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The main points I wish to make are:

1. I support GM research when it is done safely.
2. But I am against open-air GM research because it exposes our community to unreasonable risks. Evidence from around the globe shows that GMOs harm the health of people, causing problems such as reduced fertility, allergies, gut related illnesses, auto immune diseases and DNA damage. GMOs also harm animals, soil, wild life and pollute waterways. As evidence of harm accrues, so more countries are banning GM crops and their associated herbicides. My evidence includes 54 studies showing harmful effects of GMOs. These studies highlight the importance of carrying out comprehensive, long-term safety studies. Because I am concerned at how the biotech industry trivialises the massive harm caused by GMO farming, I'm submitting 2,039 further studies showing evidence of harm.
3. To minimise risk and maximise safety of GM research in Northland, I therefore ask that council prohibit open-air trials and refuse to make it a discretionary activity.
4. I ask that those carrying out GM research be held fully financially accountable for all and any harm to people, the environment and to livelihoods. I am concerned by the clause which says companies should be held accountable "to the extent possible" because it provides a let-out clause which can be exploited by lawyers and I ask that this clause be removed.
5. I believe the gravest risk of all would come from allowing field trials to become a discretionary activity. Assurances of minimising risk are meaningless, especially as Prof. Heineman, in his submission, states: **there is insufficient information to adequately assess some risks, including health risks and potential long-term risks to the environment.** Any plan change which allows open-air GM trials, for which the risks cannot be adequately assessed or managed, invites disaster, and in effect turns Northland and into one huge GMO laboratory.

A perfect example of the industry's lax risk assessment standards comes from a 2013 study by an international team headed up by Prof. Heineman. It concluded that government safety regulators fail to consider important risks from new kinds of GMOs such as dsRNA. Apparently, dsRNA can transfer from plants into humans, for example, by simply breathing in GM flour in the kitchen or by absorption through the skin. The team was concerned that dsRNA GM plants could have unexpected effects on target organisms, on people and on wildlife. The paper states, "We won't know until we do thorough assessments, and these assessments have not been done". Remarkably, the team found that there are no internationally agreed protocols or guidelines for how to conduct a thorough risk assessment on new dsRNA GMOs. The team has now developed a formal risk assessment procedure for these dsRNA GMOs, but it's unlikely to be used, because the regulators don't require it.

This blasé attitude to risk, highlighted by Prof Heineman and his team, is demonstrated repeatedly in the biotech industry:

- a. they sell GM seed having carried out 3 month studies (which is all they are required to do) and claim their seed is safe. But the massive tumors, liver and kidney damage, infertility, increased mortality, early aging, DNA damage, only emerge in longer studies.
- b. Many independent researchers have been refused access to GM seed for research.

- c. Attempts to hide the harm caused by GM feed, include trials where the Control groups were fed on GM contaminated feed.
- d. The industry sells GM seed in the full knowledge that it will contaminate neighboring farms and wreck livelihoods. Not satisfied with this, the industry sues farmers for patent infringement and dismisses compensation claims from organic farmers.
- e. The industry claims to take risk seriously but sells stacked trait seeds which have only been studied for each individual trait separately (which is all they are required to do). And it continues to sell stacked trait seed after studies show these seed predictably exhibit very unpredictable behaviour – in other words, they are not safe.
- f. The industry continues to sell Glyphosate and Roundup despite hundreds of studies demonstrating enormous harm to people, animals and the environment. Thankfully some countries and Europe are now reading the research and banning them.
- g. The industry assures us that horizontal gene transfer with Bt seeds is impossible despite studies showing that horizontal Bt gene transfer into non-target species, including humans, not only happens but that the Bt protein remains viable.

It is very risky to take promises of safe practise and net benefits seriously when the industry acts with such disregard for people, livelihoods and the environment. The best predictor of future behaviour is gained from reviewing past, recent past and current behaviours and this measure is most valid with behaviours that happen frequently. On this measure any biotech industry promises of net benefits cannot be trusted and should be considered as articulate and elegantly woven works of fiction.

