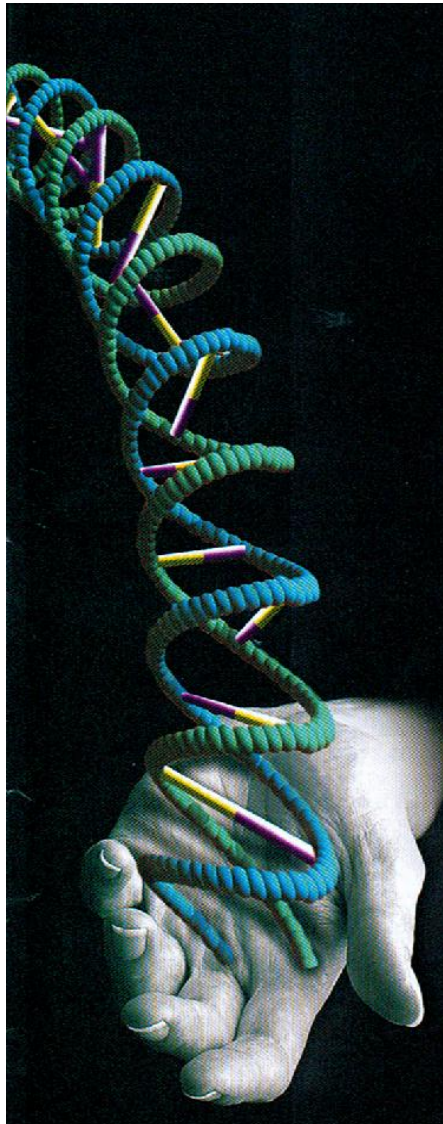


Culture, Risk, and the Prospect of Genetically Modified Organisms as Viewed by Tāngata Whenua

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Whakatane: Te Whare Wānanga o Awanuiārangi

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Their views presented here provide an in-depth insight into the values and beliefs of a wide range of tangata whenua concerning genetically modified organisms. We hope their gift will make a valuable contribution to this subject area, and provide sustenance for those who seek to travel further on this journey.

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1. Introduction

“Risk analysis is both a scientific and a political exercise. Ultimately the whole exercise is driven by values, which determine choices made even within science, and the choices made by decision-makers and by society at large.”¹

Few issues better characterize the social, scientific, and political dimensions of the late 20th and nascent 21st centuries than do debates about genetic engineering. Faced with growing public anxiety about such research, particularly that concerning genetically modified organisms (GMOs) and their possible release into the environment, the New Zealand Government has sought to address these concerns in two important ways. First was the commencement of a Royal Commission of enquiry into Genetic Modification. The Commission presented its findings in July 2001.² The Government has also funded several research projects through the Foundation for Research, Science and Technology, which investigates this technology, including the social, cultural, and economic milieu in which this research is being conducted in New Zealand.

Aims of This Project

In 2000 the Foundation for Research Science and Technology (hereafter FRST) identified the need for more research that would determine the potential key effects (beneficial and adverse) of different kinds of GMOs on the public, and in particular on Māori. It was decided that such research should also seek to identify those values and beliefs that influence the acceptability or rejection of this technology, and develop ways to incorporate those beliefs and values into a robust decision-making framework.

Commencing in March 2001, a team comprising Mere Roberts, Manuka Henare and Richard Benton from the University of Auckland, Mark Henare, now a graduate student at Cambridge University, and Terre Satterfield and Melissa Finucane from Decision Research in Eugene, Oregon U.S.A. embarked upon this research. Overall, the project seeks to answer the following questions across 3 phases of work. Firstly,

- “What are the key perceived effects of different GMO applications on Māori culture, values and beliefs?” (phase I)
- Secondly, “What is the importance of these values across a range of GM applications?” (phase II)
- Thirdly, “How might those values be incorporated into a decision making framework for evaluating the risks and benefits of GMO technology?” (phase III)

¹ P. Slovic, “Address to the Environmental Risk Management Authority,” 1998

² *Report of the Royal Commission on Genetic Modification*, 2001

The phase of work presented in this report aims to elucidate the first question, that is, to identify those key values and ethical principles that are articulated in explanations about the perceived risks to Māori and effects on their culture and traditions posed by GMOs. The information gained from these enquiries was then used to develop a survey to assess the relative importance of different concerns and, finally, to develop a decision-making framework aimed at more equitable and culturally accepted outcomes for Māori.

The results presented here flow from the information and insight gained from extensive interviews and meetings with Māori individuals and groups representing a broad cross-section of lay and professional Māori (including men and women, urban and rural, Marae and non Marae-based, old and young, eminent traditional knowledge holders, theologians and academics in the disciplines of Anthropology, Medicine, Biology, Chemistry, and other natural and social sciences). The results and implications of the national survey and the decision making framework are presented in separate reports.

Background to GMO Technology

DNA (deoxyribose nucleic acid) is the genetic material found in all living cells. In its entirety, the DNA of an organism is often referred to as the genome, which carries the genes that act as the “blueprint” for each organism. In sexually reproducing organisms, one complete set of DNA and its genes (packaged into chromosomes) is inherited from each parent. However, it has also been discovered that in nature genes can and do move between cells, and even between the cells of two different individuals without involving inheritance by sexual reproduction. Bacterial cells for example use three different ways to incorporate new genetic material from the environment, or from another cell of a different strain or gender into their own DNA (transformation, transduction and conjugation). In the 1940’s, Barbara Mc Clintock (later awarded a Nobel Prize for her discoveries) found that genetic elements called transposons can move around within the DNA of a chromosome in a cell, and even from one chromosome to another. In Indian corn such “jumping genes” result in multiple colours in a single kernel.

Building on the natural movement and recombination of the genetic material of cells, human-assisted methods and applications of recombinant DNA technology were developed, including that involving the transfer of genetic material from one species (the donor) to another (the recipient) to produce what is called a transgenically modified organism or GMO. This technology enables scientists to circumvent the barriers that exist in nature, specifically, barriers that prevent genes from crossing the species barrier. In so doing, scientists are able to create organisms that would not normally occur by way of natural mating or cross-breeding.

In New Zealand, recombinant DNA technology has been in widespread use in research and teaching laboratories since the 1970’s. One example includes human insulin which is produced by inserting the human insulin gene into a bacterial cell (*Escherichia coli*) to create a GMO, which then multiplies rapidly in the laboratory producing large quantities of human insulin protein. The genetically modified bacterial cells are then destroyed and the insulin is purified and marketed. Insulin produced by this method was introduced in 1982; a GM hepatitis B vaccine was similarly introduced in the early 1990’s. In 1987

viticulturalists started using a GM yeast to make wines from high-acid grapes, and in 1990 a GM enzyme used in cheese production entered the food supply. Since then GM foods and/or products from maize, soy, canola and potato have become widely available on supermarket shelves. In 1998 the Australia/New Zealand Food Standards Council granted legal status to twelve GM food crops, eight food processing aids and three GM food additives. Several GMO plants and animals have also been produced and are undergoing field trials in contained conditions. Examples include GM pine trees developed by Forest Research in Rotorua, and GM cows developed by AgResearch at Ruakura.³

The early promise of GMO technology exemplified by insulin was dramatically changed by a major outbreak of Bovine Spongiform Encephalopathy (BSE) or “mad cow” disease in the United Kingdom in 1992. The emergence of variant Creutzfeldt-Jacob disease or vCJD in humans focused public attention on the risks rather than the benefits involved in some biotechnologies. The apparent ability of the causative agent of BSE (an infectious protein or prion, thought to be that which causes scrapie in sheep) to cross the species barrier became linked with the ability of scientists in a laboratory to transfer genes between species that would never interbreed by natural means. This perceived link in turn fed fears about the unpredictable consequences of ‘unnatural’ technologies.

