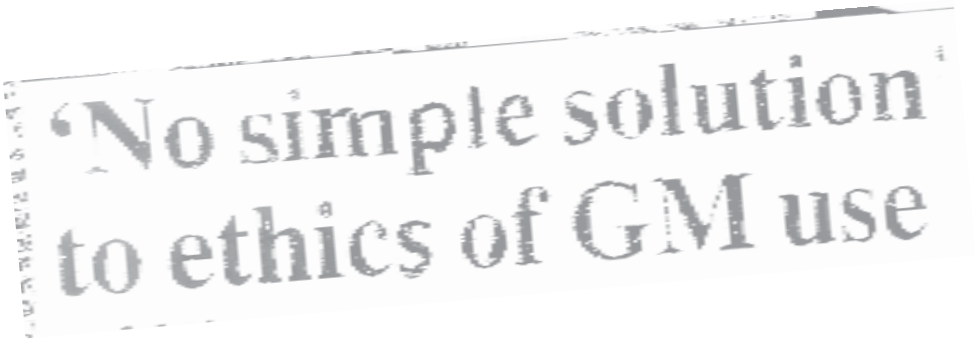


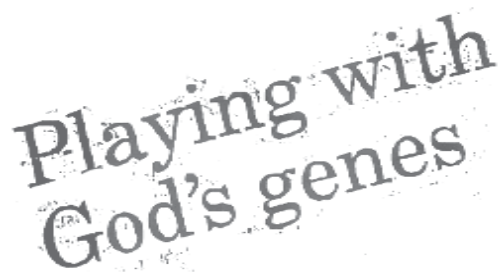
Where Do We Stand?

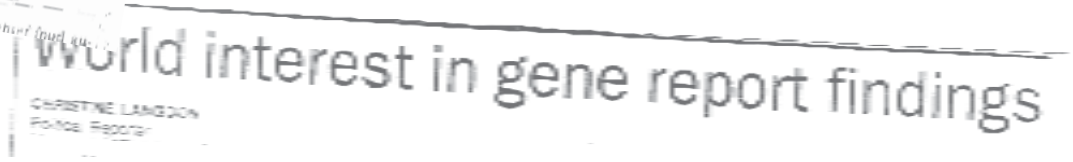
A resource & study guide
for church & community groups

on the lifting of the moratorium on genetically modified organisms in New Zealand

produced by

The InterChurch Bioethics Council





Contents

Using this resource

This short study guide has been compiled to make its contents of maximum use in a wide variety of church and community situations.

The introduction outlines the major groups for whom this resource is provided.

It is particularly suited for a series of winter studies, or a month-long course for a home group, or existing women's or men's group. Leaders of older youth and young adult groups may also find material suitable for discussion and study within the guide.

For groups where there is little common understanding of the actual processes of genetic engineering, it might be helpful to start with section 1, possibly using the Biblical material for reflection. Leaders might also choose to expand this section by reference to the Chapter 3 of the Report of the Royal Commission on Genetic Modification 2001. (This is no longer available on the Commission's website but CASI can offer you access. Contact casi@pcanz.org.nz or phone 04 381 8295.)

Groups whose members are well-backgrounded in the technology may prefer to begin with sections 3 or 4, depending on their interests, followed by sections 5 and/or 6. Section 2 could also be regarded as preliminary reading for participants, and the questions in it helpful for individual clarification of position rather than group discussion.

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Introduction

The emergence, particularly in the 1990s, of genetically modified organisms (GMOs) and other GM technologies created unprecedented public comment throughout New Zealand.

In May 2000, in response to the widely differing views as to the benefits and risks which may be associated with GM technology, the government set up a Royal Commission on Genetic Modification (RCGM). The brief of the RCGM was to report to the government on the options available to New Zealand to deal with GM, and to advise on appropriate changes to the relevant laws to and policies.

Their report concluded that New Zealand should keep its options open, and preserve opportunties for all forms of agriculture to co-exist. It called for a strong overall biotechnology strategy (currently at the stage of analysing public contributions to a discussion paper), and recommended the appointment of a Parliamentary Commissioner on Biotechnology. It also recommended introducing a new category of GM use in New Zealand, called conditional release, where the use of a genetically modified organism could be made subject to conditions and monitoring, as a further assurance of safety and to enhance the management of risk.

The Government's first response was to introduce a a two-year moratorium on any release of GMOs in New Zealand, to be lifted in October 2003. (For a detailed time-line, see page 19.) This time is now fast approaching.

While churches have been active in the debate surrounding genetic modification for some years[1], the impetus for this resource came from a request by the 2002 Methodist Conference in New Zealand. The Conference requested that 'additional educational resources specifically related to GM agriculture and the proposed lifting of the Government moratorium be made available for discussion in parishes and Synods' be prepared by the InterChurch Bioethics Council.

This study guide provides material for individuals and parishes in churches and community groups, relating to the debate in New Zealand. It can be used in a number of ways:

- as a personal guide to study and reflection of the issues;
- to resource ministers, presbyters and lay leaders in their roles as preachers and teachers;
- for use by existing groupsand parish decision-making bodies (such as councils, vestries, elders).

