



Ministry for the  
**Environment**  
Manatū Mō Te Taiao

## Valuing New Zealand's Clean Green Image

The Ministry for the Environment commissioned PA Consultants to carry out this study (funded by the Contestable Research Fund of the Ministry of Research, Science and Technology) to provide an estimate of the value for New Zealand's export trade of our clean green image.

There is considerable discussion about New Zealand's clean green image, but relatively little solid information about its value. This was clear from an earlier study which the Ministry commissioned through the Sustainable Management Fund, *Green Market Signals*, published in 1999. The current study is, in part, a response to the suggestions received from industry groups and others at that time.

The aim of this current study is to quantify the extent to which particular New Zealand exports benefit from positive perceptions about our environment. The project focuses on three export sectors: dairy, inbound tourism, and organic produce. It assesses the potential consumer reaction to an illustrative decline in New Zealand's cleanness and greenness.

The empirical work done in this study reinforces the qualitative evidence that our clean green image is valuable, and provides some useful insights into the size and nature of that value. The results are of course not definitive – no contingent valuation study can ever be so – but they do strongly indicate a significant vulnerability of export value (through reduction in product quantities likely to be purchased by consumers) in the event of a (hypothetical) degradation of New Zealand's environment.

While the research's approach and findings have been robustly peer reviewed, like all empirical economic estimates, the conclusions rest on assumptions and a specific methodology. That said, the study certainly provides food for thought. Main findings are as follows:

- New Zealand's clean green image does have a value. Environmental image is a substantial driver of the value New Zealand can derive for goods and services in the international market place.
- The study suggests this image is worth at least hundreds of millions, possibly billions, of dollars – aggregating value elements from dairy, tourism, and organic produce, and extrapolating to other sectors such as meat.
- New Zealand is relatively clean and green. This is mainly attributable to our low population density resulting in relatively benign environmental pressures.
- However, there are environmental problems that are sufficient to raise questions about the sustainability of the value of New Zealand's exports attributable to its environmental image. There is a risk that New Zealand will lose value that is created by the current environmental image if we are not vigilant in dealing with the problems that could threaten the image.

**If you would like to discuss this report further, please contact Dr Ralph Chapman, Manager of the Strategic Policy Group, Ministry for the Environment, at (04) 917 7444 or email him at [ralph.chapman@mfe.govt.nz](mailto:ralph.chapman@mfe.govt.nz).**

## **EXECUTIVE SUMMARY**

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New Zealand's environment is valuable, not only for its own sake but also for its ability to add value to the goods and services New Zealand sells in the international market place. Although there is a great deal of qualitative evidence to suggest that New Zealand's environmental image is an important driver of export value, there is very little in the way of supporting quantitative data. This report sets out to address that issue by developing some insights into the size of the value key export industries may be extracting from New Zealand's clean green image in some of the more important export markets.

### **APPROACH AND METHODOLOGY**

The diverse nature of New Zealand's exports, coupled with the large number of markets to which New Zealand's exports are directed, means that the task of compiling a comprehensive valuation of New Zealand's environmental image is, from a practical perspective, impossible.

This means that it is necessary to be selective in directing the analytical effort; it is important to determine in which markets and which industries it is most instructive to explore the link between environmental quality and export value. In addressing this issue we undertook two preliminary pieces of analysis.

The first was an "export sector scan". In this part of the analysis, we considered the sectors and markets in which New Zealand's export revenues are earned and the qualitative evidence for the value being enhanced by New Zealand's environmental image.

The second part of the analysis consisted of an "environmental scan". Here we considered the areas of the New Zealand environment under pressure and the potential for environmental degradation to flow through into the value obtained from our key exports.

These two pieces of preliminary analysis, coupled with input from the Ministry for the Environment with respect to how the insights developed from the analysis might inform current policy work, helped narrow the focus of the study to a more manageable size.

A contingent valuation methodology was then employed to determine the impact on the export sector under consideration. Essentially, this involved the determination through surveys of how the purchasing behaviour of key participants in the value chain might change under varying assumptions of New Zealand's environmental quality.

