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| How will GM affect the cost of living in NZ and how will that affect profits on the farm? | It depends on the application. To the extent GM will make production cheaper it will reduce the cost of living. To the extent it makes a product more desirable (e.g. the premium paid for the Impossible Burger) it would increase the cost of living. Genetic technologies are being deregulated around the world and as uptake by our competitors increases market process will be reduced, eroding farmers’ margins if we are still using conventional technology. |
| When many countries like Mexico are rejecting these technologies to regain seed & plant sovereignty can you give real life examples of more profitable farming? | This proposal by Mexico has been postponed until 2025 most likely because it includes the banning of glyphosate and is likely unworkable – Mexico imports 17 million tonnes of GM corn per year. In a similar move Sri Lanka banned the importation of fertiliser saying the country would be 100% organic whereafter the economy collapsed and the country was no longer able to feed itself.The use of GM by USA farmers has led to greater profits even though they pay more for GM seeds – GM is so popular amongst farmers there that, where GM varieties are available, over 90% of farmers are using them. It is worth looking up the experiences of Hawaii with papaya (GM rescued the industry there which was being devastated by ringspot virus) and Bangladesh with eggplant which sells at a premium to non-GM eggplant. |
| How much value is there in the marketplace by remaining GE free | We need to distinguish between a product which is GMO free and a product from a country which is GMO free.Products considered to not contain GMOs e.g. organic and “Non-GMO Project” labels contain a tolerance for the presence of GMO. Organics require the farmer to to use GMOs in their production systems and the Non-GMO Project label requires for example farmer’s to use no more that 5% GMO feed to qualify. Labelling rules in countries are similar e.g. Europe has a level of 0.9% of approved GMO before products need to be labelled. This is called a tolerance level and allows co-existence to happen.In Australia “GMO free” corn from GMO free states e.g. Tasmania and “GMO Free” canola from states which grow GM canola have the same premium. In other words, there is no market premium for a region or country to be GMO free. |
| Is the technology developed enough to accurately edit on organisms with a face? beef, sheep etc. Programme for IMF (intramuscular fat), worm resistance, growth | Genetic modification and gene editing is being used to modify humans, for example in the treatment of cancers where white blood cells are removed from the body, genetically modified to fight the cancer and returned to the patient or patients are being treated to genetically modify their bone marrow to address disorders such as the clotting disorder, haemophilia or the red blood cell disease, sickle cell anaemia. These changes are not passed on to any children but it does demonstrate that the technology is precise enough to be used in this way on humans.Genetic technologies are also possible in animals in a way which does change the inheritance of the animal. Unlike with plants this would also be subject to animal ethics committee approval. Modern genomics (reading the genetic code) allows scientists to double check their work. Gene editing an animal in this way is called precision breeding and would allow breeders (in conjunction with scientists) to speeds up the current breeding process which relies on random mutations in the genes of the animal. |
| Markets are growing rapidly wanting the attributes from NZ that include GE free, how do benefit behind the farm gate if we sacrifice the golden goose? | The golden goose is our environmental credentials not “GE free”. In fact we are not GE free now – much of our cheese is made with GM enzymes (has been for many years) and farmers can freely import animal meal (e.g. cotton seed meal and soya meal) which is GM and fed to animals. GM based animal treatments (e.g. vaccines) are also becoming more common.Contrary to popular belief GM markets remain stalled at around 1% of sales. The price of lamb suggests that markets for NZ produce is not growing rapidly. |
| Have we maxed out what we can achieve with [non GM] technology? Are we now in a position where we are going to get left behind? | While there is always more to gain from developments which are non-GM, the short answer is yes, we are likely to get left behind. GM is only one tool but it is currently a tool which is being denied to farmers in New Zealand. Genetic technologies such as gene editing can significantly increase the rate of genetic gain in our crops and animals and may provide additional means to reduce our environmental footprint (such as low methane grasses and clover and non-wilding trees).  |
| If you release a Gm cultivar does it put at risk our existing Cultivars | We are always releasing new cultivars and other than where farmers have made an effort to do so (e.g. spraying and planting) we have not seen those new cultivars take over the old ones. If they did there would be no market for new seeds. There is no reason why GM seeds would behave any differently. Canterbury provides a good example with its pure seed breeding that coexistence between cultivars is workable. Clearly pollen of seed can move across farm boundaries but the amounts (as shown in the Canterbury seed industry now) are small and below accepted tolerance levels. |
| Can you give us examples of greater farmer profitability but include the unintended consequences and environmental degradation from   GM crops in the answer? | Farmers in the USA have used herbicide resistant GM crops and insect resistant crops with greater profitability. The uptake in these technologies in their major crops such as cotton, corn, canola and soy is around or over the 90% mark showing they are very popular with farmers. Unintended consequences, such as weed or insect resistance, are not a result of the gene technology per se but the way in which the crops might be used. To illustrate this point Farmers Weekly this week had a front page article on weed resistance here in New Zealand where we don’t use GM. To limit insect resistance in insect resitent GM crops farmers are required to plant refugia (an area where the GM crop is not used) just as some farmers are maintaining a group of animals which are not being drenched to dilute the drench resistant worms. |
