



New Zealanders and their Land

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The wave of invasive new organisms that hit New Zealand's shores with European settlement changed our natural environment forever.

Possums, rats, goats and stoats have left their mark on the land. Along with imported weeds, they're a firm reminder of the unintended consequences that new organisms can bring.

In this century, the new organisms in the spotlight are not so much from foreign lands as foreign to the existing natural heritage.

Should the lab door be opened to let products of genetic modification (GM) reproduce in the wild?

To date, experimentation in New Zealand with the creation of new genetic structures has nearly all been within the confinement of the laboratory. A miniscule amount of research has been outdoors but under controls designed to ensure there is no escape of genetic material capable of reproducing itself - that is, no release of GM organisms (GMOs).

The push for the commercial release of GMOs carries a series of risks for New Zealanders and their land. They include risks to the environment, to the economy, and to human health.

The decision whether or not to allow the release of GMOs cannot be left to individual choice because everyone carries the risk of the consequences if some choose to push ahead. Thus it has become hotly contested ground as those convinced of the gains to be had from this new technology try to persuade the nation that the risks are worth taking.

Frequently the debate has been cast in terms of scientists versus greens but a new organisation – the Sustainability Council – launched just prior to the 2002 General Election cuts a profile quite removed from these traditional interests.

The Sustainability Council is a group of well-known New Zealanders from a wide range of different backgrounds. It comprises businessman and former Federated Farmers president Sir Peter Elworthy,

squash champion Dame Susan Devoy, Auckland University Professor of Biochemistry Dr Garth Cooper, food author Annabel Langbein and actor Sam Neill.

Its call for an extension of the current moratorium on the release of GMOs is in line with the majority of New Zealanders who repeatedly tell pollsters they favour an extension of the moratorium that is currently due to expire in October 2003.

The council argues that the year remaining is insufficient time to undertake the research required to make fully informed decisions on whether to allow the commercial release of GMOs and to implement the regulatory structures required to give effect to these decisions.

It questions what the rush is when our largest trading partner, the European Union, has had a de-facto moratorium in place since 1998 and is not expected to have laws in place for release until 2005.

What are GMOs?

GMOs are the product changes to the genetic structure such that an entirely new plant or animal is produced as the result of such changes.

Creating GMOs is generally unlike conventional breeding in that the inserted genes would not normally get there through traditional breeding processes.

The reason for this is that the genes are often from another species. They are selected for a particular property or attribute and it is hoped they will confer this particular property or attribute on to the new organism.

The concern is that once a departure is made from natural breeding methods, we are in new territory. Very little work has been done to understand the long-term effects of setting GMOs free in the environment yet a number of potentially harmful effects have been identified. Some of the harmful effects identified include:

- GM crops may show increased persistence, intrusiveness and competitiveness with existing native or exotic species. This could well alter the population dynamics and ecological balance.
- A further threat is the transfer of genes to other species. That is, the gene inserted into the GMO spreads to other plants or animals.
- GM food could cause personal injury through giving rise to allergic reactions.

GMOs in Context

It is not widely understood that work on GMOs accounts for only a very small proportion of the GM research in New Zealand and internationally.

Government funds account for the vast bulk of GM research in New Zealand and 80% of this is distributed through the state's public science pool.

Only 3% of the pool funding allocated to biological research went to produce a GM related product or solution last year. Even less of that research depends on the eventual release of GMOs.

Though GMOs get all the publicity, research involving GMO release is a small part of biotechnology. In fact, most of New Zealand's work in biological science depends on a combination of conventional technology and gene techniques that do not involve gene modification.

New Scientist magazine recently reported on the partnership developing between conventional plant breeders and gene technology that does not involve the use of GMOs, proving that GMOs are far from the only way to utilise gene technology.

The Precautionary Principle

The advocates of GMO release point to the need to take risks to make progress and to the few cases to date of harm actually having occurred. However, there has been little research into the potential harmful effects.

More importantly, the history of technological innovation tells us there can be nasty surprises down the track that are not apparent at the time the technology is launched.

