AMENDED VERSION

Submission to House of Representatives Standing Committee
c/o Parliament House
Canberra ACT 2600

Attention: Mr Rowan Ramsey, chairperson.

From: Mrs Meg Wilson

Subject: **Agricultural Innovation**
Department of Agriculture and Industry

SUBMISSION:

This submission addresses the role of technology in increasing agricultural productivity in Australia and focuses on the following terms of reference:
Emerging technology relevant to the agricultural sector, in areas including but not limited to telecommunications, remote monitoring and drones, plant genomics, and agricultural chemicals.

Dear Mr Ramsey,
Please advise me if there is a public hearing in Perth, Western Australia (WA). I would like to make a presentation.

We live in WA. Several issues of great concern are raised in this submission. The greatest fear shared by many across the country, is that this government will do nothing about them.

The public is aware of the inordinate pressure on our government from overseas multinationals. There is a public perception that government appears to be aligned with what a few giant agritech corporations want, not with what most Australian consumers want, not with what is vital for the nation's future food and environmental security. The profound health, ecological and economic ramifications are repeatedly ignored. Public concerns are ignored. This is cause for deep cynicism and distrust.

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1) THE TERMS OF REFERENCE ARE NOT CLEAR, THEY LACK FULL AND PROPER DISCLOSURE.

The public are denied the opportunity to be properly informed in the decision-making process.

We are concerned that the House of Representatives will make inappropriate or biased / skewed decisions as a result.

Any 'innovation' of a highly contentious nature should be open to full nationwide debate.

A recent survey showed that while there is a cautious agreement certain forms of genetic engineering could have valuable applications in areas of human medicine, eg for treating people with genetically transmitted diseases, most people registered objections to GM food production.

The terms of reference must be specific / precise / explicit.
By saying 'Emerging technology relevant to the agricultural sector, in areas including but not limited to... people are 'kept in the dark' and potentially misled, particularly when it comes to 'plant genomics and agricultural chemicals'.

By limiting disclosure only to 'plant genomics', the terms of reference, for example:
(a) fail to let the public know that plant genomics in agriculture can be part of the manufacture of genetically engineered organisms (GMOs) manufactured by the biotechnology industry – a production method based on the current extremely limited understanding of plant genomics and other complex interacting factors.

(b) **fail to let the public know that animal genomics** leading to genetically modified, cloned and transgenic animals, may be open to consideration. This also would be based on the current extremely limited understanding of animal genomics and other complex interacting factors.

(c) **fail to let the public know that microbial genomics** can lead to genetically modified microbes eg bacteria that may be used in livestock vaccines, and these would fall within the terms of reference. Bacteria and viruses are not classified as either plants of animals. However some bacteria are described as "intestinal microflora". Currently an attenuated GM *Escherichia coli (E-coli)* chicken vaccine is being assessed by the Australian Pesticides and Veterinary Medicines Authority (APVMA). It raises many serious issues that remain to be addressed.

The relevance and vital role of human and animal gut microbiota (microbiomes) must be understood in any consideration of GM food production.

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2) INTRODUCTION:

Scientific American June 2015

Advances, page16. Martin Rees, founder of the Center for the Study of Existential Risk

Question to Martin Rees: What are the major risks to humanity as you see them and how serious are they?

Answer: 'I'm personally pessimistic about the community's capacity to handle advances in biotech. In the 1970s the pioneers of molecular biology famously formulated guidelines for recombinant DNA at the Asilomar conference. Such issues arise more starkly today. There is current debate and anxiety about the ethics and

prudence of new techniques: "gain of function" experiments on viruses and the use of so-called CRISPR gene-editing technology. As compared with the 1970s, the community is now more global, more competitive and more subject to commercial pressures. I'd fear that whatever can be done will be done somewhere by someone. Even if there are formally agreed protocols and regulations, they'll be as hard to enforce as drug laws. Bioerror and bioterror rank highest on my personal risk register for the medium term (10-20 years)'.

Innovation should be strongly focused on raising agricultural productivity and efficiency in the most successful farming sectors, ie in those most sought after by consumers. Consumers are the market drivers, and sustainers of industry at all levels. Consumers at home and abroad are increasingly seeking organic (chemical-free and GM-free) foods. Most object to Genetically Modified (GM) foods.

Agriculture and industry should be fiercely guarding Australia's inherent goodness. It would be irreversibly damaging and extremely costly on many levels to throw this away. Choosing the best path forward with that in mind is critical.

As an island continent, our land is blessed with a natural geographical and quarantine advantage. Year after year this is enormously cost saving. This natural competitive edge protects our agriculture and livestock industries, the health and safety of Australians, and the world class biosecurity made further possible by our extraordinary bushland and ecological systems.

Our home state of Western Australia has unique geographical and natural quarantine advantages, being bound on one side by sea, on the other by desert. That has enabled this State's agricultural sector to gain an enviable reputation nationally and internationally on the basis of its 'clean, green and GE-free image'.

This winning combination of factors has enabled Western Australia to uphold a strong competitive edge. This lead that would be lost if GM agriculture were allowed to take a hold.

Despite a curious lack of support from the current WA government, our organic and biodynamic industries continue to flourish and expand; produce from this sector continues to be highly sought after at home and abroad.

Organic Canola harvests earn the premiums, continuing to out-compete recently introduced GM Canola.

We confidently predict increasing demand in future markets at home and abroad will be for organic and biodynamic produce. Logically it is in this area that innovation should be strongly focused and productivity raised.