Reponses, comment and feedback are welcome. Please address it to the chair of the ICBC (address on page 15) or the Churches Agency on Social Issues (address opposite).

[1] See inside the back cover of this resource

See also the Report of the Royal Commission on Genetic Modification 2001 p.22

1. A brief introduction to Biotechnology

Biotechnology applies a combination of science and technology to living organisms, using them (or parts or substances from them) to make or modify products, to improve plants and animals, or to develop micro-organisms for specific uses.

Science is a process of discovery - an uncovering of knowledge - uncovering that which God has made. Technology is the ability to use the knowledge determined through scientific discovery, and apply it.

This study deals with the application of biotechnology to DNA and genes in living organisms – plants and animals and a few (like bacteria and viruses) which sit between them.

What is a gene?

A gene is a segment of DNA (**D**eoxyribo**n**ucleic **A**cid) which codes for a specific molecule – usually a protein. The 'genetic code' is like a cipher, which, when translated, produces a protein.

The information stored in DNA is copied (transcribed) to make RNA (**R**ibo**n**ucleic **A**cid - an intermediate molecule). The RNA is then decoded (translated) to make protein.

DNA is the same for all forms of life on earth - wonderful combination of simplicity and complexity which can be regarded as showing God's basic design for living creatures.

Because the DNA of all organisms is made of the same chemical components, a gene from one organism can function 'normally' within the cells of different kinds of organisms. For example, when the human gene for insulin production is inserted into a bacterium (a single-celled organism), that cell can produce functional human insulin.

It is this property of DNA that makes the biotechnology revolution possible.

Where do we find genes?

DNA is present in the cells of every organism.

In the human body it is found in every cell except red blood cells. Humans have approximately 100 trillion cells, each containing the entire human genome.

DNA is located in the nucleus of cells. In humans it is into arranged into 46 chromosomes - the units of heredity (23 pairs). The complete set of chromosomes in an organism is called the **genome**. Reproductive cells - sperm and eggs - have only half the genome, arranged as 23 single chronomomes instead of 23 pairs.

If the DNA in each human cell were stretched out end to end it would be approx imately two metres long.

What is Genetic Modification?

GM is the modification of genetic material in an organism, through the joining together, deletion or addition of genes from one organism into another.

GM can result from the transfer of DNA from one organism to other organisms of the same species – *intra-specific*.

Or it can be from organisms of one species to organisms of another species – *inter-specific*.

GM sounds simple but it is complicated because organisms can utilise a subtly different code for the same protein.

DNA encodes a language which is spoken differently by different organisms. It's like different computer brands. Both Apple and PC computers can run the same programs eg "Word" but each uses a different operating system.

GM differs from conventional breeding because it's very specific, and relates to a chosen set of genes only. In conventional breeding it's not possible to be precise about exactly which genes get into the new organism and which don't. Conventional breeding works only within a species, because the chromosomes from two separate organisms have to match up before they can combine to form a new one, and the chromosomes for every species of plant or animal are different.

However, it is now known that genetics is more complex than the simple model on which genetic modification has been based – which assumed that one gene coded for one protein which determined one trait. A single gene may in fact form the template for many – even hundreds – of individual proteins. So modifying even one gene may produce many new proteins and affect a variety of traits.

A Biblical view of GM

GM was not around when the Bible was written, so the Bible has no direct response to GM **but** the Bible has principles which may be applied.

This world was created by God: Genesis 1:1 'In the beginning, God created the heavens and the earth'.

We have a God-given responsibility to be 'stewards' of God's creation (Gen 1: 28). God has given us everything we need – including knowledge, including resources.

"Love one another as I have loved you" (John 15:12) is our overarching command as we act as stewards.

This also reminds us that often our social problems are not due solely to a lack of resources. Political, cultural and ethical reasons also need to be transformed in the light of John 15:12.

2. The Story So Far - Political and Community aspects

Release of the Royal Commission's recommendations

July 2001

The RCGM released its report to a waiting public of anti-GM lobbyists, GM proponents, scientists, environmentalists, and those with all possible in-between positions. The main thrust of the report is to proceed with caution, to take account of the concerns of many New Zealanders, to particularly allow for cultural differences and issues, to instigate research to determine how GM and non-GM crops can co-exist,

and to investigate the impacts of the new technology on the New Zealand community. Particular attention was also to be paid to the potential effect of the release of GM organisms (GMOs) on the perception of overseas consumers of New Zealand's clean green image, and how this might affect our economic future.

Other recommendations include the following:

That research is undertaken on the effect of the release of GMOs on soil and ecosystems

That research is funded also to study the socio-ethical and economic impacts on the release of GMOs,

That special strategies be developed to allow the continued production of GM-free honey and other bee products

That wherever possible, non-food animals be used for the productions of proteins such as pharmaceuticals, to prevent these from GM animals from entering the human food chain.

That HSNO be amended to provide a further level of approval, namely conditional release (see below).