Here in New Zealand public concerns about biotechnology aroused by the vCJD scare concentrated on GM foods and the fact that many products derived from GM crops were already on the supermarket shelves, but in the absence of labeling people were denied a choice. In addition, little information was available about potential risks as well as benefits of the full range of GM technologies or products. One study on the attitudes of the public toward plant GMOs and their products published in 2000⁴ revealed that GM foods are strongly associated with ‘unsafe’ technologies and products such as pesticides and food additives. Over half (57%) of the respondents in a nationally conducted survey felt negatively towards the use of gene technology in food production; only 10–15% were positive. These concerns were exacerbated by a high profile December 1998 application to the Environmental Risk Management Authority (hereafter referred to as ERMA), seeking approval to field trial genetically modified cattle containing human genes. Media coverage of the public hearing in August 1999 along with the large number of public submissions to ERMA (most of which were strongly opposed to this research) ignited the formation of anti-GMO groups and protests. This opposition included an appeal to the High Court after the application was approved.⁵ The High Court allowed the appeal on the basis of technical errors in the application of the methodology and requested the Authority to reconsider the application. The application was again approved in May 2001. Public reaction to this was accompanied by protest and demand for better information about this new biotechnology. In response, the newly elected Labour

³ Further details of the many other products and uses of biotechnology in New Zealand are provided by D.R. Peterson, “Genetic Modification Background Paper No. 26,” 2002 and J. Gamble et al., *Genetic Engineering: The Public’s Point of View*, 2000

⁴ J. Gamble et al., “Genetic Engineering: The Public’s Point of View,” op.cit.

⁵ ERMA Decision GMF 98009, 2001.

Government in December 1999 announced a Royal Commission of enquiry into genetic modification. The Commission first met in May 2000 and reported back to the Government in July 2001. Public responses, as recorded in the Royal Commission's report, are tabulated below.

Table 1. General stance on genetic modification in public submissions to the Royal Commission on Genetic Modification

Strongly against	64.8%
Tend to be against	27.3
Neither for nor against	6.1
Tend to be for	1.2
<u>Strongly support genetic modification</u>	<u>0.7</u>

Note. N = 10,861. Royal Commission Appendix 3:39.

While the GM cattle decision and the Royal Commission were key events of the GM debate, Māori awareness about the potential effects of GM on their culture and relationships with valued natural resources had been formally signaled much earlier. Notably, in 1991 a claim (known by its number as Wai 262) was lodged with the Waitangi Tribunal.⁶ Motivated by prescient concerns about the genetic modification of native species of plants and animals, and commercialization of these taonga (treasures), 860 claimants (six iwi) requested recognition of their tino rangatiratanga (authority) over all of their taonga, specifically native flora and fauna, their habitats and/or ecosystems and of the mātauranga (traditional knowledge) associated with these taonga. Claimants asserted equally the resumption of their kaitiakitanga (rights and responsibilities of guardianship) over these things. Similar concerns have been voiced by several prominent Māori activists⁶ while independent research specifically focused on Māori views relating to GMOs⁷ has also identified other key issues. Of particular relevance and interest are submissions made by those hapū or iwi directly affected by applications to the ERMA. Appendix A summarises key issues raised in these submissions.

Further information comes from the consultation process with Māori conducted by the Royal Commission (see Appendix B for summaries). All of these sources revealed two broad areas of concern: one, primarily political, is based on the Treaty and how it is reflected in the process; the other pertains to culturally based beliefs and values, the majority of which were argued to be antithetical to the practice of transgenics.

⁶ A. Mead, "Genealogy, sacredness and the commodities market," 1996; M. Solomon, "An affront from ERMA," 2000; M. Jackson, "An exquisite politeness" 2001; J. Hutchings, "Molecular kaitiakitanga" 2001.

⁷ N. Gibbs, "Genetically modified organisms and Māori cultural and ethical issues," 1996; F. Cram et al., "Māori and genetic engineering," 2000.

Legislative and Regulatory Provision Relevant to GMO Research in New Zealand

In 1975, concerns expressed in New Zealand by scientists about risks affiliated with recombinant DNA technology led to a first set of regulatory recommendations, followed in 1978 by the appointment of an Advisory Committee on Novel Genetic Techniques (ACNGT). The Advisory's role was to make decisions about proposed genetic research with respect to the capabilities and training of scientists involved, the suitability of the laboratories in which the studies would be carried out, and the possible risks inherent in each experiment. At the same time, Institutional Biological Safety Committees (IBSCs) were established, and experiments were categorized according to their potential risks. These IBSC's were given delegated authority to approve 'low risk' experiments; all others were referred to the ACNGT and later to an interim assessment group (IAG) established in 1988. The latter group took responsibility for all genetic work not classified as "low risk" conducted outside of laboratory containment (e.g. field trials). As with the ACNGT, while all public sector researchers had to comply with the IAG procedures, private compliance was voluntary. IAG procedures included provision for public notification and submissions. IAG, like the ACNGT, used the Brenner system of risk assessment, the outcome of which quantifies risk along a spectrum ranging from 0 (no risk) to 4 (high risk). These assessments were used to make recommendations to the Minister for the Environment, who then made the final decision. With the 1988 establishment of the IAG, the government lifted a 10-year moratorium on field testing, paving the way for the first field trial of GM potatoes in the same year.⁸

The absence of legislative authority and private research sector compliance prompted the NZ Government in 1988 to begin the process of developing a legislative framework to regulate all GMO research. In addition, there were mounting criticisms of the IAG regulatory process by the public and by the Parliamentary Commissioner for the Environment, as well as an admission by the IAG itself that some of the issues raised by the public in submissions merited wider debate.⁹ This culminated in the passing into legislation of the Hazardous Substances & New Organisms (HSNO) Act in June 1996. This came into force in 1998 when a regulatory body, the Environmental Risk Management Authority (ERMA) took over its administration from the ACNGT and the IAG.

At the same time, eight persons independently appointed by the Minister for the Environment were selected to form a governance group to oversee ERMA policy and to make decisions on all applications submitted to the ERMA. From 1998 forward, applicants wanting to import or develop a GMO must submit their applications either directly to the ERMA or to an Institutional Biological Safety Committee (IBSC's) delegated by the ERMA to conduct rapid assessments of "low risk" applications.

⁸ J.A. Hope, "History of biotechnology recognition in New Zealand," 2002.

⁹ *Ibid.*

The HSNO Act

The HSNO Act 1996 is modeled on the ground-breaking legislation called the Resource Management Act 1991 (RMA). The HSNO Act contains several important provisions. Firstly, “environment” is defined as encompassing the natural, social and cultural environment. Section 5 states that:

... all persons exercising functions, powers and duties under this Act shall ... recognise and provide for the maintenance and enhancement of the capacity of peoples and communities to provide for their own economic, social and cultural well-being and for the foreseeable needs of future generations.

Secondly, there is a strong emphasis on public participation by way of written submissions or public hearings for all applications involving a field test or release of a GMO, or for the development in containment of any GMO considered to be in the public interest. Thirdly, it contains specific obligations on behalf of the applicant and the regulators for taking Māori interests into account.

Critically, Section 6 (d) provides that:

... all persons exercising functions, powers and duties under this Act shall ... recognise and provide for the relationship between Māori, their culture and traditions with their ancestral lands, waters, sites, waahi tapu, valued flora and fauna and other taonga ...

while Section 8 requires them to “take into account the principles of the Treaty of Waitangi.”

Amendments to the HSNO Act 1996 arising out of the recommendations of the Royal Commission 2001 were incorporated into the New Organisms and Other Matters Bill 2003 (NOOM Bill) and approved by Parliament in October that year. The latter provisions were designed to strengthen the HSNO Act in a number of ways preparatory to the lifting of the then current GM moratorium. These included the creation of a new category of approval, namely “conditional release,” as an intermediate stage between the holding of new and genetically modified organisms in fully-contained conditions and their unconditional release into the environment. It also strengthened the Treaty partnership between Māori and the Crown implied in Section 8 of the HSNO Act by establishing the Māori advisory committee to the ERMA, Nga Kaihautu Tikanga Taiao, as a statutory body (Section 24a).

