

#17

PSGR

Physicians and Scientists for Global Responsibility

New Zealand Charitable Trust

Formerly Physicians and Scientists for Responsible Genetics New Zealand

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To all New Zealand Councils and Councillors

cc District Health Boards and Public Health
Public Health Services
Other interested recipients

Formulating your Long Term Plans

PSGR is a not-for-profit, non-aligned charitable trust whose members are mainly science, medical and machinery-of-government professionals. Since the Royal Commission on Genetic Modification made recommendations “to proceed with caution”, PSGR has maintained a watching brief, in particular on scientific developments in genetic engineering (also referred to as genetic modification), as well as other public interest issues involving health and environmental safety where we can offer expert opinion on lawful and authoritative public policy information.

Please consider this information and recommendations as a submission by PSGR to your planning development and consultation 2018. PSGR will speak to this submission.

In forming responsible and effective governance

The responsibility to ratepayers and the wider community requires informed decision-making, including consideration of new information and peer-reviewed science that may challenge perceived wisdom, or current policy assumptions. In many situations an intergenerational perspective is required.

In this submission regarding your Long Term Plans we ask Council to consider the following issues to be addressed:

- Providing drinking water free of fluoridation;
- Protection against contamination of land and waterways by genetically engineered organisms;
- Urgent reduction of public, crop and animal exposure to glyphosate-based herbicides.

Appropriate policy and planning responses to these issues are also provided in PSGR's recommendations at the end of each following section.

1. Drinking water free of added fluoride and associated bio-accumulative, toxic contaminants

We refer you to our letter recently sent to MPs, attached here for your convenience.

Further to that letter, a paper has just been accepted for publication concerning the cost-benefits of water fluoridation.ⁱ Unfortunately, the authors have made seriously flawed assumptions together with erroneous statements of fact. As an example, they claimed that fluoridation has resulted in a nationwide 40% reduction in decay and thus by extension, huge cost savings. This was an inappropriate extrapolation from an isolated cohort of deprived children mentioned in the 2009 Sapere Report that specifically stated that its findings should not be used to evaluate any fluoride benefits. The authors appeared to have ignored another and much more detailed paper.ⁱⁱ

In that more detailed paper, there are direct quotes from those involved in running fluoridation plants:

In 2010, amid a budget crisis, the City of Sacramento, CA, instructed all departments to review programmes and services. Mr Marty Hanneman, then Director of the Department of Utilities, wrote in a memo to the City Council:

The City of Sacramento has been fluoridating its water supplies just over 10 years. Within that time, the actual cost of operating and maintaining the fluoridation systems has proven to be considerably more than the initial estimate. . . . The fluoridation infrastructure at the E A Fairbairn Water Treatment Plant is overdue for replacement and will be very expensive to replace . . . Fluoridating water is a very costly and labour intensive process and requires constant monitoring of fluoride concentrations to ensure proper dosages. . . . The chemical is very corrosive, so all equipment that is used in the fluoridation process has a very short life expectancy and needs to be replaced frequently. . . . but also causes frequent and complex systems failures.

This was echoed by Mr René Fonseca of Carroll Boone Water District in Eureka Springs, AR, which was required by a 2011 State mandate to begin Community Water Fluoridation (CWF)ⁱⁱⁱ:

All of our chemical feed systems require regular maintenance which is routine, but fluoride feed equipment often requires replacement and more frequent attention. . . . I have toured plants and seen in trade publications deteriorating pipes, steel doors and casing, electrical components, etc. There are millions of dollars spent yearly on infrastructure damage caused by fluoride in our industry.

The realities expressed in these two quotes are not the exceptions.

A water plant manager in Alberta, Canada, complained that the fumes from the fluoride acid etched the glass, paint, and computer screens of the water treatment plant.

Seven years after CWF began in 2001, Riverton, Utah, spent nearly US\$1.2 million for two new buildings “to get fluoride out of electrical and pump area.”

The international evidence is that the installation and long-term maintenance of water fluoridation is very expensive on the rate-paying public. The rationale is highly questionable.

Recommendation

PSGR recommends that Council does not fluoridate drinking water on the grounds that it is not lawful to put bio-accumulative toxins into people and the environment.

2. Genetic engineering

We refer Council to our letter recently sent to New Zealand Members of Parliament and copied to Councils. This is attached for your convenience.