Past surprises have included the effects from: asbestos, X-rays, DDT and CFCs.

The propellants formerly used in aerosol cans (chlorofluorocarbons or CFCs) came into widespread use in the 1950s with no recognition that these chemicals might cause damage to the ozone layer. This was in spite of a relatively good

"My feeling is that this is perhaps the most serious issue that we face in New Zealand today. It seems to me potentially a more important issue than the nuclear-free debate we had 20 years ago."

"We simply do not know enough about the long-term effects of GM on our environment, our health, and indeed, our own genetics."

"We're given assurances from many quarters that GM is safe. I take no particular comfort from those assurances. Because I remember in the 50s and 60s hearing similar voices assuring us that the so-called miracle chemicals of the time – chemicals like 245T and DDT – were supposed to be safe.

But of course, now we are living with the consequences of those assurances."

"Give the people of New Zealand time to consider and time to debate this most critical of issues."

Sam Neill

understanding at the time of the ozone layer and its function in shielding the earth from excessive UV radiation.

Only in the 1970s did scientific findings first clearly show the link between the use of CFCs and the destruction of ozone in the upper atmosphere. It took until 1987 for the political will to be gathered for at least a phase-out timetable for CFCs.

What has been drawn from such experiences is that new ways of dealing with technical innovation need to be adopted. Key to this new thinking is an approach to risk and uncertainty termed the precautionary principle.

The precautionary principle basically requires that if the risks to the environment are serious, and the understanding of those risks is inadequate, then steps should immediately be taken to prevent harm.

The principle first featured in an international legal agreement in 1987 and has since been incorporated into a wide range of environmental treaties.

The Precautionary Principle was included in the document entitled the Rio Declaration, which followed the 1992 Earth Summit. New Zealand is bound by this document.

Principle 15 of the declaration states:

"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

The government has recently reaffirmed its commitment to both the Precautionary Principle and to taking a precautionary approach.

The Environmental Risk Management Authority (ERMA) is the regulatory agency that assesses whether or not a GMO can be researched in the lab or released into the environment. A major anomaly is that ERMA is not currently required to follow the precautionary approach when assessing applications for release of GMOs.

The Sustainability Council believes that integration of this approach into ERMA's processes and into other related regulatory functions is a key reform required whether or not the moratorium is lifted.

GM Agriculture

But the GM debate is far from just a question of scientific risk and uncertainty. The trade and marketing risks for New Zealand are enormous.

Biological research is of great importance to New Zealand's economic future and there are areas – such as medicine – where gene technology may offer opportunities for advancement at relatively low risk.

The use of gene technology as a tool for plant breeding and similar diagnostic research has also proved a great asset.

But it's a completely different story with GM agriculture and agricultural applications may be among the early test cases for GMO release. There the benefits are far from obvious.

"I recently attended a week long seminar in Europe with other farmers from various nations. The European farmers advised me that 'You would be crazy to plant GM crops in New Zealand given current consumer attitudes. You New Zealanders do not realise the priceless advantage you derive from your 'clean green' image - deserved or not. Your butter, your lamb, your fruit would all lose their premium place in the market overnight if you adopt GM agriculture."

Sir Peter Elworthy

First, only a minority of New Zealand farmers want it. A Lincoln University survey undertaken in 2000 showed 49% of farmers wanted to see NZ GM-Free while only 21% wanted to grow GM crops.

Second, public opinion is against commercial release. Polling has consistently shown a majority against the release of GMOs into the environment, often even for field trials. In June this year, 56% said they wanted the current moratorium on commercial release to be extended when it expires in October 2003.

Most important however is the final step in the chain. Consumers in both New Zealand and many of its prime export markets do not want to eat GM food.

All major UK supermarkets have gone GM-Free and other northern EU nations are heading that way.

The EU is still our biggest customer for agricultural products and 71% of Europeans say they do not want to eat GM food, no matter what level of testing has been applied. Japanese consumers are also very resistant to food containing GM products.

