Frequently asked questions about

GM, GM FOODS

and managing GM in the community

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I. What is GM? The basics

1. What is genetic modification?

Genetic modification (GM) refers to a set of techniques that alter genetic make-up often by moving genes from one species to another to produce new and different organisms. These techniques are the product of advances in molecular biology.

Genetically modified organisms (GMOs) are products of genetic modification.

Another term often used to refer to the same technique as GM is **genetic engineering (GE)**.

2. Are GM and biotechnology the same thing?

Biotechnology is the term used to describe a vast range of techniques that make use of biological processses developed over the centuries. Examples of biotechnology include penicillin, the use of yeasts in beer brewing and the use of bacteria for cheese making.

Genetechnologies encompass a recent branch of biotechnology activities. This new set of applications draws upon recent discoveries in genetics and molecular biology to make a host of products, from bio-screens in sewage plants, through to genetic identification systems, and screening plants for commercially useful traits.

3. Haven't we been doing GM for centuries? Isn't GM the same as plant-breeding?

Traditional breeding and GM are used for similar *ends* – to produce more profitable plants and livestock. Yet the techniques they use are very different.

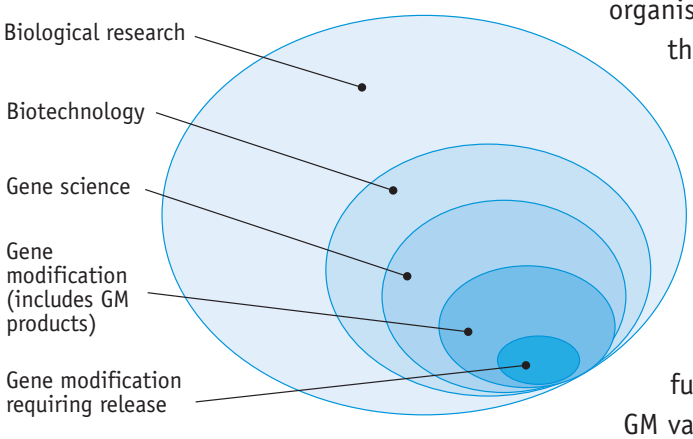
Traditional breeding is limited to crossing organisms from the same species or group of species (genus). Breeders wishing to produce more commercially profitable livestock lines are restricted to interbreeding within that species. Generally, traditional breeders rely on sexual reproduction to produce new lines.

With GM, species boundaries do not apply. GM plant breeders often insert selected genes from a wide range of organisms to produce a new variety. For instance, genes from a common soil bacterium (*Bacillus thuringiensus*, also known as Bt) are used in GM maize and corn varieties to repel insect pests such as the European corn borer.

4. What is the scope of GM applications today?

Most GM work is laboratory-confined. Laboratory-based GM is an increasingly important tool in diagnostics, conservation, medicine, plant breeding and the techniques of forensics.

Most of the current products on the market that were made using GM techniques no longer contain living material that can self-replicate.



This means that you don't have to release a genetically modified organism into the environment to gain the benefits of these GM techniques. For example, the great bulk of GM medicines are administered without containing living modified material.

Only a very small portion of GMOs are designed for release into the environment: these make up only a tiny proportion of all Government biologically based research in this country, Government being the key GM research funder.[1] GM becomes a riskier business when living GM varieties are used outdoors.

5. Is New Zealand GM free now?

Purchasers of New Zealand food products assess New Zealand's "GM Free" status primarily on the basis of whether New Zealand grows GM crops commercially. This is distinct from the use of GM in contained research. GM techniques are used widely in New Zealand laboratories, as discussed above.

So, the question of whether New Zealand is GM Free in food production is the only one relevant at present because, by and large, GM food crops are the only GMOs ready for outdoor release. GMO applications for use outdoors in other sectors – such as in forestry – are not likely to be commercially available in the next five years. GM varieties of fibre crops such as cotton are commercially available, but this New Zealand does not grow cotton.

New Zealand is currently a GM Free Food Producer. No GM crops have been commercially grown in New Zealand.

There have been several outdoor experiments of GM crops such as potato, peas and canola. These have been field trials involving a small number of plants, and carried out on the basis that no GM material would be allowed to escape to the environment. (Field trials are a step in the process of developing GMOs for the commercial market).

Some GM food ingredients are imported for use by food processors. These GM ingredients are grown in countries such as the US. The ingredients entering New Zealand are not live GMOs. They enter New Zealand as processed foods such as soybean crush and corn flour, and cannot reproduce.

II. GM food production

6. Why treat GM food differently?

Consumers in New Zealand's key export markets clearly **distinguish between GM foods, and the use of GM for medical purposes**. New Zealanders appear to make similar distinctions, according to surveys by the Royal Commission.

Europe is the nation's single largest export market for agricultural products. Europeans are widely supportive of GM for medical purposes, but **a majority clearly reject GM foods**. Consumers in many Asian markets are also strongly resistant to GM foods.[2]

It is these high levels of market resistance to GM food products and trace contamination of GM foods that justify treating GM food applications very cautiously.

