated that:

There is much debate ... as to whether we are clean green organic or clean green free roaming animals, pasture green. ... I personally see ourselves as being clean green free ranging animals grown on pasture ... animal welfare is an important aspect of clean green, and so is the pasture base of that, but I don’t necessarily see it’s saying they are chemically free, because we have significant problems, for example, with internal parasites in New Zealand. We can’t as yet rear animals ... on an economic basis that are truly chemical free.³⁹

89. John Guthrie, a Demeter-certified Bio Dynamic® grower and witness for the Canterbury Commercial Organics Group [IP65], said he considered New Zealand already lacked credibility as a “clean green” country, and that this had been highlighted in a recent tourism report.

90. In the opinion of Dr Morgan Williams, the Parliamentary Commissioner for the Environment [IP70], all forms of agriculture in New Zealand are undergoing a process of evolution that is taking all agricultural systems towards a more “ecological” approach. Dr Williams also observed that all are important to New Zealand’s future, that the boundaries between them are not necessarily fixed, and that advances in one form of agriculture have positive influences on other forms.

Organic economy in New Zealand and overseas

91. Dr Campbell provided some background information about the current and possible future values of the organic economy. His research results suggest that:

... the value of the New Zealand organic export industry will reach NZ\$60 million at the end of 2000. This combines with a domestic market estimated at NZ\$32 million in 1999 to represent a total market of NZ\$92 million (up from NZ\$3 million in 1994). One non-organic industry manager predicted that organics may “peak” at 20% of national production.⁴⁰

92. Dr Campbell went on to say that such predictions could not be confirmed as they depended on how New Zealand agriculture and horticulture developed. As an example, two potential scenarios might be considered:

- If organics remained a predominantly horticultural phenomenon, the industry could reach between 10% and 20% of horticultural production. These levels had been reached in several mature organic production sectors in Europe. For New Zealand, this would indicate a maximum value of NZ\$170–340 million in exports.
- If organics became established in pastoral industries, the potential mature value of organic exports would be vastly larger if even 10% of production was converted.

93. In general, organic market reports showed that the land dedicated to organic production, and the demand for and profits from organic products, increased significantly worldwide in the latter half of the 1990s. The organic market was expected to continue to grow throughout the world at an estimated average annual rate of between 20% and 25%, although some predicted that market growth would reach 40%.

94. Dr Campbell’s overall conclusion about the use of genetic modification technology in New Zealand was that it seemed unlikely a pluralist strategy could work if New Zealand intended to utilise genetic modification technologies as a widespread component of horticultural production.

95. James Kebbell of Commonsense Organics, a large organics retail outlet, provided further detail about aspects of the organic economy in New Zealand, saying that organic production and sales were growing at a very fast rate, globally and in New Zealand. Globally the growth was in excess of 30%. The average annual growth of Commonsense Organics over the nine years since it was established was 43%. The number of producers had also grown at significant rates. In 1991 there were less than 200 certified organic producers in

New Zealand and there are now more than 800. Mr Kebbell also mentioned that in New Zealand the consumer demand for organics did not appear to be a passing fad.

96. The Royal Society of New Zealand also commented that organic agriculture in New Zealand had expanded rapidly, earning NZ\$60 million from exports in the year 1999–2000. We noted in the Ministry of Economic Development’s public submission that in the year 2000 organic exports represented 0.1% of total New Zealand exports. When all forms of “environmentally enhanced” agriculture were combined, the Royal Society of New Zealand estimated they would comprise just under NZ\$1 billion in exports for the year 2000. John Manhire of OPEG said his organisation estimated that organic exports alone from New Zealand would reach \$500 million by 2006.

97. Dr Campbell told us that the United States Department of Agriculture had analysed the global organic market and suggested that the organic market was the fastest-growing food sector in the United States. Constraints on growth in this sector were related to supply development, not consumer demand. Dr Campbell considered that the United States agricultural sector could not convert to organics quickly enough to fill the demand, and that New Zealand had some natural comparative advantages both in its environment and style of farming that could enable it to move into organic production ahead of competitor nations.