Trade risks

New Zealand would be taking a much greater gamble than other nations if it did adopt GM agriculture because New Zealand is highly dependant on exports for its income . Agricultural production accounts for 48% of our export returns.

This is five times the OECD average of 10% and double that of the nearest country. This means that for New Zealand, adopting GM agriculture carries five times the exposure of a typical OECD nation. The Europeans have also recently adopted regulations providing for food produce to be traced to its point of origin and to pinpoint its makeup.

If GM food is rejected in the marketplace, there will be no hiding in the more sophisticated markets.

Yet, if New Zealand were to instead choose to hold back from GM technologies, and brand our products as free of GMOs, this information would also reach the consumer.

According to detailed research by Professor Caroline Saunders of Lincoln University, New Zealand could be expected to obtain higher returns for its food exports if it were not a GM producer than if it embraced GM agriculture.

Professor Saunders' study across a range of export foods showed at best minimal additional returns under GM production, and distinct benefits under the zero or low GM option.

She also noted that as an island nation, New Zealand is uniquely placed to sustain a non-GM future as it is not subject to the threat of contamination, including cross-pollination, from nearby countries.

Our customers are telling us that there is nothing but punishment for New Zealand in pursuing GM for agriculture. Official assurances that GM food is safe have not been accepted by these customers.

Clean Green Image

This international customer response reinforces baseline concern about the effect of GM on New Zealand's clean green brand. Whether or not it is justly deserved, New Zealand trade benefits enormously from our clean green image.

A recent Ministry for the Environment report estimated this is worth perhaps \$1 billion a year to the country. New Zealand's biggest company, Fonterra, puts the value of 'clean green' to each dairy farmer at between \$18,000 and \$49,000 a year.

"As an individual and in my professional life I embrace change and am constantly seeking out new technologies. I know that technology offers many keys to our successful future, and that without embracing it we will not be able to exploit our full potential as a nation. However, as a food writer, a mother and a consumer, I am concerned that we do not yet know enough about GM technology to make a decision to allow release into our environment. In containment, GM technology has many useful and important applications that I support. However, should GM release prove in any way to be unsound - either in terms of human health or by compromising our biodiversity, or our environment, we as a generation will be responsible. I am not prepared to assume this responsibility for my children and other future generations without ensuring that any risk factors have been fully identified and dealt with.

"The issue of GM release is not just about our own food chain and biodiversity. Important as this is, we also need to consider the implications for our exports and our brand. I have always considered New Zealand as the premier food basket in the world and we need to ensure we develop this position if we are to continue to be successful in the global marketplace and secure a healthy and sustainable future."

Annabel Langbein

It is also a fundamental driver of the similarly large foreign exchange earner, tourism. Whatever the science of GM food, consumer are strong in many nations that GM is neither clean nor green.

Taking the path of GM agriculture is a fundamental branding and marketing question, regardless of the

"New Zealand is particularly vulnerable because of our excessive reliance on agricultural products for our survival. So I think it behoves New Zealand to be more cautious than any other country in the world.

"Some of the questions to do with GM release are very deep, difficult questions that are going to take a long time to answer - and I wouldn't expect New Zealand to have the resources to answer them. I don't think it is appropriate or wise for New Zealand to be a leader in the commercial release of GM."

Professor Garth Cooper

science. Should New Zealand deliberately walk away from a successful and highly desirable brand in order to embrace a food production technology that so many key markets are currently resisting?

Why run the risk of being seen as an undifferentiated producer of low value bulk agricultural products alongside the US, Argentina, Canada and, increasingly, China?

Most of all, does New Zealand need to take the decision now?

The risks and rewards of GM agriculture would be far from equally shared. Any gains from the early adoption of GM technology in agriculture will tend to be concentrated with a few major interests. But all New Zealanders carry the risks.

Coexistence

The Royal Commission on Genetic Modification had proposed that New Zealand could have it both ways on GM agriculture. It suggested that GM crops be grown in some areas while others were left reliably GM free - an idea termed "coexistence". However, there is mounting evidence against this being a realistic option. Contamination of non-GM farming is now considered all too likely an eventual result.