7. Where's the evidence of market resistance?

The principle commercialised GM crops are **GM soy, corn, maize and canola**. These four account for 99% of global acreage of GM crops, and 99% are grown by the US, Canada, Argentina and China.[3]

The US Government reports that nearly all its corn exports to Europe were cut as a result of GM production. This occurred in 1997, when GM corn accounted for around 10% of all corn production.[4] This is estimated to have cost US corn growers around US$1 billion over a three-year period.[5] A significant portion of the South Korean corn market, formerly the second largest export market for US corn, has also been lost. In a now common move, South Korea has turned to non-GM corn producing nations.

Canada lost almost its entire canola export market to the EU (an average CN$185 million in annual export sales).[6] The Canadian Government also observes that "the production of GE canola is currently adversely affecting the value of non-GE canola".

The risk of country brand contamination from GM production is real. Agriculture Canada warns that consumers do not trust segregation, and that GM food production could "precipitate a loss of confidence in the integrity of the Canadian food system, which could be very disruptive [...] to Canada's ability to export to demanding markets".[7]

Market resistance has effectively restricted the range of GM foods grown. Since GM soy, corn and canola were approved in the mid to late 1990s, few other approved GM varieties have made it to market.

- **GM potatoes** were voluntarily withdrawn from North America in 2001 due to resistance from food processing companies such as Kentucky Fried Chicken, McCains and FritoLay.[8]
- **GM tomato varieties** were voluntarily withdrawn from the US and the UK in the 1990s.
- **GM flax** was ready for commercial growing in Canada, but was withdrawn in 2000 in order to avert potential rejection of Canadian flax seed products by European consumers, who account for 60% of Canadian flax exports.[9]

The latest GM proposed food variety to face market rejection is GM wheat. A form of GM wheat is ready for market approval in North America. Yet the wheat industry has opposed its introduction due to the market resistance signaled by purchasers. The Canadian Wheat Board, the country's single desk for wheat exports, surveyed its customers and found that 82% of its export markets (by volume) will not accept GM wheat. Many of its buyers have signaled their intent to source wheat from competitor markets if GM wheat is grown in Canada. The buyers state that they wish to avoid the exposure to GM contamination that they would face if sourcing wheat from a GM wheat producing country.

8. If the market resistance is so strong, why is GM crop acreage in North America continuing to grow?

Most GM crops grown in North America are consumed domestically, and by animals.

A small portion of soy, corn and canola exports are used for human consumption. These are generally processed into food ingredients that have until recently largely escaped labeling requirements (e.g., oils, additives and processing aids).

Whereas soy, canola and corn acreage for animal feed and industrial uses has increased, **new GM food varieties that are destined primarily for human consumption are not making it to market**.

The **US** is the largest GM corn producer in the world. Around 60% of all corn produced in the US goes to domestic animal feed. A further 19% is used for industrial feedstocks such as ethanol.[10] Most of the corn exported by the US is destined for animal feed.[11]

The US is also a significant soy producer. Only 16% of soybean meal and 11% of soybean oil is exported, with the rest consumed domestically.[12] 98% of all soybean meal is used for animal feed,[13] which until this year, was not labelled for GM content in the EU. Soybean oil also escapes labeling requirements in markets such as the EU, although this will no longer be the case.

Canada is the 3rd largest GM food producer. The principle GM crop grown there is canola. Canola is used in three main forms: seed, oil and meal. 80% of all Canadian canola meal is exported to the US for animal feed. The US is also the destination for around 70% of Canada's canola oil, where it is not labeled as derived from GM canola.[14]

9. Are consumers concerned about GM animal feed?

Some **UK and European supermarkets provide consumer choice**, and are attempting to source non-GM animal feed. Sainsburys, Marks and Spencer, Safeways, Carrefour and McDonalds Europe are among those that have either fully eliminated products from animals reared on GM feed, or offer their customers a choice.

The European Union has recently introduced **new regulations that will require the labeling of GM animal feed**. The requirement is designed to create greater transparency for consumers in the use of GM in the food chain.

GM food products are still relatively new and in this evolving market, it is difficult to predict how consumer reaction will develop in light of the new provisions.

In any case, the only GM varieties that New Zealand farmers could grow for animal feed at present are **GMOs that are also used for food production**. This risks cross contamination with conventional food production, especially corn products.

GM animal feeds that might be of interest to the New Zealand livestock industry – such as **GM ryegrass and GM clover – are at least five years away from commercialisation**.[15]

10. Will restricting commercial GM food production hold back research?

It is **commercial GM food production that generates a clear exposure** for the nation's brand. GM research and development, including contained field trials of food varieties, can proceed without triggering negative impacts.

In this way, **opportunities for New Zealand to capture the intellectual property on research would not be obstructed**, as all research stages required to develop a GMO to the point where IP protection could be sought may be undertaken.