Biotechnology research is not mature enough, it belongs in the laboratory for at least another 50 – 100 years. Companies are manipulating the blue print of life for profit without regard for the highly complex relationship of genes to the whole network within an organism. The evaluation of health effects are mostly left to manufacturers, their data is shrouded in confidentiality. Claims of 'substantial equivalence' are being proven misleading.

GM food production that continues to be reliant on increasing heavy pesticide use is set to have a very brief future, as worldwide levels of toxins reach and exceed safe limits for human and animal health and environmental safety. As it was with DDT, the consequences are telling.

Agrichemicals are 'treadmill solutions'; continued use is hazardous and irresponsible. Beneficial plants and insects are killed, not simply pest species. As well as leaving a toxic environmental legacy, destroying the integrity and sustainability of our agriculture, they jeopardize the well-being of current and future generations. Ultimately our economy is undermined.

The worn-out PR argument of the agritech / chemical industry, that it is impossible to farm without use of chemicals to control weeds and insect pests, cannot be substantiated. The success of chemical-free farming has already demonstrated this. Safe, relatively low cost alternatives ARE possible, as organic farmers know. Organic standards are high both to meet consumer demand and to maintain farming integrity.

3)THE BEST AUSTRALIA CAN DO IS TO REDUCE ITS UNHEALTHY DEPENDENCE ON AGRICHEMICALS.

Farmers need to be rapidly transitioning away from chemicals altogether.

There could be a cooperative arrangement between CSIRO and the universities to help achieve this. Restoring the role of local insectivorous native birds is a possibility.

Pesticides can be harmful. Despite tight controls they do get into food.

Risks of pesticides are major, effects tend to be cumulative and lasting.

A major concern about the use of patented GM seeds and plants is the associated, obligatory heavy use of patented pesticides, principally glyphosate-based herbicides. Glyphosate is now listed as a potential carcinogen. (Group 2A). Adjuvants of the POE-15 family (polyethoxylated tallowamine) in 'Roundup' are known to be even more toxic. These must be regulated as such.

Levels of pesticides in many kinds of fruit, vegetables and grains are now at levels deemed dangerous by biomedical scientists. Pesticide use is on the up. This worries environmental scientists as pesticides are designed to be biologically active.

Studies link exposure to organophosphate pesticides in pregnancy to delays in childhood development and autism; they may also play a role in vascular diseases. Epidemiological studies published in *The Lancet, Neurology, (Vol 13, p. 330)* suggest the commonly used Chlorpyrifos can damage human brain development. The US National Institute of Environmental Health Sciences, North Carolina, has evidence that pesticide exposure may increase the risk of developing diabetes and obesity.

Accidental inheritance: Many agricultural chemicals are endocrine disruptors, interfering with the hormonal signals that help to direct the formation and functioning of the reproductive system. Male offspring from rats exposed during the second week of pregnancy to common agricultural chemicals - the pesticide *methoxychlor* and the fungivcide *vinclozolin* - have abnormal

testes that make weak, low numbers of sperm.

Such harmful chemicals can also affect gene activity and inheritance. Recent research on rats and mice links pollutants – including agricultural chemicals – to epigenetic modifications that cause disease and reproductive problems, all without changing the DNA. These epimutations can be transmitted along with any health risks to future generations. Given that we all share similar aspects of biology with other mammals, it seems reasonable to expect epigenetic transgenerational inheritance does occur in people. Epimutations pass from the sperm of affected males to the cells of developing embryos, influencing future generations.

The Office of the Gene Technology Regulator (OGTR) depends mostly for its data on the biotech corporations. Thorough safety testing of GM foods and GM food production methods on human health and the environment has not been done. This ongoing neglect is inexcusable; both people and animals are unknowingly harmed by it. No studies are done of effects on human reproduction and developing foetuses: 'As a culture we do a very poor job of protecting, valuing or even noticing fertility - not just among humans, but across life's spectrum. Indeed vast amounts of money and cutting edge technology are devoted to practices that actively interfere with the life cycle. We have a global agricultural model that has succeeded in making it illegal for farmers to engage in the age old practice of saving seeds - the building blocks of life - so that new seeds have to be repurchased each year'... *('This Changes Everything', Naomi Klein, p427, Penguin Group, 2014).*

GM farming binds people to the use of chemicals.

Wildlife, an important part of the web of life and our biosecurity, are in decline as a result.

The worrying decline of domestic bees, essential to agriculture, is now attributed to pesticides.

Yields in the immediate period after commencing GM farming are not a measure of productivity. Invariably this is followed several years later by soil contamination and lowered productivity as a result of repeated chemical applications.

Pesticide resistance: Every biologist understands that controlling organisms with short generation times is fraught with risks. These can evolve far more rapidly, so if a genetic mutation occurs which can lead to resistance to pesticides or antibiotics, these organisms will respond more quickly and develop that resistance.

The best means of weed and pest control is to identify and control the problem *early*, then keep up the control for several years, as seeds can last for a long time eg for about 15 years with sub-tropical Buffel Grass. Wild oats is another example. The research done so far is very limited.

4) AUSTRALIA NEEDS A MASSIVE BIOLOGICAL CONTROL INSTITUTE AND REGIONAL RESEARCH CENTRES:

As a generalization, Australia needs to concentrate a lot less on chemicals, it needs to rapidly transition away from chemical control and focus more on biological control, particularly of major invasive species.