### **OVERVIEW OF NEW ZEALAND'S EXPORT SECTOR**

As a small open economy, New Zealand is heavily dependent on its export industries. Agriculture is the single largest earner, regularly contributing over \$20 billion to the Gross National Product. Key subsectors are meat, dairy, horticulture and organic food. New Zealand's top five export markets (in terms of revenue earned) for the year ended June 2000 were Australia, the USA, Japan, the UK and Korea. These markets combined, accounted for almost 60% of revenue earned from exports.

*Tourism* makes a large contribution to the New Zealand economy in terms of foreign exchange earnings as well as Goods and Services Tax. It is a fast growing sector with enormous potential and of similar size to the dairy industry. New Zealand's top tourism markets are Australia, the USA, Japan, the UK and Korea, although there are some fast growing markets in both South East Asia and Central Europe. New Zealand is perceived by Asian, European and North American tourists, as an "Eden-like" escape. Tourism New Zealand has taken advantage of these perceptions in presenting New Zealand to these countries, with its marketing strategy hinging on New Zealand's clean environment.

*The dairy sector* is New Zealand's largest agricultural export earner. Ninety to ninety-five percent of production is exported. For the year ended June 2000, earnings from dairy exports were close to NZ\$5 billion. New Zealand's dairy exports consist of milk powders, butter, cheese and casein-related products, with the USA, Japan and the UK being the largest single markets for New Zealand dairy products. The New Zealand Dairy Board, which currently manages most of the dairy industry's marketing, uses New Zealand's environment as a major marketing tool, regularly emphasising New Zealand's use of open pastures all year round for cattle to graze on.

For the year ended June 2000, *the meat sector* represented over a fifth of New Zealand's revenue from exports. Major meat exports are lamb and beef. The New Zealand region is synonymous with the former, thanks to careful marketing strategies, which capitalise on New Zealand's environmental image. The USA is the major destination for New Zealand beef, although Asian markets are growing in significance. Since the onset of various food-related scares, the global meat industry has come under increasing pressure to review its processing and production techniques. New Zealand is in the unique position of relating its temperate climate and clean environment to food safety.

*The Organic Food Sector* currently plays a relatively minor role in terms of overall contribution to export revenue. However, it has shown considerable growth, particularly in Europe and the USA. Organics is becoming a major marketing trend in Europe (particularly Britain), where food scares have made consumers much more conscious of what they eat. In New Zealand, the organic industry is sustained not only by smaller independent farmers, but also by major players such as Heinz Watties and Zespri. The organic sector has almost certainly gained momentum from outbreaks of BSE, E. Coli and listeria to name a few, but also through the genetic modification (GM) debate, which has been a frequent headliner in recent times. The GM debate poses an interesting dilemma for the agricultural sector. Total avoidance of genetic modification may result in New Zealand being left behind in the "technological revolution", while embracing it could lead to loss of crucial markets that currently view New Zealand as clean and green, with environmental integrity.

## **OVERVIEW OF ENVIRONMENTAL QUALITY**

By world standards, New Zealand enjoys relatively high levels of environmental quality. In the main, this can be attributed to a low population density resulting in relatively benign environmental pressures. However, there are clearly some areas showing signs of stress which could (potentially) impact on New Zealand's international environmental image.

The *air quality* indicators suggest very high standards of air quality throughout much of the country during much of the time. However, there are localised areas of concern. For example, levels of pollutants associated with motor vehicle emissions are steadily increasing in the Auckland region and little progress is being made in reducing the incidence of winter time smog in Christchurch. In the rural sector, drift from agricultural

sprays is causing localised areas of concern. Possible connections with New Zealand export industries include the tourism industry with respect to urban air quality and New Zealand's organic export products with respect to drift from agricultural sprays.