The Government's Response

The government report, released in October 2001, picked up a number of the key recommendations of the RCGM. These included:

The Moratorium

In October 2001 the government imposed a two year moratorium on any application for the release of GMOs in New Zealand. This meant that no applications could be made to ERMA for the full or commercial release of GMOs into the environment, although field release and laboratory work could be approved. The purpose of the moratorium was to allow time for putting into place some of the recommendations from the RCGM.

Bioethics Council

Since the release of the report from the RCGM in July 2001, the government has put in place a number of significant changes, including the setting up of Toi te Taiao: The Bioethics Council. The role of The Bioethics Council is to advise the Government on biotechnological issues that have a significant cultural, ethical and spiritual dimension.

The Minister's Call-in Powers

The government has also changed the reasons for which the Minister for the Environment may call in particular proposals for his/her special consideration. This could formerly be done where there could be significant economic, environmental, international and health effects or if it were judged that ERMA does not have sufficient knowledge or experience to handle the case. The proposal under new legislation is to add significant cultural, spiritual and ethical effects to that list.

Amendments to the HSNO Act

The Ministry for the Environment has produced a public discussion document called **Improving the Operation of the HSNO Act for New Organisms: Including Proposals in Response to Recommendations of the Royal Commission on Genetic Modification.**

This is an important document and the ICBC submission was among the 1011 submissions received by the Ministry for the Environment. The public discussion document and a summary of the submissions are available on the Ministry website: www.mfe.govt.nz

Legislation giving effect to some of the Commission's recommendations is contained in the New Organisms and Other Matters Bill which was introduced to Parliament on April 29th 2003, and has been referred to the Science & Technology Select Committee. The InterChurch Bioethics Council will make a written submission and appear in person before the Education and Science Select Committee.

Questions for reflection and/or discussion

1. How much of all this did you know about already?
2. What was your initial reaction to the Government's decision to impose a moratorium?
3. Has your thinking changed as the time for the lifting of the moratorium approaches?

3. The Story So Far - Scientific and technical aspects

This study is particularly about the lifting of the moratorium, which is due to occur in October 2003. The moratorium relates to the filing and review of applications for the full or open release of genetically modified organisms (GMOs). GMOs may be genetically modified plants, animals, bacteria, viruses or fungi i.e. any genetically modified living organism. However, the most likely GMOs to be released in New Zealand are GM plants, GM animals, such as GM cattle, are too valuable for open release, and are also easier than plants to keep in highly contained situation. Plants are readily manipulated by GM, and many plants have been investigated and modified , such as agricultural crops, horticultural crops and forestry plants. Research is also being done on native plants.

Plants may be modified for different reasons, so that they are:

1. resistant to pests
2. resistant to disease
3. resistant to herbicides (weedkillers)
4. able to grow in different environmental conditions, such as able to survive droughts

Some Possible Benefits and Risks of GM Organisms

Why does anyone want to modify the DNA of a plant or animal? There are many reasons.

Insect resistance: A plant that is susceptible to a particular insect may be modified by putting into the plant genome (DNA) a gene which will produce a toxin that will kill the insect in question. This means that the plant will produce its own insecticide, and so the need to spray the crop with insecticides will be greatly reduced. This can be seen as an environmental plus. A problem is created if the toxin also kills other insects which feed on the plant but which are not harmful and are not intended to be killed i.e. are non-target organisms. Another possible risk is that the continuous presence of the toxin in the plant may be more likely to encourage the development of toxin-resistant insects that the intermittent use of insecticidal sprays. Against this, it is can be seen as advantageous for farmers to not be exposed to the constant use of insecticides.

Disease resistance: Plants may be modified so that they are resistant to disease e.g. potatoes may be modified to be resistant to potato blight.

Herbicide resistance: Another possible use of GMOs is to produce plants which are resistant to particular herbicides. Thus the weeds surrounding a crop can be sprayed with herbicide without destroying the crop in question. This may give better crop yields. A possible risk to the environment is that farmers may be tempted to use higher amounts of herbicides because of the immunity of the crop to the herbicide. Indeed, farmers who buy GM crops which are herbicide resistant buy the herbicide as part of the package. There is also concern that herbicide resistance may be transferred to 'weedy' plants related to the GM plant, so they become undesitable herbicide-resistant weeds.

Pharmaceutical production: Research is being carried out on the use of GM animals to produce pharmaceuticals. An example of this is the insertion of human genes into cattle, in an attempt to produce proteins in the milk, which may be useful in the future in researching multiple sclerosis. Other pharmaceuticals such as insulin are already routinely produced by the use of GM bacteria or yeasts. The use of single-celled organisms such as yeast or bacteria appears to be less of a general concern to most New Zealanders than the use of higher animals. In addition, yeast and bacteria can be produced in fermenters and in the laboratory where containment is likely to be more effective.

Tolerance of different environmental conditions: As the world's climate changes, it becomes more important to be able to grow crops in different conditions. The modification of plants for such characteristics as drought resistance becomes highly desirable.