The ERMA Decision-Making Process

Applications to import or develop a GMO in New Zealand fall into two categories. The majority are dealt with by nineteen Institutional Biological Safety Committees (IBSC’s). Six of these are associated with Universities, eight with Crown Research Institutes, and five with private research companies located in various parts of the country. Each is authorized by the ERMA to conduct “rapid assessment” of “low risk” applications as

defined in the HSNO Act, regulations 1998¹⁰ and S42 of the HSNO Act. A total of 807 “low risk” GMO applications had been processed by IBSC’s in the period through to August 29, 2003. Of these 174 involved human genes and 31 involved native fauna and flora. Until 2003 only eleven of the nineteen IBSC’s had a Māori representative. However in that year the membership of all IBSC’s included mandated Māori representation. All other applications to field trial or release a GMO that do not meet the “low risk” criteria under S42 are considered by the Authority via an independent group of experts appointed by the Minister for the Environment. This category includes applications to field trial or release a GMO. Before approving (with or without controls) or declining an application, the Authority is required to evaluate and assess all information including that provided by the applicant, the staff of the ERMA, the public (if the application is notified), and (in applications of relevance to Māori) by a Māori advisory group Nga Kaihautu Tikanga Taiao (NKTT). Its Terms of Reference require NKTT to provide the Authority with independent informed advice on ERMA policy and process issues on specific applications, particularly in regard to the adequacy of the consultation process and on Sections 6 (d) and 8 of the Act (noted above and restated in part immediately below). In making decisions concerning GMOs, the Authority is required to act in accordance with the framework as set out in the Hazardous Substances and New Organisms (Methodology) Order 1998.

Underlying Principles for ERMA Decisions

ERMA also published an Annotated Methodology which further elaborates the decision-making process to be used by the Authority. Several key aspects of this process are highlighted below in reference to both principles and risk assessment.

Principles: At all times in the decision-making process, the Authority is guided by certain principles outlined in Part II of the Act, namely the need to “recognise and provide for”:

- The safeguarding of the life-supporting capacity of air, water, soil and ecosystems (Section 5a); the maintenance and enhancement of the capacity of people and communities to provide for their own economic, social and cultural well-being and for the reasonably foreseeable needs of future generations (Section 5b).
- The sustainability of all native and valued flora and fauna (Section 6a).
- The intrinsic value of ecosystems (Section 6b).
- Public health (Section 6c).
- The relationship of Māori and their culture and traditions with their ancestral lands, waters, sites, waahi tapu, valued flora and fauna and other taonga (Section 6d).

¹⁰ HSNO Low-risk Genetic Modification Regulations, 1998.

- The economic and related benefits to be derived from the use of a particular hazardous substance or new organism (Section 6e).
- New Zealand’s international obligations (Section 6f).
- The need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects (Section 7).
- The principles of the Treaty of Waitangi (Section 8).
- Identification and quantification of any actual or perceived adverse environmental effects and their costs and benefits including any associated uncertainty.
- Determination of what level of risk associated with any effects is acceptable to society.

Establishing the acceptability/nonacceptability of perceived risks to society has been and is the subject of considerable research. Scholars studying perceived risk generally agree that there is no universally acceptable level of risk for all peoples in all situations. This finding was aptly summarized by Paul Slovic, a specialist in risk perception, when addressing the ERMA in 1998: “Risk analysis is both a scientific and a political exercise. Ultimately the whole exercise is driven by values, which determine choices made even within science, and the choices made by decision-makers and by society at large.”¹¹

ERMA itself has stated that:

Acceptable levels of risk have an ethical component. Certain activities may at times be unacceptable to the community, and may result in political debate and political decision. Over time societal attitudes will alter. Public attitudes towards some risks may change and additional considerations may need to be included in the ERMA’s methodology. Technology may change, and increased information may also change what is deemed an acceptable or tolerable level of risk. ERMA’s methodology will need to be able to reflect the evolutionary nature of public attitudes.¹²

Māori Concerns Relating to Applications Considered by the Authority

In addition to general provisions in Part II of the HSNO Act (e.g., S5 (b)), there are two specific provisions (S 6 (d) and 8) that require researchers to take Māori cultural health and well-being into account in regard to GMO applications of relevance to Māori. Judgments of ‘relevance’ are based in part on information provided in the ERMA user guide “Working with Māori under the HSNO Act”²⁰ and on advice provided to applicants by the Māori Policy Advisors for the ERMA. Especially relevant is any research involving native flora and fauna and/or human genes which is likely to have an impact on the relationships of Māori with taonga as described in S6 (d), or likely to have Treaty

¹¹ P. Slovic, *op.cit.*

¹² *Introducing ERMA*, 1997, pp. 7-8.

implications as outlined in S8. In such cases, pre-application consultation is encouraged between the researcher and local tangata whenua groups to discuss and attempt to resolve any issues of concern. Following application, a written assessment of the information provided by the consultation process is carried out by the Māori Policy Advisors. Additional independent advice is also provided to the Authority by Nga Kaihautu Tikanga Taiao (NKTT).

The majority of submissions received from those hapū and iwi who have been involved in consultations or have made submissions on specific GMO applications to the ERMA have been opposed to their approval. Grounds for opposition are consistent across those hapū/iwi and fall into two main categories of concern. One is political in nature, and relates to Treaty of Waitangi issues; participation in and control of the process; intellectual property right concerns, Wai 262, who benefits, and access to and time for informed debate on GM. The other is cultural in nature, and grounded in traditional values or tikanga principles including religious/spiritual beliefs (Appendix A.)

Of the 129 GM-related applications to the ERMA which had been decided by the Authority up to March 2004, none have been declined. 143 have been approved for importation or development in containment; 14 have been approved for field trials in containment and 15 have been withdrawn. No applications have been received to date for unconditional release of a GMO into the environment.¹³

Towards a More Inclusive Framework for Risk Assessment

Beliefs and values articulated by Māori concerning GMOs have provided and continue to provide a considerable challenge for the ERMA and in particular for its decision-making committees (i.e. all IBSC's as well as the panel of experts referred to above as the Authority).

Decision makers, many of whom lack familiarity with and understanding of Māori cultural values and beliefs, have found it difficult to use the existing framework to evaluate and weigh in the balance non-tangible effects of a spiritual nature alongside the more quantitatively based processes of scientific risk assessment. As Judge Goddard commented of the Authority decision-making committee in the first AgResearch cattle application GMF 98009:

They accepted that S6(d) required them to take spiritual matters into account. They were unable however to assess or give weight to purely spiritual matters in the same way they felt able to assess and give weight to purely physical matters. They acknowledged that Ngati Wairere's spiritual beliefs were deeply held . . . they were however, unable to assess any adverse effects on those spiritual beliefs in the absence of empirical evidence of (for example) likely health consequences.¹⁴

¹³ Information obtained from ERMA web site (<http://www.ermanz.govt.nz>). Two of six applications for reassessment of conditions for existing approvals were, however, declined.

¹⁴ *Bleakley v Environmental Risk Management Authority (ERMA) AP177/00*. 2 May 2001. McGechan, Goddard JJ, Judgement of Goddard, J.

Confronted with these difficulties the tendency of researchers and decision makers has been to emphasise tangible, empirically discernable risks including the establishment of a causal relationships between them and the GMO, with the intention of then attempting to avoid, remedy or mitigate any perceived adverse effects. In the minds of many Māori this ‘effects based’ emphasis has resulted in devaluing and/or denial of the reality and cultural importance of intangible spiritual risks and their effects, a perception which is interpreted as being culturally offensive and a breach of Treaty/Te Tiriti rights and obligations. This frustration with the existing process has been exacerbated by the fact that apart from those few which have been withdrawn, all GMO applications to the ERMA have been approved despite opposition from a number of involved hapū or iwi. In such cases the scientific, social, economic, and cultural risks and benefits posed by the research have been judged to be acceptable. So the question which arises in the minds of Māori opposed to such research is, ‘under what circumstances, if any, might an otherwise scientifically acceptable application be declined on cultural grounds?’¹⁵ In the absence of an answer, one consequence is a lack of confidence by many in the process and in its ability to deliver equitable outcomes for Māori. Although the ERMA has implemented the Royal Commission recommendation that Māori be represented on all IBSC committees in an effort to provide more meaningful involvement and participation, significant concerns remain about the decision-making processes of the Authority, and on how Māori values and beliefs are understood and evaluated in that process.