New Zealand scientists at the forefront of GM food development have stated that they know of no GM food applications originating in New Zealand that are likely to come up for commercial release within the next five years.

11. Won't New Zealand miss the boat if we don't go GM now?

While significant amounts of GM soy and maize are grown for animal feed in North America, few countries have taken up GM food production. In the decade since GM food crops have been grown seriously, only four countries – the US, Canada, Argentina and, more recently, China – account for 99% of all GM crop production

Other countries have held back from GM crop production for precautionary and economic reasons.

Australia, for example, is not a GM food producer. This is because five out of the nine states have placed bans on cultivating GM food varieties in order to protect their brand and markets.

By remaining a GM Free Food producer for the time being, New Zealand and New Zealand regions can preserve their option to adopt new technologies (including GM) without pre-committing to the first line of GMOs.

Australian States act on GM Food Production

Six Australian states have introduced legislation on GM food production in their territories.

- **Western Australia:** all GM food production banned until 2006
- **Victoria:** GM canola banned until 2008
- **South Australia:** GM food production must meet stringent standards on contamination
- **New South Wales:** No commercial GM food releases allowed unless approved by the Minister
- **Tasmania:** All GM food production banned until 2006
- **Australian Capital Territories:** No GM food releases unless authorized by the Minister (Bill before state parliament)

III. Community management of GMOs

12. What laws govern GM releases?

The **Hazardous Substances and New Organisms Act (HSNO)** is the central act ruling the outdoor use of GMOs. Under this Act, all outdoor uses of GMOs are illegal unless they are approved by the special purpose regulator, the **Environmental Risk Management Authority (ERMA)**.

However, the Resource Management Act also provides jurisdiction for local government to introduce policy and rules to manage outdoor GMO use in their territories. It allows councils to adopt stricter standards if these are desired by the local community.

13. Isn't ERMA required to involve local bodies in the decision-making anyway?

ERMA does not have to inform a local body that a developer intends to release a GMO in their territory. This is at ERMA's discretion. It may notify, but is not required to.

ERMA is also not required to give special consideration or weight to submissions made by a local body on an application to release in its territory. In that sense, local bodies are just another submitter.

As a result, communities have no guarantee that their particular interests will be protected when GM releases are being considered by central government.

14. Isn't GM release a central government issue? Why not leave it to ERMA?

When considering an application for GMO release, ERMA is not required to consider all the aspects that may be important to a community.

At the simplest level, commencement of GM food production **has the potential to tarnish the regional or district brand** that growers and the wider community have invested in. ERMA is not under any obligation to consider such a regional perspective separate from the national interest.

More specifically, **the current law leaves communities financially exposed** if a GMO release causes harm. This is because those who release GMOs are not liable under HSNO for any damage they cause that is carried out in accordance with an ERMA approval.

A linked problem is that even if legal action can be brought under other ill-suited general law, ERMA is not required to screen the applicant for their ability to meet claims for damages. Thus if the party releasing a GMO has inadequate financial resources to cover damage claims, then the burden tends to fall on local government.

Finally, a number of councils have adopted policies requiring a precautionary approach be taken to any release of GMOs. ERMA however is not required to take a precautionary approach in its assessments of an application.

15. What options do local bodies have to control or manage GM releases?

The **Resource Management Act (RMA)** is the most targeted legal instrument for managing outdoor use of GM activities. Other options include introducing policies through a Long Term Council Community Plan under the Local Government Act.

The RMA provides a great deal of flexibility as to the approach councils can take in regulating the use of GMOs. Not all categories of GMO use need to be regulated with the same degree of precaution. Some could be controlled while others were not. Councils could also separately put in place a liability regime requiring those involved in outdoor GMO use to pay compensation for any harm resulting from their activities.

16. Won't it cost a lot to set up this additional regulation?

Good regulation does cost, just as the lack of it costs. A single GM contamination incident last year cost one Gisborne-based company $500,000. That is far more than such regulation would cost for any one council to put in place. The incident occurred before any GM crops have even been permitted to be released in New Zealand.

The flexibility available under the RMA means councils can choose to what extent they wish to take on extra duties that have any significant ongoing cost. There are mechanisms to address GMO use that do not involve significant ongoing cost.

The key question is how the costs of regulation compare with the expected costs of not regulating. Only if this overall assessment is made can a fair picture be given.

As many communities share similar concerns, they can club together to share costs of developing their responses and ensure costs are kept to very manageable levels. This includes obtaining detailed legal advice to cover councils against any legal challenges.

17. How can I tell if my Council has policy on the outdoor use of GMOs?

Most councils have recently undertaken community consultations to set a Long Term Council Community Plan. A number of local authorities have set policy on GMOs in these plans. Others have also set policy independently prior to this and you can request such statements from your council.

If no policy has been set, you can request that your council formally consider what the risks, costs and benefits to your area are likely to be from the outdoor use of GMOs and what policy council should adopt as a result.

For resources to assist you in this process, see www.sustainabilitynz.org.

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