Australia has had a lot of success with biological control, and has lead the world in this area. Eg

with the introduction of ladybirds into orchards. Israel and USA have copied the research that was developed and implemented here.

Australia can lead other countries in preparing for future impacts on agriculture from increased pest insects and diseases, (as well as insect borne human diseases), as an outcome of higher temperatures and more extreme weather events. [*Nature 2013, Scientific American 2016, World Health Organisation (WHO)]*.

With climate change predicted to increase pests and diseases, biosecurity obviously needs to be strengthened. Yet attempts are being made by the WA government to weaken Biosecurity and exclude GMOs and human health from the scope. This is cause for deep distrust and cynicism.

5) AUSTRALIA'S WORLD CLASS BIOSECURITY HAS BEEN BUILT ON ENTOMOLOGY:

Research on insects (Entomology) needs expanding. Pest species cannot be controlled overnight. It takes at least five years to find out what we can do to introduce a control agent from the country of origin of that species. Most are from the Mediterranean and South Africa where they are not out of control. Researchers go back to those countries to study the species' methods of predation, and what predates on them. Then if suitable they are brought into Australia under strict conditions.

The necessary science for innovation won't be picked up in universities which generally only engage in short term projects. The value of our WA Department of Agriculture (DAFWA) was that it could do long term trials in the bush. It was able to regulate and get onto a problem quickly. But recently, with that good core of science gone, this is no longer the case. For no sound reason, the WA Department of Agriculture and Food has been virtually decimated by the current government. This is a cause of great dismay and concern across the entire community. The Nationals who you would think could see the value of DAFWA , failed to. This lack of logic has cast the Nationals in a very poor light.

6) WHERE IS THE SUPPORT FOR INNOVATION? In WA, the Department of Agriculture & Food (DAFWA) has been stripped by government of its top research staff and duties aimed at boosting productivity and profitability on farms. *(The Countryman, 21 May 2015).* With no research and development, with no market development by DAFWA, and with its regulatory authority almost gone, nothing much is left.

7) AUSTRALIA SHOULD NOT BE MADE DEPENDENT on overseas 'commercial science'. We want Australia to be a leader in its own right, providing it own solutions to its own unique problems, and marketing its own areas of expertise.

Government has largely subjected Australia to a position of infantile dependency on imported, mostly low quality and inappropriate 'commercial science'. Our farmers and the unwitting Australian public are now tied to subsidizing overseas vested interests with few if any of the benefits flowing back into our country. Eg with GM crops we now witness the tragic, progressive undermining of the very foundations for our success in agriculture – our 'clean, green and GE-free' image. Australia now seriously lags behind other countries in the sciences, We are shocked to discover Australia no longer features at all among world leaders. (Ref: *Scientific American,*

October 2015, page 41).

8) TELECOMMUNICATIONS, REMOTE MONITORING AND DRONES CAN ALL BE VALUABLE TOOLS FOR SOIL STUDIES AND SOIL RESTORATION, ORGANIC AND BIODYNAMIC FARMING, AND FOR TRACKING SPECIES.

9) WANTED IS INNOVATION IN ORGANIC & BIODYNAMIC FARMING THAT:

* identifies and classifies soil types (part of UN Global Soil Map project)

*further improves soil health and significantly increases humus,

* further improves moisture retention.

*increases understanding of microbial genomics and mycorrhizal functioning

*further improves beneficial natural microbial and mycorrhizal functioning in soils,

*further increases plant species diversity and crop diversity and agroecology,

*supports research and development of purpose-produced crops,

*further facilitates selection of plant varieties adapted to local soils and a changing climate,

*integrates native food species, and native plants useful in pest control,

*increases use of companion and sacrificial plants,

*researches and develops the role of local native insectivorous birds in pest control,

*prevents contamination.

Intensifying agriculture offers much needed solutions, (as does intensifying urban centres). This preserves remaining natural vegetation cover, critical biomass and the essential ecosystem services these provide for everyone. Maintaining - and rebuilding - our regional microclimates are vital to the future of agriculture. Agroforestry can be play a role in this.

Productivity per area is higher on intensive farms but productivity per labourer is lower. This could be overcome through targeted crops and increasing plant varieties (multi-culture).

10) RESTORING SOIL HEALTH and RESILIENCE OPENS OPPORTUNITIES FOR AUSTRALIA TO LEAD IN SOIL RECOVERY TECHNIQUES, SOIL SCIENCE and ARID LAND MANAGEMENT.

11) INNOVATION IS URGENTLY NEEDED TO IMPROVE SOIL HEALTH AND LANDCARE TECHNIQUES TO ENSURE SUSTAINED PRODUCTIVITY.

Soil / land degradation is Australia's most serious problem. On a world scale, soil degradation has been a disaster in slow motion. "Many would argue soil degradation is the most critical environmental threat to humans". *(Peter Goffman, Soil Microbiologist, Cary Institute of Ecosystem Studies Millbrook, New York).*

More than a third of the world's top layer of soil is endangered *(UN, 2015, International Year of the Soils).* 'We are losing soil at a rate of 30 soccer fields a minute. 'If we don't slow the decline, all farmable soil could be gone in 60 years. Given that soil grows 95% of our food, and sustains human life in other more surprising ways, that is a huge problem'.

In America more than 20, 000 soils have been catalogued. Many face extinction. Are our Australian soils being catalogued? How many face extinction? Not in the sense of endangered species. Rather extinction of a kind that 'transforms a fecund soil into a dusty, microbiologically flat shadow of its former self. Once that diversity is gone, it's gone for a while. Soils take thousands of years at a minimum to gestate'. *(Peter Goffman & co-worker, Rick Ostfield).*

Soil is a surprising ally against climate change.