In its decision on application GMF 98009 (cited earlier) the Authority itself acknowledged the difficulty of assessing the weight given to spiritual or “intangible” taonga rather than to something physical to which spiritual values are attached, such as a sacred site.

The Act does not provide a sufficient framework within which to address the concerns elaborated by Ngati Wairere. In brief, the balancing of spiritual beliefs and scientific endeavor is not a matter solely for judicial weighing up. It is not surprising that Ngati Wairere and the applicant were unable to reconcile the issues involved. They do not lend themselves to point in time decision making, even though the HSNO Act requires this, and this majority decision will not take the issues away. A broader approach is required to provide a context in which the HSNO Act can operate in dealing with these kinds of issues...

The information presented in this report is a first step toward developing a framework that better enables the evaluation of cultural values and beliefs in addition to scientifically based risk assessment.

¹⁵ R.M. Roberts, “Genetically modified organisms and Maori,”2000.

2. Methodology

Interviews and Focus Groups

Three separate rounds of interviews and focus groups were first undertaken in 2001-2002 (see Table 2). Most focus groups and interviews lasted approximately 3 hours; a few meetings with knowledge specialists (e.g. traditional knowledge experts and theologians) lasted an entire day. In all, 15 focus groups and 20 individual interviews were conducted with a total of 90 participants.

Table 2. Structure and Nature of Interview Rounds

<i>Round I</i>	<i>Round II</i>	<i>Round III</i>
7 focus groups (range 3 – 13)	6 focus groups (2 –10)	2 focus groups (2 in each)
2 individual interviews	9 individual interviews	2 individual interviews
43 participants in total	34 participants in total	13 participants in total

Round I was organized using community and professional networks, and involved both known and unknown randomly selected participants. The selections were designed as far as possible to result in a representative spread of parameters such as gender, age, iwi, urban versus rural and informed (known to be reasonably conversant with the topic) versus less informed individuals. Occupations included kaumātua/kuia, school teachers, university staff and students, business people, farmers, theologians, health workers, housewives and the unemployed. Interviews were conducted on marae, in homes both in Auckland and in the North, and at the James Henare Māori Research Centre University of Auckland. With few exceptions, three investigators took part in each interview (MR, TS and MF).

The interview protocol consisted of one of the investigators commencing with a brief (five-minute) introduction to the project, emphasizing that it was specifically about GMOs (which were defined) and outlining its purpose, namely to elicit Māori views concerning GMOs, particularly any perceived risks, benefits and other effects on themselves, their culture and traditions. Mention was made of the provisions within the HSNO Act (s6 (d) and 8) for Māori views to be taken into account, and of the difficulties involved in this process for both applicants and decision-makers. The proposed outcome of this research was then explained (i.e., that it was aimed at developing a more robust and equitable decision-making framework which included Māori beliefs and values).

In order to stimulate open-ended discussion on the subject, one of the researchers then commenced with a standard question, “Tell me about your first impressions or thoughts about GMOs.” As key themes emerged over the next 30–40 minutes these were followed

up by more in-depth questions which sought to elicit underlying values, beliefs, and reasons for acceptance, rejection, or uncertainty about GMOs.

Round II focused on specific individuals including professionals (e.g., Māori scientists and medical practitioners, Māori language experts, Māori theologians, and Māori resource managers) considered to be reasonably well informed and/or to be important stakeholders in the GMO debate. Three investigators (MR and TS, and occasionally MH) took part in the interviews. Round III again placed emphasis on key individuals considered able to provide informed debate on this subject, and included *tohunga rākau*, Māori Members of Parliament, and Tribal CEO's.

In all rounds, a series of prepared examples provided a range of actual and theoretical examples of GMO applications. These included but were not limited to examples such as the genetic modification of human cells to produce insulin; the transfer to strawberries of copied genetic material from Atlantic flounder to produce frost-resistant strawberries; producing protein in the milk of modified cattle and sheep to create therapeutic drugs for diseases such as multiple sclerosis; modifying pine trees so as to produce self-pruning trees. The examples provided were designed to cover a number of the key categories relating to GMO research and its applications. These included:

1. The *purpose* of the research (to produce a GMO for medical purposes, or for food, for environmental or conservation purposes, for economic or for pure research purposes).
2. The *location* of the research (in the laboratory; as a field trial, or released into the environment).
3. The *species* involved as donor of the gene and as recipient; both native and non native species as well as human and nonhuman genes were included among the examples provided.
4. The proposed *benefits* (e.g. predominantly for Māori, or New Zealanders as a whole, for international interests v national interests), as well as some of the potential scientific risks (e.g., unintended gene transfer via pollen or soil or ingestion).

Participants were then given the opportunity to ask questions or offer opinions about each “scenario” before exploring in depth specific concerns regarding any expected cultural risks and effects. Considerable care was taken to explore the cultural, moral, scientific, and social logic underpinning all concerns. In virtually all interviews, some discussion of the integrity of the *mauri*, *wairua*, and/or *whakapapa* ensued. Equally, questions of *kaupapa* (defined here as purpose), benefit, and/or biological risks were raised as were points about the broader decision context often articulated in reference to Treaty rights and principles. Use of these scenarios also helped participants to identify and articulate certain “boundaries” or “no go” areas concerning GMO research such as the use of human genes or the introduction of modified species in the absence of adequate field trials.

Analysis

Tapes from all three rounds were transcribed and the transcripts then coded using the ATLAS.ti programme. At the beginning of the coding process, transcripts were examined as hard copy documents by members of the research team. The coding process required careful and detailed textual examination that involved identifying passages within each transcript that raised and discussed relevant values or ideas. The results were then entered into the Atlas.ti (Version 4). This is a computerised workbench for the qualitative analysis of large bodies of textual (and other) data. Once data have been coded, the Atlas.ti networking facility enables multiple connections between code groups to be generated. This allows for the production of multiple idea clusters, which in turn provides a nuanced analysis of particular ideas and the different levels of meaning that they contain. The transcripts were formatted for the Atlas.ti system and once entered, each transcript was assigned as a “Primary Document” to a “Hermeneutic Unit” (HU) - an “idea container” - in which all data, codes, and code relationships are catalogued.

Codes were not set prior to the analysis, rather it was expected and it was the case that certain commonly invoked values, such as *mauri* and *whakapapa* would emerge as important. In addition to these initial key-word targets, recurring themes and topics of discussion were identified as significant and thus assigned a code by the research team.

Passages were marked and assigned a code that identified the cultural value or belief to which each referred. In many cases a passage was dense or contained many ideas; such passages were assigned multiple codes. The informants explicated some values such as *whakapapa*, while the researchers inferred others, such as *mana whenua*, from the discussion.

The process of inferring themes from complex passages is somewhat problematic. On the one hand, researchers’ prior knowledge of Māori worldviews could serve to predetermine the codes, but on the other hand unfamiliarity with Māori worldviews could result in missing important evidence. However, it is argued that by following the process outlined below, and by drawing upon the expertise of researchers and advisors both with and without such prior knowledge, such biases have been largely overcome.

Streamlining Codes

There was an initial proliferation of nearly 50 key codes. To streamline these, a weeklong meeting was held to discuss coding involving three lead researchers (MH, MR, TS) and two external advisors, Professor Peter Gathercole of Cambridge University and Associate Professor Pare Keiha of the Auckland University of Technology. The aim was to rationalise the initial lengthier list of codes thereby reallocating codes to a more refined set of master categories. A total set of fewer than five master themes emerged as follows:

- A. Commonly invoked Māori principles.
- B. Recurrent political aspects.
 - references to Treaty rights/principles, intellectual property rights, decision-making processes.

C. Causal patterns of thought.

- any passages that hint at what certain actions as related to GMOs are said or suggested to effect or cause.