Effect of the Release of GMOs on the Environment and the effect of the Environment on GMOs

Unpredictability: Opponents of GM base some of their concerns on what they term the unpredictability of the results of inserting genes into organisms. The genes so inserted are placed in the DNA (chromosome) of the recipient organism in such a way that the protein for which the gene encodes will be expressed in the new host. This means that in some instances the change brought about will be more predictable and consistent than earlier methods used to improve plants and animals. In earlier times plants were treated with radiation or chemicals and those which developed desirable characteristics as a result of this treatment were selected to make new varieties. In such cases, there was no way of knowing what changes had been brought about in the organism's DNA in addition to the changes wanted. In GM, a gene may be selected and inserted so that the change is more specific. However, when a desired change e.g. flavour is under the control of several genes, it is less certain what other changes will occur.

Some scientists have pointed out that while there is concern about the effect of GMOs on the environment, insufficient attention is given to the effect of the environment on GMOs. The significance of this argument is that the way an individual gene which has been modified will behave in different environments may be predictable. However, if a change in a plant has been brought about by changing a cluster of genes, the way in which the modified plant will behave in different environments may be less predictable and unexpected proteins may be produced.

Gene transfer: Some of the concerns which have been raised are that modified genes from GM crops will spread into neighbouring crops. This may happen because pollen from GM plants is spread by wind, water, birds or other means and fertilises non-GM crops. Other possibilities are that decomposing GM-plants may affect the soil biota and eventually the modified DNA may enter the genome of other plants. This is of concern for several reasons:

Organic farmers fear they will lose their certification if their crops are contaminated by GM plants.

Those who want to have the choice of whether they eat GM food or not will not have that choice if food crops are unwittingly contaminated

Where toxins are put into plants to protect the plant against insects, non-target insects i.e. those which the toxin was not intended to harm, may be affected by feeding on GM crops. There may be what is termed a tri-trophic effect. Thus an insect may feed on a GM plant which contains toxin, which may in turn be the food for a bird or other animal. The effect of the toxin may thus be transferred up the food chain.

There is concern that exposure to toxins in GM crops will in the long term result in insect pests becoming resistant to the toxin.

The resistance from consumers to GM food in e.g. in Europe may affect our export markets.

There is concern that bees and therefore bee products may be affected by feeding on GM plants which have been modified to be insect-resistant.

There is concern that GM plants will transfer herbicide resistance into related wild plants. These weeds would then be immune to herbicides and become a greater nuisance to agriculture.

Questions for discussion

1. What are the most important benefits and risks as far as you are concerned?
2. Who do you think should make decisions about what is acceptable to society?

4. Where we are now

The Role of ERMA

ERMA, the Environmental Risk Management Authority, operates under the Hazardous Substances and New Organisms (HSNO) Act 1996. New organisms include GM organisms created within New Zealand or imported from outside NZ.

If a scientist wants to carry out work which involves GM (genetic modification or changes to the DNA of an organism, which may be from a plant, animal or of human origin) this has to be approved before it can begin. If the risk of any problems is very low, the work may be approved by the Institutional Biological Safety Committee of the university or other institute where the work is to be done. If the work is more major, it must be approved by ERMA.

Amendments to the HSNO Act

At present, in approving research in controlled containment situations, ERMA addresses the following questions:

1. Is the application for a proper purpose?
2. What are the risks, costs and benefits? These include possible risks to human health and to the environment. and also the possible benefits of the work to New Zealand. There is Maori input from the Maori Advisory Board to ensure that Maori views are taken into account.
3. The ability of an organism to escape from containment.
4. The ability of an organism to establish a self-propagating population, and ease of eradication.
5. Do the benefits outweigh adverse effects after considering consequences of escape and mitigation of risks by controls?

At present approval can be in one of three categories:

Laboratory containment, where the work is only to be carried out in the laboratory, and containment is extremely confined.

GM Plants which have been field-tested in New Zealand

Many of these have been developed outside NZ and imported for field testing.

1. canola and corn, herbicide resistance and improved performance
2. sugarbeet, herbicide resistance
3. wheat, disease and insect resistance, improved performance
4. potatoes, disease and worm resistance
5. tamarillos, virus resistance
6. ornamental plants, longer stems, new flower forms

Field release, where the work is done as field trials, but there are strict containment laws in place. These include such requirements as fencing, distance from non-GM crops or animals, destruction of GM material at the conclusion of the trial, possibly harvesting of GM crops before they produce seeds or pollen.

Open release: To date there has been no release of GMOs in New Zealand. One of the problems identified in many submissions to the RCGM, including that from the ICBC, was that there are no regulations in place to govern the release of GMOs. Thus to go from field trials to open release would at present mean to go from highly contained situation to one where there are no restrictions at all.

A fourth category has been proposed:

Conditional release: This is a new category proposed by the RCGM and accepted by the government. When conditional release is granted there will be requirements which will depend on the specific application and may include such provisions as monitoring of to what extent GM pollen or seeds spread into neighbouring crops, whether GM DNA survives in the soil, whether GM DNA is taken up by non-target plants, whether a planned effect of the GMO such as toxicity to an insect pest affects non-target insects.