12) UNITED NATIONS (UN) GLOBAL SOIL MAP PROJECT: A first step would be to work together with the United Nations (UN) to create the Global Soil Map project. Sophisticated techniques are used to produce a map with a resolution of 1 kilometre.

13) PRISTINE SOILS ARE NEEDED AS BENCHMARKS.

14) PROTECTED ZONES ARE NEEDED FOR ENDANGERED SOILS.

15) ORGANIC FARMS PROVIDE NECESSARY BASELINES. The baseline for monitoring is no GMO presence and no pesticide residues

Restoring productivity and enriching soils is best achieved by recreating and maintaining a surface layer of rich natural humus. This should be a primary goal of agricultural innovation.

Chemical fertilizers do not work as they release polluting nitrous oxide into atmosphere, and the excess is often washed away by rain. This leaches into rivers, causing damaging algal blooms

Long term use of fertilizers risks turning even fertile soil to desert.

Indiscriminate fertilizer use harms soil turning it acidic or salty, and suppresses symbiotic relationships. Research is showing microbial intervention has limited value. "There are some problems you can't invent your way out of" *(Dara Entekhabi, Massachusetts Institute of Technology).*

Micorrhizal relationships are very important to plant health and need a strong research focus.

16) CONCEPTS OF PRODUCTIVITY

Is it better for Australia to focus efforts and resources on quantity / abundance ie manufacture of a

high tonnage of a cheap and inferior product over a short term due to environmental impacts ? Or better to focus efforts and resources on richness in output ie an affordable, quality product that can be sustainably produced over the long term? Our conviction is the latter.

A type and level of productivity that is safe and sustainable over the long term should be a primary goal of agriculture.

There is an oversupply of food and food wastage in western countries. Is increased productivity justified with such a glut? Inequities in food distribution need to be addressed.

Some argue that introducing a similar oversupply of food into other countries would encourage rampant population growth in the face of unsustainable exponential population growth worldwide. This would speed the world's carrying capacity over a 'tipping point'.

Methods aimed at improving Organic and Biodynamic food production work best towards achieving safe and sustainable productivity over the long term, with a high quality product. In the real world, this requires maintenance of healthy, resilient natural systems and use of relatively uncomplicated management techniques.

17) IN AGRICULTURE THE PROBLEM IS THAT BIG BUSINESS IS USING PATENTED SYSTEMS TO MAKE MONEY. It has become unduly obsessed with interfering with our food production and food supplies. Australia is losing its sovereignty, a great worry to many. Government is now widely regarded with suspicion and distrust for its complicity in this.

The Precautionary Principle should be exercised

In the rush for big profits by the biotech corporations, Australian consumers are forced to bear the risks of bioerror, and to be participants in a global food experiment without their informed consent. A whole generation of Australians is being sacrificed for the sake of profiting a few. It is disturbing indeed that government is complicit in this.

GM commercial applications to the regulator, the OGTR are usually of a low quality and unacceptable to many in the public.

Making matters worse, to save time and expense involved in complying with regulatory regimes, many multinationals would like to eliminate regulatory barriers. This is outrageous. Many of those regulations they want to remove are those designed to protect human health and the environment – eg regulations setting safe levels of pesticides, other chemicals and genetically modified organisms in foods. The TPP is about this.

GM food production threatens biosecurity: 'Larger areas of unsustainable monocultures, fights over intellectual property and suing of farmers, and further concentration of corporate control over our food supply pose significant biosecurity risks'. (*Australia, State of the Environment 2011).*

Major risks are 'Major changes in food production technologies reducing numbers of people

living in regional Australia and managing the land for personal and public benefit'. ((*Australia, State of the Environment 2011, Page 677*).

18) AVOIDANCE OF TOTAL MONOCULTURES CAN IMPROVE PRODUCTIVITY :

(See pages 6-7, Innovation in Organic and Biodynamic agriculture farming as a solution).

Massive industrial scale production reinforces and expands monocultures which are notoriously more prone to large scale pest and disease outbreaks, sometimes causing total and permanent losses to farmers. They tend to promote pests and diseases because these are given such a big target. Industrial scale farming carries high risks – a pest or disease can explode and causes massive problems. This faulty trend has been encouraged by foreign-owned, big corporations which brought in the motto "Get big, or get out". Economies of scale have been given as a reason, but this has not raised productivity, on the contrary. Broadacre grain farms run at a loss in WA. They fail to learn from Canada which now regrets going into broadacre experimentation – an experiment that can't be retracted. Land is quickly degraded. Western Australia and its rural communities have not benefited from foreign ownership and absentee landlords. GM chicken vaccines would favour industrial scale production settings which are fraught with problems and high risks on several levels.

19) THERE HAS BEEN A DECLINE IN RAINFALL IN WA OVER THE LAST 30 YEARS.

The impacts are obvious. Productivity can be increased by recognizing to the contribution that land clearing makes to adverse climate change in our region, and responding appropriately. The harsh lessons have still to be learnt. Advocates of clearing more bushland to replace ruined and exhausted land – an outcome of poor management – are viewed as grossly irresponsible. Such 'treadmill solutions' disrupt regional microclimates, making regions hotter and drier, and dashing any chances of raising productivity. Undermined are valuable biodiversity and biosecurity benefits of retaining adequate bushland, further destroying future opportunities. Globally deforestation accounts for ca 18% of global carbon emissions – more than from combined vehicle emissions *(2009)*.