We refer particularly to Councils in Northland, Auckland, Bay of Plenty and Hawkes Bay that have worked to protect their ratepayers from the risks of releasing genetically engineered / modified organisms into the environment; and the risks to health, horticulture, agriculture and exports. See <http://www.wdc.govt.nz/PlansPoliciesandBylaws/Plans/Genetic-Engineering/Documents/GE-Poll/GE-Poll-Results-WDC.pdf>

Under the new Resource Legislation Amendment Act 2017 Councils retain the right to safeguard their region. Councils have responsibilities and powers under the Act that can add another important layer of protection.

Although there is a view among some councils that public policy on matters relating to genetic engineering can be safely left to New Zealand’s Environment Protection Authority (EPA) there is adequate evidence that shows that EPA’s oversight of these matters is biased to industry interests (through being partial and selective) and therefore does not give due weight to public and environmental safety issues – and therefore the public interest.

Therefore, EPA’s claimed policy on genetic engineering matters is arguably inconsistent with the purposes and intent of the Hazardous Substances and New Organisms Act 1996. Therefore, such Deficiency suggests that the EPA’s policy does not have any statutory authority in law – and cannot therefore be relied upon by councils in giving effect to their statutory obligations.

Recommendations

On this issue, PSGR recommends that Council gives weight to the findings of the Union of Concerned Scientists (UCS) on Food and Agriculture. On genetic engineering in agriculture the UCS found **that** the risks have been exaggerated, but so have its benefits and that we have better, more cost-effective options. You can find their reports on <http://www.ucsusa.org>.

PSGR also recommends that Council draws on the experience of Northland, Auckland, Bay of Plenty and Hawkes Bay Councils – i.e. concludes that the risks involved require responsible legislation to reflect the precautionary principle on any proposed release of a genetically engineered organism into the environment in Council's area of jurisdiction. Such a decision on the facts presently available will indicate to the public that Council exercises its statutory powers reasonably and in accordance with the factual and authoritative information presently available.

3. Use of glyphosate-based herbicides (GBH) – unconscionable on the facts

Despite New Zealand's Environmental Protection Authority rejecting a statement by the World Health Organisation's International Agency for Research on Cancer (IARC), that glyphosate is "possibly carcinogenic to humans" (category 2B), there is substantial scientific evidence supporting an IARC statement that glyphosate-based herbicides are a risk to the environment and to human health.

Glyphosate is the active ingredient in the glyphosate-based herbicide Roundup and many other brands of GBH herbicides. Once used, it is pervasive in the environment. Residues were recently found in samples of 45 percent of Europe's topsoils^{iv} and in the urine of three quarters of German participants.^v A previous study by the Heinrich Böll Foundation, in analysing glyphosate residue in urine, concluded that 75% of the target group displayed levels that were five times higher than the legal limit for drinking water, and one third of the population showed levels between ten and 42 times higher than what is normally permissible. Glyphosate has been detected in breast milk and in honey samples taken from sites around the world.

Although manufacturers and other advocates say there is no certainty of the biological significance in the presence of the herbicide in people, this is belied by the latest analysis of cancer risks, glyphosate's action as a registered antibiotic, and findings of its use in agriculture impacting emerging problems with bacteria resistant to antibiotics. See:

<http://www.canterbury.ac.nz/news/2017/new-research-finds-common-herbicides-cause-antibiotic-resistant.html>.

Glyphosate can enter the body through food or drinking water. It can be inhaled through breathing in spray drift. Foraging animals and pets are equally exposed. Glyphosate can disrupt human cellular structure and function, and contribute to uncontrolled cell proliferation (a cancer-like characteristic). The changes brought about in human skin cells by GBH are consistent with the changes that are seen in hepatocellular carcinoma, lung cancer, colorectal cancer, and melanoma.

Very low concentrations of glyphosate have been found to stimulate unhealthy cell growth, while higher concentrations suppressed cell growth. This indicates that the herbicide is a powerful disrupter of the endocrine system. Such disruptions can therefore potentially disrupt all normal human-body-life-processes. The greatest dangers may therefore be found in extremely low concentrations that are measured in parts per trillion, rather than in parts per million.

In one study, glyphosate residue was recorded in 99.6% of 2009 monitored participants.^{vi} Significant values were found in children and adolescents. This study was the largest of its kind ever carried out.