Issues to be Considered in the Lifting of the Moratorium

In preparation for the lifting of the moratorium on October 29th 2003, the Ministry for the Environment issued a public discussion paper on the changes that are proposed for the HSNO Act. These changes include proposals in response to the recommendations of the RCGM, some of which are outlined above. The ICBC made a submission on the discussion paper and will make a submission to the Education and Science Select Committee on the New Organisms & Other Matters Bill. One of the major changes proposed is the institution of a fourth category of release of GMOs, that of conditional release. All requests for release of GMOs will continue to have to be approved on a case by case basis. One proposal is that ERMA will decide whether a GMO will be released unconditionally or whether conditions will be put in place, such as monitoring the effect of a GMO crop on neighbouring non-GM crops.

Legal Liability regarding GMOs

A number of submissions to the RCGM asked that the question of liability for harm done by GM plants or other GM research or development be considered. The government commissioned the Law Commission to examine the question, but the outcome of this was not definitive. The Law Commission was asked to do more work on this, and the government has not yet made a statement re liability. The concerns raised have particularly related to the contamination of non-GM crops by GM crops, and the effect this would have on organic farmers or on markets for GM-free crops.

It appears likely that the outcome of government deliberations may be that those who wish to retain GM-free status will be expected to take responsibility for this, in the way that those who grow other speciality crops do this. Thus growing seed crops which require to be uncontaminated by other crops is ensured by the grower being responsible for the maintenance of sufficient distance from other crops and the placing of suitable border crops around the seed crops.

This raises difficult conflicting questions of caring about the outcome of actions on others, and taking responsibility for oneself. With the effect of GM crops on non-GM crops, it is particularly difficult to allocate responsibility for crop contamination and hard to balance the rights of both GM farmers and non-GM farmers to autonomy, and to make their own choices. The RCGM raised the possibility of having areas where certain GM crops may not be grown because of the importance of that area for producing that particular crop.

Questions for discussion

1. Who do you think should be responsible if there are adverse effects of GM crops e.g. organic plants are contaminated?
2. How should we balance the needs of different people in the application of GM technology?

Section 5
What Are the Ethical, Spiritual, and Cultural Concerns in the Use of GMOs?

There is public concern regarding the use of GM technologies and GM products in New Zealand. Spiritual concerns raised include a sense of humility. Do we have the 'right' to manipulate 'God's world' in this way? There is belief that we have a duty of care to the environment in which we live, and which we will leave for future generations, and a concern that we do not violate species integrity or biodiversity. The Church has a strong sense of responsibility for others and there is a commitment to ensuring that research and applications of GM technology should be made with real consideration for the needs of all people, especially the poorer countries and the disadvantaged throughout the world. Environmental issues also include the requirement that GM crops should only be used if their dissemination and physiology is substantially understood and controlled, and that the rights of others e.g. organic farmers, are respected

In meeting with church members and others throughout New Zealand, the members of the Inter-Church Council on Genetic Engineering were frequently aware how much the value which was seen in GM research and development depended on the purpose for which it was carried out. For example, medical research was often seen as worthy because it addressed a specific need. Those to whom an illness had a special significance e.g. those who cared for sufferers from multiple sclerosis or cystic fibrosis, were keen that research which might eventually treat or mitigate these illnesses should continue.

Ethical concerns include the need for autonomy and the rights of all to give or withhold informed consent regarding GM. This is coupled with a fear of the unknown and a concern that there is insufficient information and understanding for people to make good decisions. There is also a conviction that the outcome of GM research and field trials is uncertain, that scientists do not 'know it all' and that there should be more research into possible long-term effects of GM products and technologies. A practical outcome of this need for autonomy is the requirement for labelling of GM foods so that consumers have as much choice as possible. The fear of uncertainty in GM research and field trials emerged as a wish for sufficient questioning by ERMA about the safety of processes and the extent to which the possible outcomes had been tested.

The Churches support a bi-cultural stance and recognise the importance of the Treaty partnership. This is reflected in recognition of the Crown's responsibilities under the Treaty of Waitangi and the assertion that ERMA should listen to Maori concerns and these concerns must not be overlooked in their final decision-making

The Church has concerns about the globalisation agenda of organisations such as the World Trade Organisation and the OECD, both from the point of view of a threat to our sovereignty, and the effect on poorer countries. We do not support the patenting of human genes and are particularly concerned about the possibility of exploitation of Maori or other groups in New Zealand who may be the subject of research.

The InterChurch Council on Genetic Modification asked the Royal Commission to make the following recommendations to the government:

1. That an independent NZ Genetic Modification Ethics Council be set up specifically to address the ethical and spiritual concerns being raised by many New Zealanders, in relation to all GM research and applications. As new situations and ethical dilemmas will arise with new applications, this requires an ongoing process.

2. That moneys be allocated from the current public good science funding to carry out research into the ethical and spiritual implications of GM technology in New Zealand.