20) INCREASING PRODUCTIVITY THROUGH USE OF BIOTECHNOLOGY IN AGRICULTURE IS ILL-ADVISED:

(i) There is no public imperative to market most products of gene technology, indeed the imperative is NOT to approve them for agriculture at this time.

(ii) The claimed benefits in food production are unproven. What is the net cost-benefit advantage of introducing genetically engineered organisms into agriculture over continual progress in traditional agronomy, breeding and ecological agricultural practices? ie home-grown research and production of safe, non-GM alternatives? Who benefits?

GMO contamination of organic and GE-free crops is potentially disastrous to our GE-free farmers (the majority of Australian farmers), organic and biodynamic farmers, agriculture and the economy. Resulting impacts on the environment, public health and quality of life / public

amenity from lax or inadequate biosecurity expose ordinary people to greater risk for no other reason than putting vested interests of multinationals and their affiliates first. This leads to a serious imbalance, that threatens public health, food safety, and the environment. This totally unacceptable.

(iii) Food biotechnology companies engage in increasingly harmful 'treadmill solutions'.

(iv) The potential current and emerging Biosecurity risks of introducing genetic engineered technology into Australia are listed as 'major' to 'catastrophic'. *[Ref: Australia State of the Environment report 2011, Commonwealth Govt CSIRO].*

(vi)The important genuinely long term, independent, peer-reviewed medical and scientific testing for effects on human health and safety are not being done. Who has the burden of proof? Detection is extremely difficult and costly.

***Scientific American*, July 2009.**
'Unfortunately, it is impossible to verify that genetically modified crops perform as advertised. That is because agritech companies have given themselves veto power over the work of independent researchers....Research on genetically modified seeds is still published, of course. But only studies that the seed companies have approved ever see the light of a peer reviewed journal. In a number of cases, experiments that had the implicit go-ahead from the seed company were later blocked from publication because the results were not flattering....It would be chilling enough if any other type of company were able to prevent independent researchers testing its wares and reporting what they find.....But when scientists are prevented from examining the raw ingredients in our nation's food supply or from testing the plant material that covers a large portion of the country's agricultural land, the restrictions on free inquiry become dangerous.'

Professor Brian Cox 'In search of science – Clear Blue Skies' 2015
'In any commercial environment, specific targeting brings with it the possibility that during the process of discovery, the kind of result that doesn't positively enhance the chance of success may be ignored. This is extremely worrying indeed. In historical scientific journals, negative results were recorded as well as the positive ones, and that's important as all knowledge is valuable. In a commercial setting, the temptation is to ignore the negative results. This is almost anti-knowledge. It goes against the ethos of science'.

Extract from the 'The Encyclopaedia of Healing Foods', page 41

[By the authors of 'The Encyclopaedia of Natural Medicine'].
Dr Michael Murray and Dr Joseph Pizzorno with Lara Pzzorno, MA, LMT
Atria books 2006

Part 1, page 41.
'SAFE EATING

Our View of GM Foods,

We are concerned about the development of GM foods for several reasons.

First of all, there is little scientific data on the long term safety of GM foods. It may turn out that GM foods cause unexpected health consequences that will not be apparent for years.

Second, genes from genetically modified plants have already been shown to be capable of escaping into the environment and contaminating natural crops.

And third, manipulating genetic material changes the expression of proteins and antigens in foods, a situation that could lead to allergic reactions.

Since GM has already been shown to contaminate the natural variety of a crop, it is conceivable that they could also cross-fertilize with other plants, resulting in all varieties of a plant being the GM version.

GM could also lead to nonproducing crops or even "superweeds" that could wreak havoc and overtake planted crops.

Another concern is that some GM foods, such as GM corn, are being manipulated to resist synthetic pesticides. As a result, more of the pesticide is being used and humans' exposure to toxic pesticides is actually increasing while insects develop resistance to the pesticides' toxic effects.

Finally, we also respect the strong sentiment that genetic engineering is morally wrong as it implicates an attempt to modify nature beyond natural laws.

There does not seem to be a strong reason for GM foods, and the GM foods that have currently been introduced have not fulfilled their promise to reduce pesticide use or maintain the integrity of the environment. We therefore recommend choosing non-GM foods'.

(vii) Large gaps in knowledge are not being addressed in the profit-driven rush by the biotech corporations to market their products. Plant genomes are highly complex. Despite rapid growth in the plant technology sector, understanding is in its infancy. Correspondingly the understanding of nutrition and of human and animal microbiomes is still very much in its infancy, so the effects of GM foods on human and animal health are barely explored.

(viii) It is presumptuous to focus only on biotechnology as the only means of maintaining and raising agricultural productivity. We are cynical about corporate PR, misinformation and false claims that biotechnology, accelerated by genomics, "will" create wealth for both producers and consumers by reducing the cost and increasing the quality of food. And by unsubstantiated claims that famine and malnutrition in the poorest countries may be alleviated by applying genomics or other tools of biotechnology to improving subsistence crops.

(ix) Australia would increasingly become a test-bed for GMOs. No one should want this.

(x) We would lose the priceless natural quarantine advantage of being an island continent.

(xi) Australia needs to find its own safe, non-contentious, non-GM, innovative solutions.