I oppose changes to the plan especially with the TPPA looming. The TPPA gives corporations the power to sue Council in overseas courts which have no interest in the welfare of our community. Freeing up GM research could prove risky and potentially very costly. For instance, last year Bilcon were given the go-ahead for a venture provided an environmental impact study was favourable. At the Environmental Impact Study, the community successfully argued against the project, stating it was counter to core community values which included their economy, life style, social traditions and quality of life. Bilcon objected and sued Canada in an offshore TPPA type arbitration (thus getting around local laws). The arbitrators decided in favour of Bilcon, stating that core community values such as the economy, life style, social traditions and quality of life, should not be considered in an environmental impact study. This shows that when the biotech industry promises "net benefits", what they really mean is net benefits to their profit margins with gross risks and contempt for community values, worn by the community.

6. Abrupt climate change is happening and according to the council website we can expect hotter, drier weather with more severe droughts, and more severe weather events. The council climate data says we can expect a 10% crop decrease with each degree of temperature rise. GM crops have shown themselves to be more expensive to buy and grow, more toxic to the environment, lower yielding in stressful conditions, prone to succumbing to the very diseases they were bred to resist, requiring increasing amounts of toxic sprays with each year of use, a catalyst for rapid development of weed and pesticide resistance, and less resilient than their natural counterparts.

Because of this, when companies promise "net benefits", I think we need to pay attention to the words of Dr. Doug Gurian-Sherman, a former biotech specialist for the U.S. Environmental Protection Agency. In 2008, he said, "After 20 years of GM research and 13 years of commercialization, GM crops have a track record that allows us to evaluate their future

prospects.... Let's be clear. As of this year, there are **no** commercialized GM crops that inherently increase yield. Similarly, there are no GM crops on the market that were engineered to resist drought, reduce fertilizer pollution or save soil. Not one."

And again in The Ecologist, Feb 2015: GMOs are summarised as 20 years of hype for a worthless technology. It states: "No matter how much money has been thrown at GMOs from government, private investors and corporations, no matter how much PR spin is put on the story, the fact remains that the promises that GM food would revolutionise our world, feed the hungry, boost the yields **and** therefore the incomes of farmers, cure disease and more recently, fight climate change, remain spectacularly unfulfilled".

Another reason for caution against hopes of net benefits comes from Modern Farmer Magazine¹. In 2013, Aaron Bloom, a crop consultant and farmer had been growing GM crops for 5 years but he changed back to natural crops **because they are more profitable**. The article adds that many other conservative, Midwestern farmers are doing the same, not because of ideology, but **because natural seed yield better, sell better, and are more profitable**.

The same article also cautions about promises of net benefits. Farmer Chris Huegerich said, "Five years ago the GMO seeds worked and I didn't have corn rootworm because the Bt gene worked and I used less pesticide. Now, the worms are adjusting, and the weeds are resistant. Mother Nature adapts".

The promise of **net benefits** will be used to argue for open-air research but the history of GMOs shows us that there are no net benefits, only terrible risks and gross costs which will be born by local farmers and the local community.

7. I would like to finish by taking up Chris Huegerich's point that mother nature adapts. As gene science has developed, we have learned about the crucial importance of epigenetics – how a plant elegantly and consistently adapts to its very specific local environment. Epigenetics have as great an effect on plants as the genes, and epigenetic adaptations are transferred each year to the next generation of seed without altering the genes. Abrupt climate change means seed will need to adapt very rapidly and appropriately to widely varying local conditions. Because of this, I think it will become vital for farmers to save their own seed for next year's planting because that seed will continue to acclimatize uniquely and rapidly to the particular area it is grown. This happens much faster than is possible with GM seed and my concern is that Bt GMOs, such as Bt pine trees, could wreck this process as their pollen spreads widely and Bt GMOs have been shown to harm themselves, other plants, animals, organisms and the environment. With abrupt climate change this is not a risk I believe we can afford to take.

Today I have presented evidence showing GMO technologies are not safe, are not adequately regulated, do not have sufficient research protocols, are inadequately researched before release into the open, are guaranteed to wreck the livelihoods of some farmers, are almost certain to harm the health of local people and harm the environment. I therefore ask council to remove all "get out" clauses such as "to the extent possible", and deny the request for a plan change which would allow open-air GM research as a discretionary activity based on supposed "net benefits".

Thank you