3. That the terms of reference of ERMA be reviewed to ensure that appropriate notice is taken of the recommendations of Maori.

4. That measures be taken to ensure that the New Zealand public is given accurate and sufficient information regarding GM, GMOs and GM products to allow it to make informed decisions to accept or reject GM technologies, including GM food. Wherever possible products alternative to GM products will be available, to safeguard the right of all consumers to choose.

5. That the patenting of human genes be illegal in New Zealand.

6. That recognition be given to the widespread intuitive unease regarding the transfer of human genes to other species, especially to higher animals. We do not know the full implications of this sentiment for public policy. However, the transfer of human genes into higher animals should only be approved where highly focussed benefit is expected and after consultation in depth with the NZ community.

Questions for Discussion

1. Do you think we as humans have the right to manipulate or modify the genes of plants?
2. What beliefs contribute to your decision?
3. What do you think is the most important of the recommendations by the Inter-Church Council on Genetic Engineering? Why?

7. References and Further Reading

1. *Designer Genes. The New Zealand guide to the issues and facts about genetic engineering.* Ed ited by Ray Prebble. Published by Dark Horse, Wellington, 2000.. A readable general book about genetic modification, with contributions from all sides of the GM debate.
2. *Cutting-Edge Bioethics. A Christian Exploration of Technologies and Trends.* Eds J F Kilner, C C Hook, D B Uustal. Pub. William B Eerdmans Publishing Company , Grand Rapids, Michigan/Cambridge, UK, 2002.. Parts of this book are too technical for most readers. However, there are some good discussions of the likely benefits and ethical issues relating to various GM technologies.
3. *Will the Enz Justify the Genes?* Proceedings from a symposium on the ethics of genetic engineering. Published by the Joint Methodist Presbyterian Public Questions Committee for Capital City Forum, August 2000 .
4. *The Report from the Royal Commission on Genetic Modification, 2001.* Summary available on http://www.gmcommission.govt.nz The executive summary of this document is found in the fourth volume, Report and Recommendations 2001. Contact agency, Department of Internal Affairs, PO Box 805, Wellington.
5. Latest information from the Ministry for the Environment is available at www.gm.govt.nz
6. Information on spread of genes from GM crops to non-GM plants may be found in the above website, link to Colorado State University site.
7. *The Plant Journal*. See www.blackwellpublishing.com/plantgm/gm.asp Aims to 'undertake a holistic approach to the issues involved and to provide an independent and authoritative resource of world class academic information"
8. Latest information from Foundation of Research Science and Technology, including research on impacts of GM, is available on http://www.frst.govt.nz/about/portfolio.cfm?idPortfolio=9&Version=1
9. The United Church of Canada's website justice section http://www.united-church.ca/jpc/biotech/home gives access to studies on bioetchnology and genetic modification.
10. *Economic Risks and Opportunities for the Release of GMOs in New Zealand,* April 2003, Ref. ME465: a research report prepared for the Ministry for the Environment and the Treasury by BERL and AERU. http://www.mfe.govt.nz/publications/organisms/economic-impact-apr03/
11. *Genetic Engineering for a New Earth* by Celia E Deane-Drummond, ISBN: 1 85174 408 8 A Grove Booklet exploring issues such as What promise does genetic engineering hold out for the world? How might we evaluate that — what are the scientific, theological and ethical issues involved? What bearing does the biblical tradition of wisdom have on this? (1999) http://www.grovebooks.co.uk/acatalog/Grove_Books_Online_Ethics_3.html

Appendix 1

The InterChurch Bioethics Council

The Council was set up in 2000 by three churches: Anglican, Methodist and Presbyterian as the InterChurch Commission on Genetic Engineering, with the purpose of making submissions on behalf of the churches to the Royal Commission on Genetic Modification (RCGM). Since then, issues of public concern which were outside the brief of the Royal Commission have been raised, such as human reproductive cloning and the use of embryonic stem cell for research purposes. In 2002, the InterChurch Commission on GE was re-named the InterChurch Bioethics Council and its brief enlarged to address such issues.

Topics and issues are brought to the attention of the ICBC by the media, by members of the churches, by government agencies and by information on websites and in e-mails from interested individuals. We welcome comments from all of these sources.

Terms of Reference of ICBC

1. To provide opportunities for consultation and dialogue with church members and the community generally on the ethical, theological, spiritual and cultural issues in the use of biotechnology.
2. To take an educational role for the Anglican, Methodist and Presbyterian churches on the above issues.
3. To make submissions and comments to the New Zealand Bioethics Council and other relevant bodies on the above issues.
4. To report at least annually to the three churches.

Activities of ICBC

Members of the ICBC have spoken at church gatherings throughout New Zealand, addressing the ethical, spiritual and cultural issues raised by biotechnology.In October 2000 a 40 page written submission was made to the RCGM, followed by an oral submission and a closing submission. Many of the recommendations made by the ICBC were included in the RCGM recommendations and have been evident in the government report.