| Can you give me examples of GM tech that could directly help me on farm if NZ allowed it? | HME ryegrass, high tannin clovers, gene edited endophytes and non-wilding pine trees were all examples used at the panel session. The first two reduce greenhouse gases and nitrogen leaching, the gene edited endophytes retain the plant protection qualities of the endophytes while reducing animal toxicity such as ryegrass staggers. Non-wilding pine trees allow trees to be planted for shelter, erosion control or plantation forestry without the threat of seed escaping as wilding pines. These are all applications in the advanced stages of development and trials. |
| How will farmers receive tangible benefits from GM crops if we’re shut out of premium markets? (My business & premiums are under threat if NZ changes regs) | The evidence does not support the assertion that if New Zealand changes our regulations farmers will be shut out of premium markets. The USA is the largest producer of GM crops as well as the largest producer of organics. New Zealand sources its GM free corn seed from the USA where 95% of the corn is GM. Europe imports seven billion euros worth of GM animal feed to produce its meat and milk. |
| How easy it is for GM crops to affect a paddock of non GM crops next door? | This depends on the type of crop, how it reproduces and what you mean by “affect”. Markets have a tolerance for GM presence – 0.9%-5% (see answer to previous question). Animals eating GM feed do not have to be labelled. In general to achieve the 0.9% tolerance level in a crop does not take much effort. |
| Is there any risk to our NZ biodiversity or tourism income if we move to GM? | No. The approval system is designed to manage any risk to our biodiversity. Tourism was not affected during the hyper-publicity that was corngate just as tourist don’t avoid Paris which is run on nuclear power. |
| What’s the impact of GM on biodiversity? | See answer above. |
| Could we approve and use GM technology tomorrow, or is there a lag? | The government has pledged to introduce legislation to parliament by Christmas 2024 at which time it will start to move through the legislative process (select committees etc) and have the new legislation in place by the end of 2025. So yes, there is a lag. |
| What’s the impact of GE on biodiversity? | It is the applications of GM (or conventional breeding) which might have an impact on biodiversity, not the technology itself. It is stated that every week a garden plant (not GM) become naturalised in New Zealand and many will go on to become weedy. There seems to be an assumption by some that using gene technologies to improve the production of a plant automatically makes it more weedy. This assumption is wrong. Sterile pine trees are designed to be the opposite. Insect resistant plants mean less non targeted sprays are used. Making farming more productive with a lower environmental footprint means we can set aside more land for biodiversity while still feeding the same number of people. |
| what is the danger this technology will let to proteins being made in a lab not on a farm? | This is already happening and the producers are touting a much lower environmental footprint. All the more reason that we need to use all the tools in the toolbox to drive down our own environmental footprint. |
| Is the genie already out of the bottle? Is there any way back to natural genetics? | We gave up natural genetics 10,000 years ago. We have turned grass into corn and wolves into chihuahuas.  |
| Is it possible to have some farmers GM and some not in the same region? Or if one goes GM, all goes by default? | Yes, coexistence is possible as shown in the USA and Australia. As with all farming its success at an individual level is dependant o farmers being good neighbours in both directions. |
| How do we stop Big ag controlling farmer benefits using ownership of the cultivars | Plant variety rights (used for non-GM) and plant patents (used for GM) are similar in this respect.  |
| Has the work been done to understand the relationship between GE organisms and the wider ecosystem? Transference, cycling, negative synergies? | Transference, cycling, negative synergies would be considered in the same way they are considered for non GM plants. |
| HOW will GE reduce on farm costs? Seed etc will be more expensive when someone owns a patent? | It is a farmer choice to buy GM seeds. That decision will be made on their own assessment of benefit vs seed cost. Famers make these decisions every day (when faced with when it comes to new cultivars – will this cultivar be more productive, have better persistence, affect the growth and health on my animals. The decisions around GM will be no different. |
| Should we bring back woolly mammoths? | Why would you want to? |
| If GE can’t be traced, then what prevents the technology being abused or used without notification. It was said earlier, tech will outrun regulation.   | This is theoretically possible but practically unlikely. You need to have the laboratory and skills to construct genes and undertake the scientific procedures. This sort of work, undertaken by nefarious actors, is unlikely to go unnoticed in New Zealand. |
| If we believe this would be best for nz what is next step to change  regulations | See above |
| Is the first critical work on from here. Establishing the education between GM (modified) to GE (edited) sounds critical | It is probably more important to ensure people understand the difference between conventional breeding techniques such a mutagenesis (non GM) and precision breeding (GE). Mutagenesis, such as radiation and chemical mutagenesis, is unregulated and is where seeds are exposed to radiation or chemicals (such as mustard gas) to produce thousands of random and unknown mutations followed by planting the seeds to see which survive and which have beneficial and/or detrimental mutations. This is the suck and see approach and has been used to breed our modern crops and vegetables for more than 50 years. Plants bred this way are allowed to be used in organics.Precision breeding is using modern techniques of gene editing, such as CRISPR-Cas9, to make precise changes in the plant’s DNA thereby changing the function of a gene.If the genetic code were a book gene editing (GM and regulated) is like using Microsoft Word to change the exact word on the exact page you want while mutagenesis (not GM and not regulated) is like leaving your 3 year old for three hours with the book and a crayon. |