New Zealand's *land and landscape* have been altered dramatically since the time of human occupation with pasture and, more recently, exotic forestry replacing areas previously covered in indigenous forest and grassland. Associated with the change in land use are two environmental issues which could conceivably impact on the value of New Zealand's exports. First, the susceptibility of New Zealand's steeper landscapes to erosion and the visual impact of some of New Zealand's current land-use practices (such as the logging of exotic forests) may compromise the credibility of images used to sell New Zealand as a tourist destination. Second, the possibility of contaminated sites in New Zealand's rural areas resulting in chemical residues in exported food and beverages may pose a threat to any value created by New Zealand's international environmental image.

While the more remote parts of New Zealand have some of the finest *freshwater* in the world, many of the lowland water ways are under threat – principally from non-point sources in the guise of organic matter, nutrients and sediment washing into waterways or nitrates leaching into groundwater. By far and away the largest source of pressure on water quality is pastoral agriculture (particularly dairy) directly related to the high stock levels.<sup>1</sup> There is also evidence to suggest that (some of) New Zealand's groundwater resources (including geothermal) are being exploited at unsustainable rates. It is possible that this in turn could impact on the tourism industry. In addition, the environmental impacts of dairy farming on water quality in rural areas may have an impact on the purchase behaviour of environmentally conscious consumers (including tourists).

From the limited data available, it appears that the quality of the *coastal marine environment* is of a high standard. However, as with the other components of the environment discussed above, there are localised areas of concern – particularly with respect to estuaries and harbours near the main population centres. Contaminants include non-biodegradable litter and heavy metals (zinc, copper and lead) washed into the coastal marine environment via stormwater systems. The most plausible link with New Zealand's export trade comes in terms of litter insofar as this may affect marine life prominent in New Zealand's eco-tourism industry and the visual amenity of the coastline.

Monitoring the levels of *waste* generated in New Zealand can provide an indication of emerging pressures on environmental quality in New Zealand and thus an early warning sign of pending environmental degradation (or the need for preventative action). The evidence available from the Auckland region shows that, although the levels of recycling are increasing, this is not sufficient to slow the increase in volumes of waste being directed to the region's landfills. Although this pattern is not so evident in other parts of the country, the possibility of leachate from landfill reaching waterways and elements of the hazardous waste stream have the potential to impact on environmental quality across the country. It is possible that New Zealand's waste stream could pose a threat to the tourism industry (if the waste stream is allowed to degrade the quality of marine and freshwater resources) and/or the agricultural and horticultural sectors (for example, if the hazardous waste stream results in chemical residues being found in food exports).

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<sup>1</sup> Note that high stock levels do not necessarily imply poor environmental management. There is evidence to suggest that there are farms with high stock levels in New Zealand, which have good environmental performance, and farms with low stock levels, which do not.

## **FOCUS OF THE VALUATION EFFORT**

The results of the export and environmental sector scans suggested three areas in which it would be particularly interesting to focus the valuation effort, namely:

- the relationship between the value obtained in emerging markets for New Zealand's added value dairy products and the impacts poor farm management might have on the rural environment;
- the relationship between environmental quality generally and the in-bound tourism sector; and
- the relationship between various policy positions with respect to the release of genetically modified organisms and the value obtained from the exports of organic produce to the United Kingdom.

The first two areas were chosen because of the size and importance of the sector to the New Zealand economy and because of the extent to which the sectors rely on New Zealand's environmental image to market their goods and services. The third area was selected because of its currency as a policy issue and because of the recent spectacular growth in exports of organic produce.

In the first two areas, we focused our empirical work on the end consumer – Malaysian buyers of New Zealand dairy produce, and tourists from Australia, USA, UK, Japan and Korea. However, with respect to the export of organic food to the United Kingdom, it was considered more useful to target the wholesale buyers of New Zealand organic produce. (Typically, the UK retailers use their own house brands in selling produce; the UK consumer is mostly unaware of the country of origin of organic produce).