D. Hybrid references to scientific and cultural knowledge.

- for example the fusing of principles of whakapapa with principles of western science's notions of phylogeny and species barriers.

E. Attitudes about gene technology.

Category A, 'Commonly invoked Māori principles,' included the various invocations of ideas such as *tapu*, *mana*, *mauri* and *whakapapa* as well as references to traditional values, such as *manaaki/aroa ki te tangata*. Category B emphasised general thoughts, opinions and ideas involving a wide range of concerns, including the practice of science generally and of GM in particular, the HSNO Act and other legislation, and identifying 'outside' influences on the GM debate.

This report primarily considers codes under master heading A and B, paying express attention to two codes recognized as prominent across the majority of interviews and focus groups. Most concern key philosophical beliefs (e.g., *mauri*), norms, and cultural forms and institutions (particularly *whakapapa*), as well as values broadly construed (e.g., *kia tūpato*, *kaupapa*); key socio-political concerns are also well represented here. The primary areas of concern are summarized here via the following headings; each construct is granted detailed attention in the report sections that follow.

1. I nga wā o mua
2. Risk taking
3. He tangata, he tangata
4. Spiritual Matrix A – tapu, mana, noa
5. Spiritual Matrix B – mauri, wairua
6. Taonga
7. Whakapapa
8. Kaitiakitanga
9. Kia tūpato
10. Kimihia te mātauranga/mōhiotanga
11. Kōrero tahi
12. Tino rangatiratanga and Treaty Principles
13. Individual choice is important
14. Tikanga
15. Kaupapa
16. Karakia

- 17. Pro/Anti Explanations for Response to GM
 - 17a. Use of Human Genes
 - 17b. GM Food
 - 17c. Natural v Unnatural
 - 17d. Situational Acceptability (e.g. a medical application)

Presentation of Results

The first objective of this report is to delineate the cultural considerations most frequently referenced as participants attempted to understand, evaluate, and/or contest the acceptability of different GM applications. In some cases these values, norms, institutions and ideas were clearly identified by participants. In other cases, as has been noted, the underlying principles were inferred from the context of the discussion wherein the concepts discussed appeared to express key ideas prominent in Māori intellectual and cultural traditions. For instance, few people used the term *kia tūpato* ('be careful' - a shorthand for the need to exercise caution) but numerous people invoked the precautionary principle by talking about the necessity to avoid any adverse risks and proceed with caution generally.

In the next five chapters, these ideas and attitudes are discussed in the light of the conversations with the participants in the interviews and focus groups, under the headings.

- Primary philosophical concepts (spiritual matrices A + B; Chapter 3)
- Key values highlighted by participants: 'he tangata,' aroha, manaaki, and whānaungatanga (Chapter 4), along with the importance of choice, (included in Chapter 7).
- Norms: 'i ngā wā o mua,' 'kia tūpato,' and 'kimihia te mātauranga,' (Chapter 5), and 'kaupapa' (Chapter 7)
- Institutions: whakapapa, kaitiakitanga, tikanga and karakia (Chapter 6)
- The resolution of conflicting norms and values, along with political considerations, attitudinal perceptions reflecting conflicting norms and values respectively (Chapter 7).

These expositions are followed by an overall account of the response continuum (Chapter 8). The report closes with a brief discussion (Chapter 9).

3. Primary Philosophical Concepts

Spiritual Matrix A: Tapu, Noa, Mana

The cluster of ideas, designated here as Spiritual Matrix A - the *tapu, noa, mana* spiritual matrix, involves three terms in common usage in Māori society. *Mana* incorporates notions of power, authority, and prestige, and the recognition of these qualities. It references both the power intrinsic to the gods or atua – what Barlow defines as the “enduring, indestructible power of the gods”¹⁶ – as well as the power embodied in the individual person as passed down from the ancestors (*mana tupuna*) or as manifest in skill or acumen in a particular area (*mana tangata*). *Mana* can also be used to reference the power rooted in links to the land and in its potentiality to provide for human sustenance (*mana whenua*).

An all-pervasive construct, mana has a part to play in most ceremony, ritual, and everyday activity. It is central, equally, to the maintenance of both group and individual integrity. Mana is intrinsic to the wholeness of social relationships, well-being and integrity, and is expected to be sustained across time and space. The promotion of the common good and authentic Māori social or environmental policy thus requires appropriate structures and institutions for the ongoing enhancement of mana. Generative power is also linked to mana. For example, *mana wahine*, the integrity of women, is connected with Papa-tūā-nuku and her generative and nurturing power, while *mana tāne*, the integrity of men, is linked to the power of Te Waiora a Tāne, the source of life. Besides life-giving powers, the imparting of order (which enables life forces to avoid chaos, destruction and pollution) also contributes to *mana Māori*, the integrity of Māori people. This association with form and order is the basis of concern for ritual and convention. Mana is exhibited in its completeness when order and form are right. It is a quality and power bestowed on individuals or groups by others and not by oneself. An understanding of mana is essential for understanding the worldview of Māori and of Polynesians in general.

Mana as Referenced in Discussion About GM

The principle of *mana* was rarely discussed in relation to the practice of GM *per se*. It was often used, however, in discussions about the consultation and decision-making processes of ERMA and Māori groups, particularly in relation to decision-making rights. In this context, it was recognized that much of the current impetus to ensure (not restore) a Māori presence in the GM regulatory process under the HSNO Act, was both a product of and a restoration of *mana* at the level of hapū, iwi, and nation.

¹⁶ *Tikanga Whakaaro*, 1991, p.61.

Brief mention was made of *mana* in three other contexts. The first referred to the *mana* of animals, as in the following extract:

The kiore [rat] has its own mana . . . [and] a cow has its own mana . . . And maybe there are some offshoots or medicines or something that come out of it, but it's mana belongs to itself.¹⁷

The use of *mana* in this context suggests that organisms have a certain autonomy, expressed here as *mana*, that should be respected, and should not simply be regarded as available for human exploitation. In this sense, *mana* has close links with the principles of *kaitiakitanga* and *te ao tūroa*, which are discussed separately below.

The second use of the principle of *mana* arose in a discussion about human-to-animal gene transfer in which the respondent saw spiritual benefits deriving from consuming genetically modified meat:

Going back to our kōrero earlier about cannibalism, I turn around to eat the sheep who carries my genes, what I am really doing is eating back my mana, or eating back somebody else's mana that is in that sheep — and that should make me stronger. Well, knowing all those concepts, it will. It will drive me to know that I will be stronger.¹⁸

Finally, whilst discussing the ability of the *atua*, Tāne, to modify organisms, one respondent argued that, since such activity takes place in the *tapu* realm of the *atua*, it is a dangerous activity for humans who do not have the *mana* to take on such responsibilities safely.

Tapu

Tapu is a cosmic power imbued in all things at the time of creation and would normally remain for the duration of a thing's existence. In the Sky Father and Earth Mother account each of the children were conceived with the *tapu* of the parents, and they in turn are the sources of the *tapu* of all the domains and things of creation ascribed to them. Persons, places or objects are *tapu* and are therefore in a sacred state or condition.¹⁹ In its primary meaning, *tapu* expresses the understanding that once a thing is, it has within itself a real potency that is manifested in *mana*. Coupled with the potential for power is the idea of awe and sacredness, which commands respect and separateness. It is in this

¹⁷ In this extract the respondent discussed the purposive aspects of phenomena, that particular things have particular uses. He expressed concern for organisms that might be involved in GM but acknowledged that the technology was outside of his experience.

¹⁸ As mentioned above, the extract is taken from a discussion of the implications of human-to-animal genetic transfer. The respondent argued that the insertion of human genes actually gives kinship rights over the recipient organism. The respondent argued that practices exist which can mitigate spiritual problems which might arise from such activity, and cited the historical practice of 'eating tapu' as of dealing with a spiritual perturbation.

¹⁹ See Māori Marsden, "God, Man and Universe: A Māori View," 1975 p.197.

sense that *tapu* can mean restrictions and prohibitions.²⁰ However, *tapu*, a core part of Pacific belief systems, was recognised by early Western observers who imported it into English and other European languages in such forms as “taboo,” largely in terms of restrictions or prohibitions. Unfortunately it is the limited and negative understanding that is widely used to explain *tapu*, but this is only one aspect of its meaning.