(xii) Introducing GMO 'exotics' carries hidden dangers, just as with the introduction of exotic plants into Australia. 'We are prepared to spend vast amounts of time and money, and go to great lengths to ensure Mars missions do not export potentially dangerous micro-organisms from Earth. Unfortunately these wholly sensible interplanetary precautions have not been adopted closer to home. Here on Earth many inhabitants are facing the very real prospect of annihilation by alien pathogens'. *[New Scientist, 'Sudden Death', 5 June 2004, page 5].*
This is among the reasons we strongly oppose the proposed commercial introduction of the attenuated pathogenic GM *Escherichia - coli* (GM *E-coli*) chicken vaccine.

(xiii) The main reason GMOs are accepted into the country as low risk is because it's still too soon for any dangerous potential to be known to science and so they don't feature on our quarantine schedule. It's only when they reveal themselves that they can added to the list. This is one reason we strongly oppose the proposed commercial introduction of the attenuated pathogenic GM *Escherichia - coli* (GM *E-coli*) chicken vaccine.

(xiv) Productivity must be seen in the context of the risk factors posed by GM food production methods and GM foods. Food quality and safety and food security are the fundamental concerns of people here and abroad. Unlike long experienced natural foods, safety of GM foods cannot be guaranteed. The obligatory reliance of GM food production on heavy pesticide use is dangerous and unacceptable.

(xv) GM contamination poses a major potential threat to our biosecurity and export markets. The potential for genetic contamination of our Australian environment by GMOs has yet to be researched.
WA's GE-free and Organic farmers that have made WA recognized internationally as having a strong product integrity focus, freedom from pests and diseases, myetoxins, contaminants. Since the introduction of GM to WA, many countries like Japan are now backing off. Any GM material found in consignments is regarded as a 'contaminant' and residue', and detrimental to WA's status. The majority of people globally say they do not want GMOs in their food. We do not want GM food.

(xvi) Genetic contamination of the environment by GM crops has yet to be researched in Australia.

(xvii) Emerging high level risks are not considered by the OGTR, which approves virtually every GM application. The 'Ability to genetically engineer new species becoming widely available and used by a range of skilled and unskilled people' poses potential current and emerging risks to the nation's biodiversity. *['Australia State of the Environment 2011', Commonwealth Govt, page 678, last para].*

(xviii) Biogenetic waste issues are inevitable, they pose hazards and a lasting legacy.

(xix)With the decline of Australia's research base, the necessary research and monitoring tools which regulators require to strengthen future risk assessments do not appear to be available. This is unacceptable.

(xx) Liability and insurance Australia does not have the legal framework to deal with GMO issues. The impacts of patent law have already devastated many American farming communities;

we do not want the same here. GM agriculture has been a very divisive issue n WA.

(xxi) There has been no widespread public participation in debate about the risks and implications of GMOs. Government is not fulfilling its duty of care. Views of what are "acceptable' risks in the view of the assessing person(s), can differ dramatically from the views of the Australian public which bears the risk.

(xxii)Total constraints to use of GMOs in agriculture remain while necessary independent and comprehensive risk assessments have not been done that include:
a) independent, peer reviewed replications of Applicant's tests.
b) an adequate analysis of the engineered genetic structures and the long term stability of the GMOs over multiple generations.
b) studies on the safety of preparing and eating the patented GM products in association with their patented pesticides, especially those plants with 'inbuilt' (genetically engineered) pest resistance.
(c) independent, genuinely long term scientific and medical peer-reviewed epidemiological research on animals and humans, and especially long term metabolism, immunological and reproduction studies on humans.

(xxiii)The potential for and logistics of regulatory oversight are raised especially in relation to GM microorganisms, given the ubiquity and flexibility of bacteria in particular, and their link to intractable diseases. They have the potential to become intractable pathogens.

(xxiv) The standard for animal integrity is unclear in current legislation. Those concerned with the ethics of food biotechnology suggest traditional forms of livestock farming set the standard for animal integrity. Genetic alteration of animals determines that animal health and welfare is an ethical issue. Issues arise over the way animal biotechnology intersects with other practices in animal industries and raise a unique set of issues that are not being addressed.

(xxv) GM agriculture favours massive industrial scale production of monocultures which are notoriously more prone to large scale pest and disease outbreaks, sometimes causing total and permanent losses to farmers. Broadacre farming despite economies of scale, have less productivity and face losses beyond financial. Soils become exhausted and degraded by this method.

(xxvi) GM farmers would be persuaded to subscribe to still more 'treadmill solutions' which on the best scientific advice is ill-advised. Australian consumers would end up indirectly subsidizing these, without their informed consent.

(xxvii) Urgently needed by all Australians are:
- Precautionary Principle appropriately applied to GMOs.
- a legal framework to deal with GMOs
- a right to know and when eg effects of the obligatory connection between patented GM foods and patented agichemicals.

- as GMOs move up the animal food chain, a knowledge of what the limits are.

-a dedicated, long term, national surveillance system for the potential health effects of GM foods

-a state pre-border, border and post-border monitoring system to prepare and allow for effective responses to, and management of, emerging pest or pathogenic forms of GMOs.

- surveillance and intelligence strategies that target Biosecurity.

- a tracking system through the food supply.

- an APPROPRIATE LEVEL OF PROTECTION POLICY (ALOP) .

- A BIOSAFETY PROTOCOL which in Australia would allow member states to bar imports of genetically altered seeds, microbes, animals and crops they regard as a threat to their environment.