Links to additional information on glyphosate

- Public Health Concern: Why did the NZ EPA ignore the world authority on cancer? A report released by Jodie I Bruning, B.Bus.Agribusines and Steffan Browning, MP <https://www.greens.org.nz/sites/default/files/NZ%20EPA%20Glyphosate%20and%20Cancer%202017.pdf>
- A Monograph on Glyphosate from the Pesticide Action Network Aotearoa New Zealand (PAN) <http://www.pananz.net/wp-content/uploads/2016/10/Glyphosate-monograph.pdf>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/36-glyphosate-pan-mongraph>
- Physicians and Scientists for Global Responsibility New Zealand Charitable Trust - Glyphosate <http://www.psgr.org.nz/glyphosate>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/16-glyphosate>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/25-glyphosate-calling-for-a-ban>
- The environmental impacts of glyphosate, Friends of the Earth Europe https://www.foeeurope.org/sites/default/files/press_releases/foee_5_environmental_impacts_glyphosate.pdf

Recommendations

PSGR recommends Council refrains from using glyphosate as an herbicide in all places accessible to animals and humans including waterways and where spray drift could pose a risk to people and could damage food crops. Less invasive methods are available.

We can supply further authoritative information on fluoride, genetic engineering and glyphosate-based herbicides if that would be helpful to Council.

Please consider this information and recommendations as a submission by PSGR to your planning development and consultation 2018.

Jean Anderson
For the Trustees of Physicians and Scientists for Global Responsibility New Zealand Charitable Trust

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ⁱ David Moore¹, Matthew Poynton¹, Jonathan M. Broadbent and W. Murray Thomson. The costs and benefits of water fluoridation in NZ
BMC Oral Health (2017) 17:134 DOI 10.1186/s12903-017-0433-y

ⁱⁱ Lee Ko, Kathleen M. Thiessen. A critique of recent economic evaluations of community water fluoridation. International Journal of
Occupational and Environmental Health 2015 Vol. 21 No.2

ⁱⁱⁱ Fonseca, 2012, private communication

^{iv} <http://www.pan-europe.info/sites/pan-europe.info/files/Glyphosate-published.pdf>

^v <https://www.euractiv.com/section/agriculture-food/news/overwhelming-majority-of-germans-contaminated-by-glyphosate/>

^{vi} <https://www.euractiv.com/section/agriculture-food/news/overwhelming-majority-of-germans-contaminated-by-glyphosate/>

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17 November 2017

To all Members of the New Zealand Parliament

cc All New Zealand Councillors; Members of
Federated Farmers; Royal Forest and Bird
Protection Society, and other relevant
organisations

PSGR is a not-for-profit, non-aligned charitable trust whose members are science and medical professionals. Since the recommendations of the Royal Commission on Genetic Modification “to proceed with caution” PSGR has maintained a watching brief on the scientific developments in genetic engineering (also referred to as genetic modification).

Genetically engineered organisms

This letter is to request that all Members of Parliament work cooperatively with all other Members of Parliament from across the political spectrum, in order to ensure a precautionary approach to the use of genetically engineered organisms. We ask this in the interest of protecting New Zealand's GE-free production and natural environment, and the economic advantage of a GE-free status for our export markets.

It is with concern that we again read proposals of using genetic engineering / modification technology outside of a laboratory. While New Zealand has worked soundly in this field in projects requiring the strictest confinement, there has been long-standing and strong academic and public opposition to approval of these novel organisms for release into any environment.

The basic problem inherent in all the discussion about genetic manipulation and gene editing (especially CRISPR) is that it is based on unscientifically naive exaggerations of what the technology actually achieves. Proponents talk about it being so precise and accurate and only making small changes that could have occurred as a result of ordinary germline mutations. This is fundamentally misleading. What they are talking about is the change which is targeted, but the targeted change is invariably accompanied by a very large number of other changes at similar sites in the DNA of the genome being altered. Although each of the changes may be small, genetic CRISPR is still a scattergun approach like earlier methods of genetic engineering. And the correlations between the sites affected by the scattergun are very likely to be of some genomic significance, which may eventually come to light at the population level after a long time. The effect of many changes are likely to remain undetectable using standard techniques of phenotyping because of their wide dispersal in the genome. Thus, genetic engineering and the recently acclaimed CRISPR are not much like the way enthusiasts describe them.