Tapu is traditionally applied to many states of being and there are therefore many types of *tapu*. All children are *tapu* as are individuals and groups. Houses and gardens are *tapu*, trees and birds are *tapu* as are rivers, and lakes and oceans, and ecosystems. The natural world as a whole is therefore *tapu*. While *tapu* needs to be treated with respect, awe and sometimes fear, this necessity depends to some degree on the relationship of one’s own *tapu* to the *tapu* belonging to other persons and life systems in the environment. Regardless, a respectful relationship ensures balance, health and wellbeing, but a bad relationship of abuse often leads to disharmony and imbalance. This applies to the *tapu* of distinct features of ecosystems. They need to be protected, strengthened and constantly confirmed so that balance, harmony and potentialities can be fulfilled.²¹

Tapu References in Context of GMO Debates

The principle of *tapu* was frequently invoked during study discussion; usage varied widely, most notably in the use of *tapu* to describe both the ontological properties of an entity (i.e., the attributes and qualities that constitute an animate or inanimate being) as well as that entity or being’s affective qualities. In its ontological dimension, *tapu* is seen as intrinsic to the existence of all things, whereas in its affective aspect it can be present or absent as a potent force. It might be said that all things **have** *tapu* but only some things **are** *tapu*.

In consultations with study participants, the term *tapu* was most commonly used to reference an entity’s potency, with many (a) pointing to the forms in which *tapu* manifests itself in the world, and (b) noting the ways in which it must be managed. Opinion also varies regionally as to which things possess significant *tapu* (a whale might be seen as *tapu* by a coastal Māori group, for example, but might not be regarded in the same way by an inland Māori group). *Tapu* can apply to individual things as well as to groups of things. A certain tree, for example, might be seen as *tapu* while the class of trees to which it belongs is not. When a thing or a person is identified as *tapu* in this way, certain restrictions or sanctions come into effect, while at the same time its spiritual efficacy is enhanced. People note the possibility of managing *tapu* through a variety of means; it is also generally agreed that such activity is seen as dangerous and often reserved for special people, such as *tohunga* specially gifted and competent to deal with such matters. In the discussion from which the following quote is drawn, the respondent

²⁰ For a discussion on Māori philosophy see Michael Shirres OP, *Te Tangata. The Human Person*, 1997, p. 79; also Māori Marsden, *The Woven Universe*, 2003.

²¹ For discussion on *tapu* and religion see Māori Marsden, “God, Man and Universe,” pp. 196-197; Anne Salmond, *Between Worlds*, 1997, pp. 176-177, 510. See also J. Prytz Johansen, *The Māori and His Religion in its Non-Ritual Aspects*, 1954, pp. 185-213.

is discussing the mythical ability of the atua Tāne to modify organisms. The opinion is expressed that such modification takes place in the realm of the atua and is therefore a dangerous activity for humans who do not have the mana to do it safely.

What you are dealing with [genetic material] is very tapu . . . and because it is very tapu, there goes with it responsibilities and dangers, if you do things wrong.

Regardless of differences concerning the details, consensus as to the tapu nature of phenomena is evident in certain spheres. Multiple aspects of the social and physical context of death, such as *tangi hanga* (funeral rituals) or *urupa* (burial places or cemeteries) are almost universally thought of as *tapu*. Similarly, food is often linked with *tapu*, although primarily as a means of negating, or pacifying its effects (this is discussed below). As the following extracts show, the human body is also widely regarded as *tapu*, and *tapu* is often seen to extend to parts of the human body, such as blood, hair, and human genes.

. . . [the] human body was sacred and it needed a special admission of sanctity to maximise its performance . . . ²²

. . . the tapu nature of genes from humans is one thing.

Interviewer: But everything is tapu.

Consultant: Well, yes, but if everything was tapu in that sense we wouldn't eat anything. Because everything has a place in its own tapu but, I guess from my perspective as a Māori, human genes have a special tapu and that is an issue for me.²³

The general consensus or consistency with which human “body parts” are said to be subject to *tapu* has potentially significant implications for GM when human genetic material is used, in that most conceptualize a gene as a body part. No clear explanations were put forward, however, as to the precise way in which *tapu* might be managed in the context of GM. Rather, some respondents argued simply that humans are too *tapu* to be subject to this kind of technology at all, while others maintained that the *tapu* of humans does not constitute a barrier to GM. There is clearly considerable divergence of opinion across Māori on the subject of *tapu* and GM, and it is difficult to see how this might easily be resolved.

Noa

The principle of *noa* is inversely related to *tapu*. *Noa* is the state of existence where the efficacy or potency of the spiritual forces is temporarily mitigated or negated. The *noa* principle was only occasionally articulated in specific relation to GM, but it was used, for example, in categorising organisms. One person argued that it might be considered more

²² In this extract the respondent talked about the special tapu of the human body, and lamented the loss of tikanga related to human tapu. Smoking and bad lifestyle choices were singled out for particular criticism.

²³ This extract is taken from a discussion where the respondent argues that humans possess a special tapu and therefore should not be directly subject to GM.

acceptable for a *noa* organism to be modified than a *tapu* organism, and that it might be unacceptable for material from a *noa* organism to be transferred into a *tapu* organism. This latter view is expressed in the following extract wherein the possibility of modifying pine versus kauri trees was discussed as a hypothetical scenario:

. . . if your tipuna is a kauri tree and the pine is in a different whakapapa now that pine may be regarded by Māori as being *noa* [so] you're taking something less and putting it into something that's great. . . .

Another use of the *noa* principle is seen in the following extract, which describes the movement between states of *tapu* and *noa*. In this extract the respondent described how he prepares for visits to the doctor, by neutralising and then reactivating his *tapu*. He recounted his childhood experiences with the doctor where he had received treatment to his head (an area of the body regarded by many as particularly *tapu*) and yet had not experienced any loss of *tapu*.

If I was to go to the doctor, I whakanoa myself — I leave all those things *tapu* that I practice. I leave them here — why? Because I am going to a doctor who I know is going to help me and I trust that will help me. So he doesn't want all my hang ups to get to what he needs to do for me. He wants to just do what he can for me and I when I get out then I come back and [can] be *tapu* again . . . So, to whakanoa means to leave all those personals behind and go according to the *kaupapa* of your need.

The fundamental point for this speaker is that the protection of some areas of the body thought under most circumstances to be *tapu* and hence to be potent with the power or forces that being *tapu* embodies can be protected by temporarily suspending those powers through the practice of whakanoa. More critically, it is the purpose or the 'kaupapa' of the need (here a childhood need is used as the medical analogous case) that drives the introduction of a whakanoa and hence the possibility of accepting the normally unacceptable.

This view has implications for the practice of GM which require further explication. If, for example, GM was deemed to be a *tapu* activity, it might still be acceptable to employ the technology under certain conditions. The extract might also indicate, however, that biomedical science (and by extension some types of GM) are considered *noa*, and therefore not subject to *tapu* or indeed are effective counter forces in relation to *tapu*. Another respondent noted that *noa*, like *tapu*, should not be treated lightly, and that the appropriateness of its use was for Māori to determine:

Whakanoa to me is something that is strictly for Māori use and it's not used because [somebody] has decided that [GM experiments are] going to happen and the first thing they do is get a Māori *tohunga* in and whakanoa.²⁴

Moreover, this speaker is pointedly warning against the simplistic notion that Māori resistance to GM can be regarded as a 'problem' easily – perhaps even trivially –

²⁴ In this extract, overall, the respondent expressed a strong anti-GM opinion.

addressed by the quick importation of a tohunga who might be asked to perform a strategic ‘on command’ whakanoa.

Others did suggest, however, that appropriate *karakia* to manage the potentially powerful forms of *tapu* and *noa* could be useful in dealing with metaphysical disturbances which might occur in the course of GM experiments. This is discussed in greater detail in chapter 6 under the heading: *Karakia*.