(xxviii)Expanding GM food production would give rise to a divisive and damaging social outcome for our farmers and our communities.

(xxix)Biotechnology is already poorly regulated in the US , yet OGTR, APVMA and FSANZ rely on the US's antiquated system. They rely for assessment data on the US agritech industries and their affiliates. This questionable arrangement gives no confidence in the safety of human beings, animals and the environment.

(xxx)Genetically engineered agricultural products can have complicated effects on the environment and economic structure as demonstrated by the current development of herbicide resistant crops and GM contamination issues.

(xxxi) GM food production methods are giving rise to herbicide resistant weeds and crop plants requiring ever more toxic chemicals (harmful 'treadmill solutions'), and the emergence of intractable "super weeds", "super bugs" and "super pathogens".

(xxxii) GM microbes are likely to become permanent GM contaminants, or micropollutants if they lead to genetic pollution. Once in the gut and tissues of an animal and the food chain, they cannot be recalled. Litigation cases are likely.

(xxxiii) Emerging major risks are 'the potential for new micro-pollutants to emerge, that increase pressures many fold' *[Australia State of the Environment Report 2011, Commonwealth Govt].*

(xxxiv)The potential current and emerging Biosecurity risks of introducing genetically engineered technology into Australia are listed as 'major' to 'catastrophic' *[Ref: Australia State of the Environment report 2011, Commonwealth Govt CSIRO]*

(xxxv)Zoonotic potential of GMOs may be dangerous. Eg GM bacteria.

(xxxvi) Harm to our agriculture and livestock industry: Introducing more GMOs would undermine Australia's competitive advantage. Australia's famous "clean, green and GE-Free"

image" would be further undermined - even permanently lost. Australia's strict quarantine, its present relatively high standards of biosecurity in livestock farm management and agriculture continue to be the key to its success as a nation and prominence as a reliable exporter. We need to retain that strong, competitive edge and health benefit for Australians.

In contrast Canada has suffered huge setbacks by 'going GM', and is now stuck with GM. It serves the self-interests of overseas multinationals to now attempt to reduce our country's competitive edge by pushing GMOs onto Australian farms, and create what they call "a level playing field". The proposed TPP is largely about that. This is outrageous.

(xxxvii) The Australian public interest, human and animal health and welfare, and environmental security in Australia, must always have precedence. Protection of planetary well-being must always take precedence. This is not reflected in the government's actions.

(xxxviii)Maintaining market access, industry profitability (especially primary industries) is now threatened by GM food production, raising some GMOs to a pest status eg GM Canola escapees..

(xxxix) Biotechnology used in food production systems as a business plan is ultimately harmful to our society, to animals and human beings. The plan centres around obtaining subsidies for imported 'treadmill solutions' .

The business model : Biotechnology used in the agriculture and livestock industry along with the associated pesticides, appears to follow a similar business model to that used in the hardware technology industry. *It would unethically commit GM farmers directly, and the Australian public indirectly, to subsidizing the giant GE food corporations, mostly without the public's knowledge and consent.* The implications however are far more serious and complicated. This aggressive business model has already lead to Australian consumers being forced to participate in a global food and pesticide experiment, also mostly without their knowledge or consent. Serious health and safety issues remain unresolved as well as moral and societal issues. A whole generation is being sacrificed basically to profit a few giant agritech corporations. Children must not be made unwitting participants in a food experiment.

GMOs are inherently unpredictable. Will children and pregnant mothers of today sue the government tomorrow?

(xxxx) Harmful would be these imposed circumstances:

- Farm workers do not appear to have any guarantee of safety.
- Consumers do not have any guarantee of health and safety, and are not advised of the GM product despite their right to know.
- Farm employees and consumers are not advised of their legal rights when things go wrong.
- Public are not told who would be accountable for what.
- Public /consumers are not being told why they should be forced to indirectly subsidize this GMO technology without a net cost / benefit advantage over continuing progress in home-grown research and production of safe, non-GM alternatives.
- Farm employees and consumers have not been advised what the standards are for failure for the GMO industry in Australia, nor the standards for failure of our regulation process.

(xxxxi) For crops, it is impossible to establish wide enough *cordon sanitaires* anywhere to prevent pollution by wind-blown GM seeds and pollen. It defies logic and experience.

Similarly with dispersal of GM microbes. Australians are made to bear the risks and losses when things go wrong.

* **What legal protection does the government provide for any harm done?**

* **Who is controlling the public sphere?** Who ensures there are no resulting health and safety issues for consumers, farmers and farm workers? The public has the right to know.

* **What are the standards of failure for the GMO industry?**

* **What are the standards of failure for the Office of the Gene Technology Regulator (OGTR), Australian Pesticides and Veterinary Medicines Authority (APVMA) and Department of Agriculture ?**

* **Which government agency would undertake independent, ongoing monitoring** on the several levels necessary, to follow the inevitable spread of GMOs by various routes, and to determine its persistence and side effects? Adequate inspection would carry high costs. The Applicant should agree to bear the costs

* **What is the government's duty of care?** While it appears a licence can be retracted / revoked at any time, eg when *a GMO* becomes implicated in a disease, GMOs in the animal food chain would leave a permanent legacy.

***Why is a low quality of information submitted by applicants to OGTR permitted?** The unbalanced reliance of the OGTR for data on proprietary corporate science, an instrument of an overall business plan, is unacceptable. Lack of transparency by Applicants in relation to health and safety tests is inexcuseable. Low standards of assessment result. These pose unacceptably high risks to both animal and human health and environmental safety in Australia. All citizens bear the risks. This is not in Australia's best interests.