Once again the problems with gene drive technologies arise because of the disconnect between the engineering plan and biological/ecological reality. There is so little that is really known about the long or short term effects of gene-drive deployment that, in our opinion, it would be utter foolishness to unleash it on the environment, especially something as delicate as our native ecology. It is as if Hahn and Meitner, having discovered nuclear fission on the laboratory bench, told everyone to get busy designing and building a nuclear power plant.

Molecular biologists present inflated views of the worth of what they do in order to get research grants, start believing what they have said and then peddle it to the community as a way of justifying their funding. It all has to sound clever, smart, innovative, commercially viable, entrepreneurial and a solution to climate change, world hunger, antibiotic resistance, other medical problems, or ecological collapse. What is done is mostly scientifically and/or commercially speculative. Most of it does not work. The few magic bullets that are produced are dressed up so that their side effects are masked – like the herbicide, glyphosate - and sold as complete solutions that are actually partial.

All molecular biological explanations are couched in terms of accepted concepts like “gene” that are not only problematic philosophically but also practically. We still have very little idea how complete genomes work. It is important to understand much more than the relationship between the genes and the features of individual organisms. We need to know what the effects of changes are on entire populations many generations down the line. That is what ecology depends on. It is likely there are huge chunks of ‘junk DNA’ in the human genome, and in that of any other mammal, whose sudden loss would drive the species to extinction. None of that is ever considered in technological evaluations. As long as a proponent demonstrates the target effect and nothing else very evident, the world can be convinced that what is being done is safe and smart.

The main problem we are facing with biotechnology is that we are not, as a species, humble enough. Predictions of safety by proponents have been shown to be false, with short term monetary gain taking precedence over long term risks. We ask who, in ten years’ time, would be held accountable for environmental damage. We repeat, once released, genetically engineered organisms can self-replicate and contaminate wild species.

Recently, talk has again suggested applying the technology for uses that would expose genetically engineered organisms in the New Zealand environment that are capable of replicating. As has been seen overseas, once released the novel DNA is irretrievable, will spread, and has negative results.

The request for your support to a precautionary approach reflects:

- Evidence from two decades of commercial use of genetically engineered organisms overseas;
- Improvements in society's understanding of complex natural systems, and knowledge in epigenetics;
- The long term impacts from transgenic organisms;
- Success in developing effective non-GE solutions to issues society seeks to address.

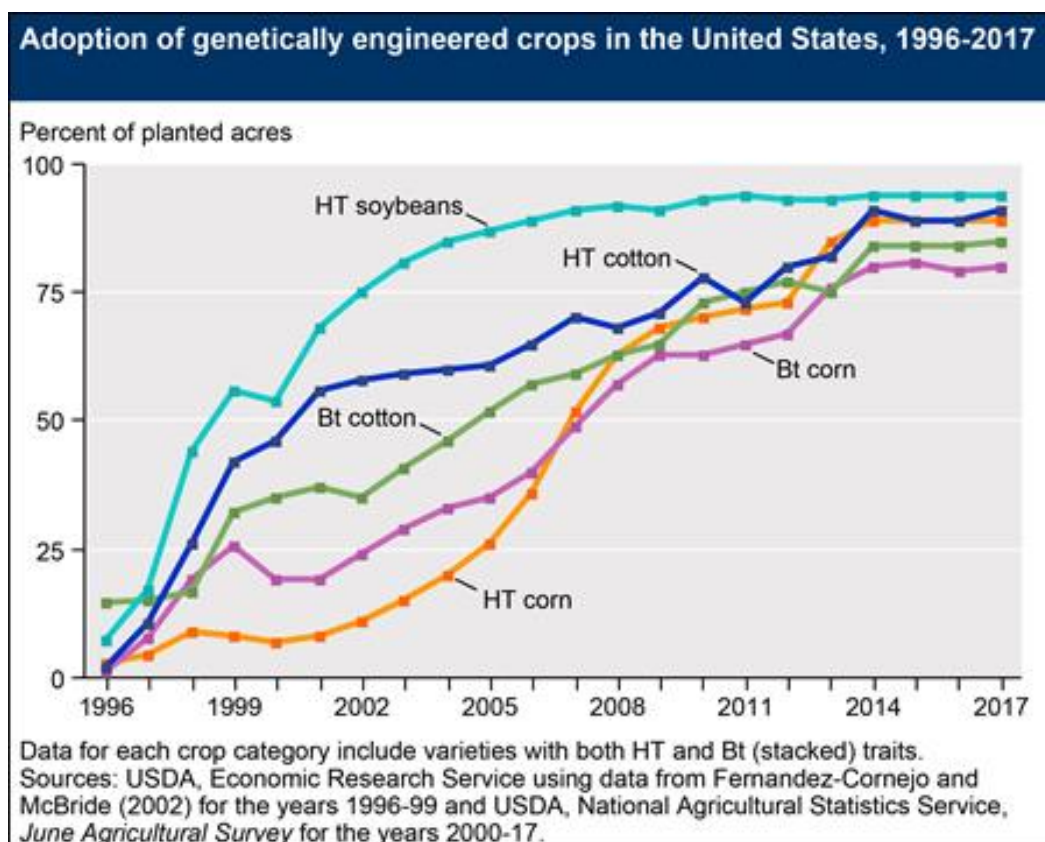
PSGR urges caution be adopted by New Zealand's political leaders, in national and local government, for the regulation of such novel organisms outside of full containment.