Spiritual Matrix B: Mauri and Wairua

Mauri

In addition to *whakapapa*, the concept of *mauri* is one of the most commonly invoked principles in Māori discussions of GM. Definitions of *mauri* by scholars and commentators centre around concepts such as life-essence, life force, and vital principle. According to one influential school of Māori philosophy, *mauri* refers to the life force or potency originally possessed by Io, the Primary Life Force and Supreme Cosmic Being. It is a force transmitted by Hauora, one of the children of the creation parents, who is responsible for *mauri* and *hau* (the spark that ignites the *mauri*) and therefore life in all creation. It is intimately related to other metaphysical qualities - *tapu*, *mana* (discussed above), and *wairua* (discussed below) - and each of these forces are essences of forms of life in persons, objects and non-objectified being. They endow things with its special character, which must correspond to its nature.²⁵ *Mauri* is a concentration of life itself, like the centre of an energy source; further, the purpose of its power and energy is to make it “possible for everything to move and live in accordance with the conditions and limits of its existence”.²⁶ Everything has its own *mauri*, its own nature – people, tribe, land, mountains, stones, fish, animals, birds, trees, rivers, lakes, oceans, thoughts, words, houses, factories – that permits them to exist within their appropriate realm and sphere.²⁷

Among the spiritual values that comprise the *tapu*, *noa*, *mauri*, *wairua* matrices, *mauri* was the value most commonly invoked. *Hau* was mentioned by few participants in this study.

²⁵ For a fuller discussion on *mauri*, *tapu*, *mana*, *hau*, *wairua* and their place and applications in an industrial, positivist, utilitarian and secular society see Manuka Henare, “Human Labour as a Commodity – A Māori Ethical Response,” 1988, p. 218. See also Manuka Henare and Bernard Kernet, “Māori Religion: The Spiritual Landscape” 1996, pp.205-215; Anne Salmond, *Between Worlds*, 1997, pp. 176-177; J. Prytz Johansen, *The Māori and His Religion in its Non-Ritual Aspects*, 1954, pp. 118, 237-240; and Māori Marsden, “God, Man and Universe,” 1975, pp. 196-197. An extended definition of the term *mauri* is also included in the next section of this chapter, in connection with the relationship between *mauri* and *wairua*.

²⁶ See Cleve Barlow *Tikanga Whakaaro*, 1991 p.83.

²⁷ For additional discussion on the function of the *mauri*, the life-conservation-death principles and how *mauri* may be violated and restored, see Cleve Barlow, *Tikanga Whakaaro*, 1991, p.83, and Makereti, *The Old Time Māori*, 1938, p. 181.

Mauri in the Context of GM Discussions

Use of the term '*mauri*' in the GM debate seems to converge around a linked set of questions, each concerning the transfer of genetic material from one organism to another. The first question asks whether or not the *mauri* or some of the *mauri* of the donor organism is transferred along with genetic material. If not transferred, is that because *mauri* is considered intrinsic to that object and thus cannot be transferred or is it because the creation of a new organism through GM results in the generation or necessitates the recognition of a 'new' *mauri* in the organism? If a transfer or exchange of *mauri* is said to take place, is the *mauri* or the *whakapapa* of the recipient *or* the donor organism affected? In the event of an effect in these respects, is that effect positive or negative? Generally speaking, it was more common for 'an effect' to be expected in reference to the recipient organism, suggesting that transferred genetic material was regarded as 'foreign' and embodied with agency in reference to the *mauri* and *whakapapa* relations that locate and define the recipient organism (discussed here and below in the section on *whakapapa*). However, when the donor organism was human, it was often the case that the donated genetic material was conceived of not as a copy of someone's genetic material but as a 'piece' or 'essence' of that person who is 'gifting' that material to the recipient. Hence, further questions arose as to whether or not the donor was *knowingly* gifting the genetic material and if not: "might the gift come back on them"?

Each of these foundational questions is summarized below; further discussion of the multiple dimensions of discussions about *mauri* follows.

- Is *mauri* intrinsic to each organism (i.e. inseparable from and a property of the whole organism) and hence not transferable?
- Is *mauri* a property of individual parts of an organism (e.g. hair, nails, organs, genes) and hence transferable?
- If individual parts of an organism e.g. a gene possesses a *mauri*, is that *mauri* the same as, or different from the *mauri* of the whole organism?
- If *mauri* is transferable, under what circumstances might the effect be good or bad?

Mauri as Distinct from Its Physical Form

First it must be noted that *mauri* in the GM context and many others is regarded as a property distinct from the host entity's physical form. Thus, for some, determining the effect of GM on the *mauri* of an organism was initiated by discussions premised on the decoupling of the *mauri* from the physical form of an organism itself. The *mauri* in most of these cases is perceived as the link between the physical and spiritual (*wairua*) properties of an organism. Example references to this decoupling of the physical and spiritual realm are as follows:

Mauri has its links . . . if it was a spirit of a rat in the body of a rat, it would have its own mauri to connect [them] together to make it a living force.

. . . the belief is that there's wairua and tinana. Now wairua is the spiritual part of the person and tinana is the physical side. Now you need something to join them together. And what is that something that joins them together: it's the mauri.

Mauri as Transferable

The view that transgenics necessarily involves the transfer of *mauri* seems to rest upon two basic assumptions. First, that *mauri* is divisible — either in the sense that it is separable from the organism to which it first became a part, or in the sense that the totality of all *mauri* is subdivisible according to categories of organism, for example, a species or other kind of group. Secondly, it is assumed that the wholeness of the *mauri* is found in every element of an organism such that *mauri* and DNA are analogous to the extent that DNA can be found in most parts of an organism.

While it was difficult to find concrete examples of exactly how *mauri* might be transferred in GM processes, some respondents pointed to analogous precedents such as earlier debates about human organ transplantation. The following quote, for example, contrasts two cases of organ transplantation wherein the *mauri* was said to have been transferred. The speaker first discusses a kidney transplant where the donor was a Pakeha woman and the recipient was a Māori man and then described a man who had a new hand grafted onto his arm (a case that was widely reported in the international media):

. . . the kidney she gave him, because both of his were [ruined], kept him going and it never rejected him . . . whereas if you have a look at that [recent] example of . . . [the] New Zealander who had the hand transplanted — the hand rejected. . . . There must [have been] something wrong with the mauri there. The mauri of the hand and the mauri of the person didn't mix. You can use all sorts of medical terms to describe it, but in actual fact there was something wrong. In [the first] case, that's why his wife's kidney . . . kept him alive for another three years . . . the mauri must have been right for him.

One of the implications of this view is each individual (in this case, each human) possess their own unique *Mauri*. This understanding is also articulated in the next extract:

Mauri sometimes is called the mauri rere, he mauri tau. Mauri rere is one that [shows a] flighty attitude . . . [when the person] can't keep still. And mauri tau is one who holds his cool . . . [so] now, we are talking about different types of mauri.

Others, however, regard *mauri* as undifferentiated. Assuming that transgenics also entail the transfer of *mauri*, this attitude raises the question of whether such movements are significant given that *mauri* is shared anyway:

Participant: I think once you give up your view that mauri just exists within one species or whatever, there is mauri which is present in [everything]²⁸

Interviewer: Meaning the same? The same mauri is present in all things?

Participant: For some Māoris.

Among those who held that *mauri* is transferable, the belief that gene transfer constitutes a denigration, diminution or pollution of the *mauri* was strongly held. The following example expresses the unequivocal view that transgenics does affect *mauri* in a necessarily harmful way:

. . . each plant has a source and a continuity [of] mauri . . . what you're doing by genetic transfers [is], you are degrading the mauri.

Another participant, however, held that the process might be used to enhance the *mauri* of a recipient organism, for example by adding the *mauri* of a more 'revered' species to a 'normal' one. The outcome of such transfers might also be unpredictable, as argued in this discussion of a scenario in which it is posited that an anti-fungal toad gene be inserted into a kūmara to prevent rot:

Anything you do has an impact . . . if you [put] a toad gene in a kūmara, you've changed the mauri of the kūmara. Have you changed it for [the better]? Well, yeah, it's resistant to rot and mildew but you've also probably changed it for some bad as well.