## **VALUATION RESULTS**

The surveys targeting the end-consumer (dairy and in-bound tourism) both revealed that if perceptions about New Zealand's environmental image worsened in our key overseas markets, we would see two distinct types of consumers emerging: those who do not change their purchasing behaviour at all and those who completely change their behaviour by not buying any New Zealand product. While the latter group is the dominant one, there does appear to be a significant proportion for whom environmental value is not a driver in their purchasing decisions. This is certainly true for tourists that travel to New Zealand on business or to visit friends and family.

A short summary of the key results from the three sectors analysed follows:

### **A. Dairy**

The dairy survey was conducted at three supermarkets in Kuala Lumpur, Malaysia. The results were used to generalise to similar markets in Asia and the AIME (Africa, India and the Middle East) region. The extent of the loss to the dairy sector depends on its ability to redirect product lost from its consumer markets in Asia and AIME (due to worsened environmental perceptions) to potential ingredients markets world-wide, and also on the relative profitability of the consumer business compared to the ingredients business. Losses in the short-term would be substantially higher than those in the long-term due to the cost structure of the dairy industry. In the short-term, despite loss in volume, the level of infrastructure and labour would remain similar, implying a reduced revenue with costs comparable to the status quo (and hence a higher loss). In the long-term, however,

infrastructure and labour costs will gradually reduce thereby abating the loss from worsened perceptions.

For the purposes of this investigation, we first estimated revenue lost from the Asia and AIME markets due to a perceived change in New Zealand’s environment. In the worst case scenario, where the New Zealand dairy industry is unable to redirect any “lost” product to its ingredients markets, the loss in revenue was estimated to be \$569 million. This is equivalent to 14.3% of revenues earned from dairy exports (excluding caseins and caseinates) for the year ended June 2000.

Due to the lack of detailed information on profits earned by the dairy industry, we conducted a simple heuristic analysis of profit by assuming that the total surplus earned by the NZDB was a linear combination of profits from added value products and profits from the ingredients business. While this was a rather simplistic representation of the dairy industry’s profit structure, it gave us some idea of the magnitude of loss in profit.

Loss in profit is summarised in the table below.

**Table 1: Loss in profit to dairy sector under worsened environmental perceptions**

Profit Scenario	Percentage of Lost Product Redirected (%)	Loss in Profit
Added Value and Ingredients Equally Profitable	100	\$0
Added Value and Ingredients Equally Profitable	0	\$19 million
Added Value twice as profitable as Ingredients	100	\$16 million
Added Value twice as profitable as Ingredients	0	\$31 million
Added Value ten times as profitable as Ingredients	100	\$55 million
Added Value ten times as profitable as Ingredients	0	\$61 million

**B. Organics**

The loss to the organic sector depends on consumer and retail politics in our key overseas markets. The UK was an interesting example to analyse, in that it is a country where relatively few individuals wield a considerable amount of influence on the retail and wholesale trade. Two wholesalers (Organic Farmfoods and Worldwide Fruit) were interviewed in this part of the investigation. While this is a small sample, it is worth noting that Organic Farmfoods is the largest organic food supplier in the UK and is a key player in the British organic industry. The latter is the sole distributor of ENZA fresh produce in the UK. The key results from the organic sector surveys indicated that New Zealand would almost certainly lose business in the UK in the event that New Zealand embraces GM technology. In the event of GM trials for research purposes, it appeared that while some wholesalers may not cut off New Zealand supply in the short-term, they may start looking for alternate sources of supply. In the event of uncontrolled release of GM crops in New Zealand, we would almost certainly suffer immediate heavy losses in volumes exported.

The valuation for the organic sector involved analysing survey results for Organic Farmfoods and Worldwide Fruit individually. Due to the small size of the sample, aggregating results would have yielded estimates with very large uncertainties. Due to the lack of information on costs incurred (as well as profits earned) by the organic sector,

it was necessary for us to conduct a profit analysis using a heuristic approach (as was the case in the dairy sector valuation). Loss in profit was evaluated under various profit margins (or the percentage of revenue attributable to profit).