Under current legislation there is no requirement for the Environmental Protection Authority (EPA) to apply the precautionary principle, or to require a bond, or to require proof of financial fitness from applicants. These are mechanisms that should encourage moderation of commercial risk-taking. This leaves New Zealand vulnerable to similar detrimental effects seen overseas, and at risk of repeating past mistakes on the scale of the destruction of 3000 genetically engineered sheep at Whakamaru in the Bay of Plenty.

This 2002 event resulted from the clinical failure of products outlined in Application Code GMF98001 made to the Environmental Risk Management Authority (ERMA), now the EPA, and the collapse of the overseas investment company running the experiment, leaving no funds for scientific bio-security tests or remediation at the site. At that time, ERMA admitted there was no monitoring at the Whakamaru farm and no recommendations in place for on-site monitoring. Requests from a range of interested parties for scientific analysis of the carcasses for future scientific benefit were denied.ⁱⁱ

Contradicting the need for precaution regarding genetically engineered organisms, there are calls from some commercial interests seeking to 'relax' rules, to reduce the EPA's oversight of experimental genetic engineering techniques. These calls are effectively encouraging the transfer of risk to the wider community and 'New Zealand Inc.' in order to advance interests in commercialising transgenic organisms, and leveraging Intellectual Property (IP) for their financial gain.

The US is the largest producer of transgenic crops; herbicide tolerant and Bacillus thuringiensis (Bt). Since mass commercialisation two decades ago, adoption has grown dramatically as can be seen from this graph produced by the Economic Research Service of the US Department of Agriculture.ⁱⁱⁱ



Recent reports show US farmers are abandoning transgenic crops because of poor monetary returns. A media report says: "Bold yellow signs from global trader Bunge Ltd are posted at US grain elevators barring 19 varieties of GMO corn and soybeans that lack approval in important markets."^{iv}

A closer-to-home study will show how planting transgenic canola in Tasmania led to disaster with volunteer seedlings appearing many years after the cessation of plantings. The Moratorium that resulted was made indefinite in 2014 to protect its clean, green brand.^{v vi}

The evidence overseas from commercial release of such novel organisms also includes:

- Increased use of toxic chemicals in agriculture^{vii};
- Disruption of complex natural systems;
- Changes in gut flora in animals and humans consuming genetically engineered foods;
- Increased incidence of tumour development shown in long-term feeding studies;
- Genetic instability and unexpected effects from the processes of genetic engineering;
- Contamination in the field, including by experimental and unauthorised test-crops emerging years after field-trials, even hundreds of miles away from the trial site, a result of horizontal gene transfer;
- Extensive spread of weeds that have become resistant to genetically engineered DNA sequences as a result of in-field horizontal gene transfer^{viii};
- A new generation of transgenic crops being engineered to resist even more toxic chemicals such as 2,4-D responding to the growing failure of herbicides such as glyphosate, the active ingredient in Roundup used on Roundup Ready transgenic food crops;
- The potential for unexpected effects impacting gene expression in future generations.

These and other issues have raised local and international concern in scientific and civil-society communities. The transfer of risk that commercial release of transgenic organisms involves is indicated by the fact the insurance industry refuses cover for the potential damage of these organisms occurring, whether quickly, or slowly, or over an extended term.