In response to this, the US Government has proposed regulations that would provide for food safety tests to be conducted before a new GM plant was even field trialed. The regulations cite "the likelihood that cross-pollination due to pollen drift from field tests to commercial fields" would increase as more field trials started.

In other words, the risk of even small trial plots contaminating commercial crops is now judged to be sufficient to make pre-testing advisable. The new GMO may otherwise enter the food chain illegally.

A US agricultural industry consultant, Susan Harlander, bluntly put it that "cross-pollination among conventional and biotech crops is inevitable".

For New Zealand then, it would just be a matter of when the scale of GM planting became such that contamination was similarly "inevitable". The separate harvesting and processing of crops can reduce the extent of additional contamination - it cannot prevent it entirely. And the effectiveness of such systems over time is already under question. The cost of the systems required to minimise contamination is such that it is uneconomic for most crops unless the accepted tolerance levels are very high.

In Argentina, segregation of maize is estimated to raise costs 7%, according to the International Service for National Agricultural Research. This is thought to be too much for all but the highest value GM crops in Argentina. The European Commission has similarly produced a study projecting that crops such as rape seed and corn cannot be segregated economically.

Inadequacies in the segregation systems can be even more costly. The failure of segregation measures designed to keep GM corn separate from non-GM corn in the US led to one incident that cost hundreds of millions of dollars in product recalls.

If introducing GM agriculture for some farmers now means that all farmers are exposed to eventual contamination, then the choice is not just a matter for individual farmers. All farmers are stakeholders in that decision. As are all New Zealanders – especially as any decision to embrace GM agriculture would expose the New Zealand economy to a far greater extent than it would other nations.

Liability

Who pays if a particular GMO causes financial losses for an individual or a company ?

Government initially referred the question to the Law Commission but the commission said that it cannot advise on new law until the Government decides to what extent those undertaking GM research "should be held accountable for anything that goes wrong".

The Sustainability Council believes that "polluter pays" should be the fundamental principle on which environmental liability is based. This would ensure that GM developers and users meet the full costs associated with this technology.

Unless they are bearing the full financial risks of GMO release, then someone is paying a costly subsidy. This will either be taxpayers or innocent victims.

Earlier this year, the European Commission set policy that will result in GM developers bearing the full costs of any environmental damage resulting from the release of GMOs. The principle that the 'polluter pays' is the foundation for the proposed European law and it applies to all serious

environmental hazards, not just GMOs. It sets the framework for a single European standard for environmental liability.

A key step to ensuring the polluter does in fact pay is to introduce what is termed strict liability. This means it is not necessary to prove the operator is negligent in order for compensation to be claimed. Under current law, the victim would too often end up picking up the tab for damages. Ensuring the polluter pays is also about setting the right incentives for companies to take due care so that damage is prevented in the first place.

At Risk – our people and our country.

The GM debate means more to New Zealand than perhaps any other country.

New Zealanders identify with their environment much more than most populations and the nation's clean and green reputation serves exporters and tourism remarkably well. New Zealanders depend for their livelihood on agriculture far more than their trading partners.

There is much at risk and so little evidence of a sure gain from agricultural GM release. No convincing business case for embracing GM release has yet been presented.

Once a GMO is released, there is no putting the genie back in the bottle. It is essentially irreversible.

When so much is at stake, surely we can afford to take more time than the current moratorium would grant us. Time to consider the issues in a much broader context than the debate has allowed to date.

"Never before have New Zealanders been more aware of the need to protect the environment and resources for the benefit of future generations. I share the concerns of most New Zealanders about the release of GMOs into our environment. I fear that not enough is yet understood about GMOs. We need more research, more information, more validated argument and, above all, more time to thoroughly analyse what the introduction of GM to our food supply means to the future of the country."

"I support the extension of the moratorium. This does not mean that I am not pro-science, or that I am anti-GM, rather that I wish to see more research on the risks before a decision of this magnitude is made. We only have one chance to get this right."

Dame Susan Devoy

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