ICBC have met with Ministry for Environment officials, and presented submissions on the public discussion papers on Improving the Operation of the HSNO Act for New Organisms, and on the New Zealand Biotechnology Strategy. ICBC will make a presentation to the NOOM Bill when it comes before a Select Committee later in 2003.

ICBC have also met with the Secretariat of Toi te Taiao the Bioethics Council and will take opportunities as they present to have an input into the activities of the Council.

Contacting ICBC

Members of ICBC contribute expertise in ethics, theology, philosophy, science, medicine and cultural issues. They are available for discussions or presentations in church groups and in the general community. It is expected that this group of studies will be followed by other series on other biotechnological topics. For further information please contact the chairperson or a member of ICBC.

The Council is chaired by Dr Audrey Jarvis, Palmerston North, Phone: (06) 357 3089, E-mail: jarvis.ab@xtra.co.nz. The other members are Dr Chris Downs, Prof. Grant Gillett, Dr Graham O'Brien, Dr Briar Peat, Dr Barbara Peddie, Ms Maree Pene, Mrs Deborah Stevens, and Dr Susan Werstein.

Appendix 2

The Preamble to the Inter Church Commission's submission to the Royal Commission on Genetic Modification

We The InterChurch Commission was formed to express balanced and considered Christian views on the issues surrounding Genetic Modification research, crops, foods and other products in Aotearoa-New Zealand. The seven commissioners represent the Anglican, Methodist and Presbyterian churches. As an InterChurch Commission we have identified eight ethical foundations on which a response on behalf of the churches can be based. These would be differently expressed by different groups within the churches, but carry the same implications. These insights have emerged from our consultations with groups of interested church people throughout the country, and from the personal enquiries we have made in our own worship settings. These eight foundational categories are as follows :

1.Humility before the Creator is a fundamental attitude which allows Christians to realise that they are part of something far greater than themselves. This inspires reverence in us for that greater being of which we are no more than a tiny part, as is expressed in passages such as Genesis (1). "In the beginning God created the heavens and the earth", and Jesus' reaffirmation of the first great law – "You shall love the Lord your God with all your heart, with all your soul, with all your strength, and with all your mind" (2).

2. Responsibility for/to the whole of creation is another fundamental attitude. This responsibility is not only for what we may think we have power over, but also to that which gives us that power. We come from the earth, we are rooted in (or arise from) it, so that we have a two-fold responsibility, to the Creator and to creation. We find this expressed in Genesis (3) as humankind is "made in the image of God" and "given dominion over the creation" and in the New Testament, that "the creation itself will be delivered from corruption into liberty when we responsibly take up our inheritance in Christ" (4).

3. Our being and all of creation is grounded in God. Traditionally that grounding is seen to be in the fact that we are called into being by God (5), and this is related to the creating and sustaining activity of God through Christ.

4.The truth of God is eternal, which contrasts with the fact that our knowledge in all areas is limited by time and history. We find this powerfully expressed in Job (6) where God asks: "Where were you when I laid the foundations of the earth?" This thought is also found in later writing when we are warned that "we are in danger of becoming fools where we most profess to be wise" (7).

5. We are called into Community with the faithful in Christ, and with all creatures who share the creation with us. We are taught that the proper attitude here is love and that it is good and pleasant when families dwell together in unity (8). This ideal model includes harmony throughout creation. Love is the underlying principle here. Love is said to be the highest of the fruits of holiness. In expressing this love, the Church has concerns for the humble and needy people of the earth and does not condone the exploitation of their potential productivity, or the takeover of their traditional farming methods and their specialised knowledge of their own environment

6. We are not in complete control of our own fates in this world, there are forces at work greater than us. Today this in interpreted in many ways, the world has its natural catastrophes and accidents but the power and the riches and resources accumulated by some countries, some consortia and some companies are seen as dangerous, or mistrusted by many, on the evidence of their actions. This frequently-expressed position relates to our concerns for the disadvantaged in the world, as in point 5

above.

7. The reality of sin is an undeniable strand in the faith of the Church. From Psalm 53's vision of our own sheep-like tendency to stray, we are reminded that evil comes from within and we lose ourselves in debased thoughts (9). This is harsh judgement, but the history of greed, ambition and the misuse of power by many who set out to be guardians and leaders among human beings gives powerful testimony to the existence in all humans of a propensity for self-interest that allows us to be controlled by forces or motives we know are not good.

8. Faith and hope are ever-renewable and powerful motivators for Christians. For the scientist, the company or the country working with GM hope can guide and motivate so that decisions are made for good rather than evil.

It is in the light of this framework that we intend to present our case in relation to genetic engineering. We will try, as far as possible, to make our submission from the position of faith but able to be shared by a number of concerned individuals whatever their personal religious or secular orientation. Our use of biblical references is an attempt to resonate with the traditions and narratives of the Church of which we are a part. We recognise that the faithful come in many colours and interpret these strands in different ways, while yet retaining the fundamental attitudes that are expressed. Our submission in its entirety will seek to give expression to the foundational categories identified above.