The worst case scenario for the organic sector was one under which New Zealand allows uncontrolled release of GMOs. Under such a scenario, both wholesalers indicated that they would decrease or sever demand for New Zealand produce. **Error! Reference source not found.** illustrates profit lost under the uncontrolled release scenario with no price change.

**Table 2: Loss in profit due to uncontrolled release of GMOs**

Wholesaler	Fruit	% Decrease in Volume due to Uncontrolled Release of GMOs	Loss in Profit at Profit Margin = 5%	Loss in Profit at Profit Margin = 10%	Loss in Profit at Profit Margin = 20%
Organic Farmfoods	Kiwifruit	100	\$356,400	\$712,800	\$1,425,600
Organic Farmfoods	Apples	100	\$355,520	\$710,500	\$1,421,000
Worldwide Fruit	Kiwifruit	50	\$29,700	\$59,400	\$118,800
Worldwide Fruit	Apples	50	\$109,620	\$219,240	\$438,480

### C. Inbound tourism

The inbound tourism survey targeted departing tourists (at Auckland International Airport) from Australia, the USA, UK, Japan and Korea. The change in tourist purchasing behaviour under worsened environmental perceptions depended to a large extent on the country that the tourist came from, coupled with the purpose of their visit. Australians exhibited the lowest percentage change in length of stay under worsened perceptions, while tourists from the Japanese and Korean market had the largest percentage change in length of stay.

The loss to New Zealand was evaluated on the basis of three different benefit measures all pertaining to direct value added from tourism. The first pertained to loss in “direct value added” plus wages,<sup>2</sup> due to losses from the five markets under a degraded environment. This first benefit measure yielded a loss of \$780 million. The second benefit measure also took direct value added and wages into account, but also included the effects of GST. Using this second benefit measure, we found that the loss from our top five markets was \$938 million. The third benefit measure was similar to the second, with the exception that it omits the effect of wages (and employment by the tourism industry). This yielded a loss of \$530 million.

<sup>2</sup> The inclusion of wages in the benefit measure implies that we are assuming that employment is a benefit, rather than a cost associated with tourism.

**Table 4: Loss to New Zealand's inbound tourism industry**

Benefit Measure	Loss from Top Five Markets
Direct Value Added + Employment	\$780 million
Direct Value Added + Employment + GST	\$938 million
Direct Value Added + GST	\$530 million

The loss to the New Zealand tourism industry was only evaluated for the five markets studied. Had we included the effects of other markets, the loss figures above would have been greater.

## CONCLUSIONS

During the course of this investigation, it has become clear that New Zealand's environmental image is indeed a key driver of the value New Zealand is able to obtain for its goods and services in the international market place.

At the qualitative level, there is evidence from previous surveys and analyses to suggest that environmental image is an important contributing factor to the behaviour of purchasers of New Zealand's exports. In addition, many of the key marketers of New Zealand product use New Zealand's image as part of their marketing strategies.

The empirical work done in the context of this study reinforced this assumption and provides some additional insights into the size and nature of the impact.

Needless to say, one has to be extremely careful in attaching undue weight to the figures generated in the course of this work, or in generalising too quickly to the value of New Zealand's environmental image generally. In particular, there are reasons for thinking that the valuation might be too high – or too low.

While these uncertainties might have been a concern if the change in purchase behaviour observed was relatively small, the size of the impact is such that they do little to undermine the significance of the result.

The size of the contribution the environmental image is making to some of our major and emerging export industries, coupled with the degradation in environmental quality in some key areas, suggests that New Zealand runs some risk of losing the value created by its current environmental image.

However, on this issue, it is important to note that the relationship between environmental quality and export value is somewhat indirect in nature. In particular, it is the environmental image that creates the value, not environmental quality *per se*. Furthermore, environmental image and environmental quality may move independently of one another.

Thus it is quite possible that, in the short term at least, New Zealand may be able to maintain at least some of the contribution to environmental value in the face of declining environmental quality. However, it seems unlikely that this could be sustained over the long term. In the long term, one can expect environmental image and environmental quality to track one another. Acceptance of this position would imply a risk averse approach to environmental management.