What biosecurity controls are in place? GMOs pose major biosecurity risks for Australia. What credible contingency plans are in place in the event farmers using GMOs are suddenly faced with a quarantine emergency and/or destroying their stock? It would be nigh impossible to contain a released bacterium eg pathogenic GM E-coli. Genetic pollution from GMOs pose current and emerging risks to wild species (*Australia State of the Environment Report 2011, Page 675, top right para)).*

All this should be a potential major biosecurity issue. (Current and emerging risks)

***Would government ensure all GM products are labelled as such?** Consumers are angry that GMO labelling is not happening. GM corporations use expensive campaigns to prevent labeling of GM food / GM-derived food that would expose the presence of GM ingredients, making such foods appear natural and normal to the unsuspecting shopper. This highlights

the dangers to the consumer-public of commercial industrial science versus independent science. Australia's consumer safety hangs on biased, low quality company data, lacking full transparency, obtained from unacceptably limited tests, conducted over a very short period, and subject to low standards of assessment.

21) MICROGENOMICS AND GM MICROBES:

Emerging major risks are 'the potential for new micro-pollutants to emerge, that increase pressures many fold'. *[Australia State of the Environment Report 2011, Commonwealth Govt).*

The potential current and emerging Biosecurity risks of introducing genetically engineered technology into Australia are listed as 'major' to 'catastrophic'. *[Ref: Australia State of the Environment report 2011, Commonwealth Govt CSIRO].*

Industries producing antibiotics have known since the time of their invention in US over 60 years ago that antibiotic resistance would happen, the dangers that would pose, and that 'upgrades' and 'new features' would be needed. This has given rise to profit- making 'treadmill solutions'. The casual, unfettered, gung-ho attitude of those early days is now seen in the food Biotech industry today. That must change. Biosecurity in Australia, human and animal health and environmental safety depend on it. Serious questions about accountability and ethics are raised.
Bacteria are relentlessly evolving resistance and by nature will continue doing so unless a different way is found to fight them. "Every time we develop a new drug it fails" says John Pepper, a theoretical biologist at the National Cancer Institute (USA). So the solution is "Quick, make another antiobiotic! This lasts only a few months. But that's not good enough anymore."

A decision to add new GM strains of bacteria *(*eg attenuated pathogenic *GM E-coli chicken vaccine*) which can potentially become antibiotic resistant over time, would hasten the coming of a catastrophic post-antibiotic era.

GM bacteria can potentially become as flexible and opportunistic as regular bacteria.
Bacteria have evolved widespread resistance to antiobiotics leaving doctors in a crisis. The US Centre for Disease Control & Prevention estimates ca 23,000 people a year die of antibiotic resistant infections. Pathogens are emerging that are resistant to almost every drug. The standard response to this crisis has been to slow the evolution of resistance and find new drugs to replace old ones as they grow weak. But this is only a treadmill solution.

Introducing GM 'exotics' carries hidden dangers, just as with the introduction of exotic plants into Australia. 'We are prepared to spend vast amounts of time and money, and go to great lengths to ensure Mars missions do not export potentially dangerous micro-organisms from Earth. Unfortunately these wholly sensible interplanetary precautions have not been adopted closer to home. Here on Earth many inhabitants are facing the very real prospect of annihilation by alien pathogens'. *[New Scientist, 'Sudden Death', 5 June 2004, page 5]*

This is among the reasons we strongly oppose the proposed commercial introduction of the attenuated pathogenic GM *Escherichia coli* (GM *E-coli*) chicken vaccine.

A biosecurity alert is currently out in Australia for a new bacterial strain of *Xyella fastidiosa*

('Phony Peach'). The threat to Australia is very serious as this bacterium would decimate many of our most valuable edible crops and native plants. This illustrates the critical importance of maintaining Australia's strong geographic and quarantine advantage as an island continent, and our strict Biosecurity, by disallowing any imports that bring together pathogenic microbes – including GM varieties – that have not evolved alongside each other. Defra in UK is now under pressure to develop a secure market for UK grown trees. In the same way Australia needs to develop its own home-grown solutions to its live stock and agricultural problems.

Zoonotic potential of GMOs may be dangerous:
GM microrganisms could become classed as micro-contaminants or micro-pollutants once they become absorbed into living tissues of both plants and animals, and affect reproductive germplasm or cause systemic disease. Damaged sperm entering a receptive egg and causing disease / abnormalities in progeny could be regarded as zoonoses.

The OGTR and APVMA must take full responsibility for their decisions – and for past decisions that now urgently need reviewing. *Referencing short term, limited, low quality studies of applicants is unacceptable.*

Antibiotics and vaccines have fostered a decline in knowledge-intensive, integrated disease management, whereby farmers use a variety of non-chemical methods and non-biotechnology applications, to reduce use of and reliance on antibiotics. The apparent deliberate inaction or an incapacity on the part of government to address these issues is unacceptable. The focus on biotech solutions in agriculture is misplaced and potentially dangerous.

GM vaccines and antibiotics are no longer acceptable in this day and age.
eg a pathogenic GM *E-coli* chicken vaccine if approved, would deepen the dependency of our farmers on inappropriate biotechnology, jeopardizing the integrity of our Australian food production systems and livestock, and sacrificing valuable opportunities for Australian leadership in improved alternative biological science, veterinary medicine and medicine.

Thank you for the opportunity to comment