98. In a paper presented with OPEG’s submission, Dr Campbell explored the organic economies in other countries. Denmark had one of the fastest growing organic economies in Europe, due largely to government subsidies for conversion to organics and other measures supporting the development of the organic economy. In 1999, 20% of Denmark’s dairy production was organic, and 3.6% of farm land was dedicated to organic production. Average premiums for organic food in Denmark were in the region of 30–50%. The Netherlands also had a fast growing organics sector, largely due to organic dairy farming. We also heard from the Canterbury Commercial Organics Group that Denmark was considering a complete conversion to organic agriculture.

99. We heard, however, from Dr Marshall, a witness for the Dairy Board, that the Danish dairy industry now had a surplus of organic milk, and that about half the total organic milk was currently being mixed into traditional dairy products. He told us also that in the Netherlands a significant number of dairy farms had converted to organics, but that this had been stopped as of November 2000.

100. Dr Campell's paper included the following table summarising the value, growth rates and premiums in 21 organic markets around the world for the 1998–99 year. The table suggested that many economies had organic sectors that were comparable with or larger in size than New Zealand's, and that were growing at rates comparable with New Zealand's organic sector.

	Value of organic market (US\$ million)	Annual growth in organic market	Average premiums
Brazil	\$150	20%	25–35%
Canada	\$571	25%	10–50%
USA	\$4,000	20%	10–20%
Argentina	\$3	25%	N/A
Mexico	\$15	N/A	30–40%
Taiwan	\$9.5	30%	up to 400%
Japan	\$3,000	N/A	10–30%
Hong Kong	N/A	15%	15%
Korea	\$61	N/A	50%
Germany	\$1,500–1,800	10%	30%
Denmark	N/A	N/A	30–50%
UK	\$836	100%	25–100%
France	\$610	25%	25–50%
Slovakia	N/A	N/A	15%
Poland	N/A	N/A	10–30%
Austria	\$152	N/A	10–50%
Italy	\$900	20%	20–200%
Spain	N/A	N/A	20–50%
Australia	\$132	60%	35%
New Zealand	\$16	70%	10–100%
TOTAL	\$12,255		

Social equity

101. The Maori Congress [IP103] considered that the genetic modification technologies now being developed would tend to reinforce the existing patterns of capital ownership. The Congress felt an ever-tightening loop or a relationship was established through these patterns, so that not only Maori but also the poorest people and the most endangered landscapes and ecosystems were then considered commodities instead of being part of an integrated environment.⁴¹ It also called for a move away from the conventional chemical agri-technology industry towards fully adopting organic production by 2005.

102. Friends of the Earth (New Zealand) [IP78] explored equity issues associated with genetic modification in its written submission, emphasising that the risks associated with genetically modified food and medicines could outweigh the benefits, and in particular:

... GM food may appear to advantage poorer families by being cheaper and more affordable than more expensive, organic non-GM alternatives, but the resulting widespread intake of GM food would have the especially large potential to adversely affect human and other species. Children of poorer families would have no choice but to eat GM foods and could therefore be disadvantaged in terms of health, immunity, food diversity and other potential harms unknown to us at this point in time. In effect, any advantages of GM products in the short term are insignificant compared with the potential disadvantages to humans and other species in the longer term; these disadvantages would affect all of us including the very groups of persons who may have benefited and/or profited from GM.⁴²

103. The New Zealand Grocery Marketers Association [IP54] called as a witness Michael Rosser, a former Director-General of Health in New South Wales, who explained that:

Should there be price rises in the range of 0–6% for different types of food – depending on its likely genetic modification status – the rises will impact on people in the lowest income decile more than other deciles below the sixth decile (the “average wage” decile) due to the poorest people purchasing more of the (processed) food groups where there is likely to be a greater impact from the introduction of the proposed Standard A18 [which requires all ingredients to be labelled if of genetically modified origin].⁴³

104. At the Ngaruawahia national hui we heard from Angeline Ngahina Greensill (Tainui) that “people who can’t afford to buy will buy the cheapest product, which is going to be GMO stuff; yes, they’re going to get the sickest; its going to be our people”.⁴⁴

105. A speaker at the Whangarei public meeting told us that:

With problems worsening in South Auckland and other low income areas around the country, I find it an utter disgrace that GE food sits on our supermarket shelves waiting for these unsuspecting buyers. For the kiddies in these areas brought up on soft drink, highly refined foods and takeaways, all of which now contain GE ingredients, the future currently looks extremely bleak.⁶