References

1. Genesis 1:1
2. Luke 10:27
3. Genesis 1:26
4. Romans 8:20
5. Psalm 149:14
6. Job 38:4
7. Romans 1: 21,22
8. Psalm 133
9. Psalm 53

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Appendix 3

New Zealand Biotechnology Strategy: Community and Biotechnology Section

This Strategy was issued as a Public Discussion Paper in October 2002, in response to the Royal Commission's recommendation for such a strategy. This section was written by Deborah Stevens on behalf of the Inter Church Bioethics Council in response to Question 2: What role can schools play in increasing awareness and understanding of biotechnology?

As acknowledged in the draft strategy document, the application of biotechnology raises issues of responsibility and ethics. The draft strategy suggests support for secondary and tertiary level biotechnology education, including the development of new broad-based biotechnology resources for schools &/or the introduction of new science modules that encompass social aspects of biotechnology. While these are commendable suggestions, it is the contention of this submission that pupils in our primary and secondary schools need intellectual space to explore different approaches as a means of evaluating ethical issues relating to biotechnology. An academically rigorous curriculum in values education that incorporates both theoretical Ethics (including the difference between Natural Law, Situation Ethics, Utilitarianism, Virtue Ethics and so on) and applied ethics needs to be introduced into schools. This curriculum should be applied from Year 1 to Year 13. Specific issues to be covered, at pre-determined age groups, might include medical ethics, genetic engineering, social justice issues, euthanasia, issues of animal rights, environmental ethics and business ethics. Without an understanding of different underlying theoretical positions, children and youth will not be able to compare, contrast and evaluate differing views effectively.

New Zealand is a multi-cultural society with a wide variety of cultural and religious traditions. In addition, our country is located in the Pacific basin and has trading links with countries with widely different belief systems. A real appreciation and understanding of alternative belief/faith perspectives is a vital part of a values education curriculum. This is especially true with respect to an understanding of the Maori perspective, such as care for the environment and spirituality, and respect for the principles of the Treaty of Waitangi.

An understanding of philosophical thinking and a development of the use of reason would be central to the development of a Philosophy and Values curriculum. Issues of truth and reason underlie discussions in Science, History, English, Social Studies and Mathematics. In addition to providing the new subject of Philosophy and Values Education, the national education curriculum should facilitate cross-curricula links.

The British system may provide a useful model. "Religious and Values Education" is compulsory in every British school, public and private, from Year 1 to Year 11, after which it becomes an elective subject. It is of note that the subject of religious and values education is the most rapidly growing curriculum area in Britain with 230 000 plus students sitting national qualifications in this subject this year. A key assumption underlying the British curriculum is that under no circumstances should ideas or beliefs be imposed on children.

Recommended Action:

That the curriculum in New Zealand **primary and secondary schools** include a specific subject dedicated to the study of philosophy and ethics, both theoretical and applied, incorporating the development of critical thinking skills, the use of reason and an appreciation and understanding of alternative belief/faith perspectives.

A GM Timeline

Government action	Church action (Anglican, Methodist, Presbyterian)
May 2000 Royal Commission on GM established	*July 2000* InterChurch Commission On GE (ICC) established
August to September 2000, applications called for Interested Person Status	*August 2000,* ICC applied for and received Interested Person Status
August 2000 to December 2000 call for written submissions	Met with church congregations and members of community
October 2000 to March 2001, hearing oral submissions	*October 2000,* 40 page submission to RCGM
	February 2001, oral submission, cross-examined other submitters
	Members spoke at at more church meetings
March 2001, closing submissions	*March 2001*, presented closing submission
July 2001, recommendations from RCGM	
October 2001, government report on RCGM recommendations 1. Two year moratorium 2. Bioethics Council est. 3. HSNO Amendment Act 4. NZ Biotechnology Strategy proposed **MORATORIUM TO BE LIFTED OCTOBER 2003**	*2002* ICC re-named InterChurch Bioethics Council. Terms of reference extended. Submission on HSNO Amendment Bill Submission on Biotechnology Strategy **CORRESPONDENCE WITH MINISTER OF THE ENVIRONMENT ON MORATORIUM**

Acronyms

DNA	deoxyribonucleic acid – fundamental unit of inheritable material – part of a gene
ERMA	The Environmental Risk Management Authority – the New Zealand agency which considers all applications for the use of GM (and other potentially hazardous) technology.
GM	genetic modification (equivalent to genetic engineering – GE)
GMO	genetically modifed organism
HSNO	Hazardous Substances and New Organisms legislation (also known as HASNO)
ICBC	InterChurch Bioethics Council
ICC	InterChurch Council on Genetic Engineering (precursor to ICBC)
NOOM	New Organisms and Other Matters Bill
RCGM	Royal Commission on Genetic Modification
RNA	ribonucleic acid – an intermediate molecule in the translation between a gene and the protein it produces.

Useful debate impossible – expert

Looking at genetics

Food authority backs release of GM corn

GM mosquito to fight malaria

Southlander says farmers need choice