Drawing on scientific, legal and other expertise, some New Zealand councils used the then standing Resource Management Act to consider in their Plans their responsibilities regarding precaution around genetically engineered organisms in the environment and on long-term land use. This process is ongoing with more Councils examining what steps they can take to protect their region.

Challenged in the Environment Court, these measures stand. They include a local level of oversight of transgenic organisms such as requiring bonds from commercial users of genetically engineered organisms to mitigate exposure of costs to ratepayers under 'socialised risk'. The measures respond to community and scientific concerns and may also help regional development for producers of safe, clean, premium-quality, GE-free foods for local and export markets; many of the latter demand 'GE Free' produce. In depth research showed Councils they needed to think long-term and for future generations, especially as the EPA loses jurisdiction at the point of approving a commercial release of a genetically engineered organism.

Federated Farmers have recently withdrawn their challenge to Northland Environment Court decisions giving Councils the right to oversight.

Thank you in advance for reading the information we have provided and for working with other Members of Parliament irrespective of political affiliation and responsibilities. Working together to ensure precaution in legislation is vital in responding to the proven risks from existing and new experimental techniques in the development of genetically engineered organisms.

Whatever your party's official stand on the transgenic debate, we urge you personally to recognise and support the need for precaution, and look forward to hearing from you

For further reference, we recommend the following:

- Genetic Engineering and New Zealand, PSGR, released May 2017
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/39-2017-genetic-engineering-and-new-zealand-9-may-2017>
- 'An Overview of Genetic Modification in New Zealand, 1973–2013: The first forty years', a review of genetic engineering research in New Zealand by the independent McGuinness Institute, Wellington. It recommended that a moratorium on commercial transgenic release be instigated.
<http://mcguinnessinstitute.org/includes/download.aspx?ID=130247>
- Public Health Concern: Why did the NZ EPA ignore the world authority on cancer? A report released by Jodie I Bruning, B.Bus.Agribusiness and Steffan Browning, MP
<https://www.greens.org.nz/sites/default/files/NZ%20EPA%20Glyphosate%20and%20Cancer%202017.pdf>
- A Monograph on Glyphosate from the Pesticide Action Network Aotearoa New Zealand (PAN)
<http://www.pananz.net/wp-content/uploads/2016/10/Glyphosate-monograph.pdf>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/36-glyphosate-pan-mongraph>
- Physicians and Scientists for Global Responsibility New Zealand Charitable Trust - Glyphosate
<http://www.psgr.org.nz/glyphosate>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/16-glyphosate>
<http://www.psgr.org.nz/glyphosate/viewdownload/10-glyphosate/25-glyphosate-calling-for-a-ban>

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WHANGAREI

Jean Anderson, Businesswoman retired, TAURANGA.

ⁱ In 1938, physicists Lise Meitner and Otto Frisch made a discovery that could lead to the atomic bomb; that a uranium nucleus had split in two.

ⁱⁱ http://www.parliament.nz/en-nz/pb/business/qa/47HansQ_20040518_00000758/12-transgenic-sheep%E2%80%94environment-whakamaru-farm.

ⁱⁱⁱ <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>

^{iv} US traders reject GMO crops that lack global approval, 7 May 2016, www.reuters.com/article/us-usa-gmo-crops-idUSKCN0XX2AV

^v 10 January 2014 <http://www.abc.net.au/news/2014-01-09/tasmania27s-gmo-ban-extended-indefinitely/5192112>

^{vi} Audit Report May 2014 Former Generically Modified Canola Trials sites <http://dpiwwe.tas.gov.au/Documents/GM%20Canola%20Former%20Trial%20Sites%20Audit%20Report%20May2014.pdf>

^{vii} "Herbicide-resistant crop technology has led to a 239 million kilogram (527 million pound) increase in herbicide use in the United States between 1996 and 2011" <https://enveurope.springeropen.com/articles/10.1186/2190-4715-24-24>

^{viii} Environ Sci Eur. 2017; 29(1): 5. 2017 Jan 21. doi: 10.1186/s12302-016-0100-y PMID: PMC5250645 Herbicide resistance and biodiversity: agronomic and environmental aspects of genetically modified herbicide-resistant plants
Gesine Schütte <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5250645/>