Echoing this view, another person suggested that it is in part the circumstances or conditions surrounding the actual transfer that should also be taken into consideration. While the *mauri* of individual organisms might be enhanced through transgenics, it was argued that the transfer could also impact positively or negatively on the broader context in which the organisms are situated. There is a sense in which, as all *whakapapa* species are related to other organisms and inanimate entities in the recipient organism's *whakapapa*, it follows that those relations hence species will be affected. This thinking was implied in the context of a discussion about using GM to restore *toheroa* beds significant to northern iwi:

there's a big shift [in thinking] towards two unrelated species being put together for [a] reason . . . producing children, producing life . . . the mauri is developed, is made healthy etc. And so in this sense the mauri of the toheroa, I think, will benefit. But it's the context of the relationships that surround [the **toheroa?**] and the responsibility which . . . I think is important.

²⁸ A note on quotations. Separated indented paragraphs indicate a change in nonconcurrent speakers. When the term "participant" or "participant 1, 2..." is used, the quotes denote a conversation between an interviewer and one or more consultants/interviewees.

Mauri as Nontransferable

Many participants, on the other hand, held the view that transgenic modification did not entail the transfer of *mauri*, although the basis for this view varied. In the following excerpt the participant questions the notion of an exact link between the *mauri* of a whole organism and its genetic or cellular derivatives, one implication being that if no such link exists, then genetic transfer will not result in the transfer of *mauri*:

No I don't think it [what is transferral] is . . . mauri. I think [the] mauri is still there [remains].

A more commonly expressed opinion is that *mauri* is an inseparable part of the organism. In this view *mauri* can be affected in the sense that it can be diminished, resulting in sickness or death, but it cannot be transferred between organisms. Again, processes seen as analogous to transgenic modification were used to illustrate the point, as in the following discussion of what happens to the *mauri* of a tree when it is made into a carving or canoe:

The person who fashions it has a mauri . . . the wood itself has a mauri, the action to carve it has a mauri, [and] the end product would probably be a mauri that [brings] together all of those things. But the original mauri would probably stay with the [tree] stump.

Interviewer: So it is not that the mauri leaves the tree, but you could say some part of the mauri goes into the next entity — the canoe, the carving?

Participant: The mauri will probably stay in the tree, but the new object will get a mauri of its own.

The participant went on to explain how a new *mauri* could be set in place:

A carving is carved out and yet, while the carver is carving, he does not put a mauri in it until he has completed his carving, and then he puts a mauri in and he names a mauri in place, and that is what makes it come alive.²⁹

The participant then applied the process directly to genetic transfer, suggesting that it is the assignation through naming of a new entity and *mauri* and hence its purpose is set in place:

. . . a gene can be shifted around until the mauri is set in place and then it stops for that species.

The idea of naming a new thing in order to imbue it with a *mauri* of its own was reiterated by another participant, who detailed how the different principles of *tapu*, *mana*, *ihi* and *wehi* weave together.

²⁹ Note that it is a well-established Māori view that carvings and other material taonga are living entities, with the power to influence other phenomena.

The mauri is a godly issue, but it is for us to recognise that by giving it a name. . . . He mana he tapu he wehi — [it possesses] all those, but there is no mauri mentioned in those tapu things. It is the mauri that really kicks all those issues into action. So then the mauri is . . . named. As soon as that name is mentioned, the mauri then kicks into ihi, wehi, tapu — all those issues.

It is also important to note that where *mauri* is regarded as nontransferable in transgenic processes, it does not always follow that only genetic material is transferred. The next extract, for example, argues that *wairua* is transferred although *mauri* is not. [*Wairua* is discussed more fully in the next section; its prominence as a key construct varies across *iwi* as does that of *mauri*.] In the following quote, the idea of setting a new *mauri* in place through *karakia* is a key point:

Participant 1: . . .[you mean] the mauri does not get transferred to the new thing — it is only the wairua of it? Therefore, for [the new thing] to survive in any way you would have to give it a new mauri — wouldn't you?

Participant 2: You have to give a new mauri.

Participant 1: And is that through karakia?

Participant 2: Through karakia.

Participant 1: Therefore this one isn't affected — the original one — because that is what a lot of Māori think; the mauri gets transferred.

Participant 2: The wairua gets transferred, not the mauri.

One Māori scientist expressed the view, seen in the next excerpt, that there is no evidence to suggest any impact, whether positive or negative, upon the *mauri* of recipient organisms. Beyond that assertion, his statement contains two other points of interest. First, the speaker raises the question of the possible effects of modification on *whakapapa*, an issue which is covered elsewhere in this report. Secondly, he reflects on the potential threat to his own *mauri*, health and well-being incurred through practicing GM.

[My] understanding [is that] the science [of GM] doesn't upset my mauri. Seeing it actually done before my eyes, I don't [experience] a psychological or physical effect . . . and then you say so what, what about the poor cow. I look at the cow — it's just [that] another bit of data that has been added to it. I don't think [the cow's] whakapapa has been disturbed. I don't think [the cow's] mauri has been disturbed, and we are yet to find out. I feel quite confident that the cow won't have physical or psychological problems, it would be just [a] cow.

It is evident from the responses outlined above that no consensus yet exists among Māori as to the probable or possible effects of transgenic modification upon *mauri*. This is largely due to widely different understandings of what *mauri* actually is. This situation is

further complicated by the close entanglement of the notions of *wairua* and *mauri*, as discussed in the following section.

Wairua

Barlow distinguished *wairua* as the spirit within all things, that is, all things have a physical body (*tinana*) and a spirit (*wairua*). Consistent with some of the above comments, these spiritual and physical properties are joined together by the *mauri*. However, “when a person dies, their physical remains are [said to be] interred in the earth; [whereas] their spirit lives on and travels the pathway of Tāne to the gods that created them.”³⁰

Wairua in the Context of GM Debates

The principle of *wairua* was infrequently invoked during the interviews — more often in discussions of metaphysics than in relation to genetic modification — yet it remains an important element in the discussion. Most obviously, it reiterates the belief held by many contemporary Māori and consistent with a considerable volume of scholarship on the subject, that the world consists of both material and spiritual phenomena, as seen in the earlier quote describing the relationship between *mauri*, *wairua* and *tinana*. In addition, the traditional belief is that material phenomena originates from the spiritual realm. The latter, considered to be of a higher order, thus infuses all aspects of the physical world.³¹

Wairua was variously defined by participants as “God force,” “soul,” and “spiritual endowment.” In many cases *wairua* and *mauri* appeared to be used by study participants interchangeably. This is not surprising; as Joan Metge observed in the 1960s that it seems in contemporary Māori discourse the term *wairua* often stands as a supercategory under which a cluster of subcategories — *tapu*, *mana*, *mauri* and others — are grouped:

. . . sometimes . . . *mauri* is also part of the *wairua*. The *wairua* itself is not just one thing. There are different parts to the *wairua*. There is the *hau*, and there’s the *mauri* — it’s classed as one of them. And all these [are] different types of *wairua*.

In this use, the category *wairua* refers to *te taha wairua* — the spiritual side of existence. Depending on the context, however, it is important to differentiate between the use of *wairua* as category and *wairua* as force or potent principle. This distinction is articulated in the next extract which argues that *wairua* and *mauri* should not be conflated and that, as before, the *wairua* and not the *mauri* persists beyond the point of physical death.

. . . you can say in Māori . . . *mauri ora*. But you can’t use it for *wairua*. You can’t say *wairua tū*, *wairua ora*, because the *wairua* . . . doesn’t thrive or die. [This explanation] could be . . . trying to Christianise it a bit [but] both are aspects of the soul. The [ever]living part of it is the *wairua*, the *mauri* is that part that decays and dies away.

³⁰ *Op. cit.*, p. 152

³¹ See M. Marsden, “God, man and the universe,” 1975, p.134; T. Tawhao, “Pre-Christian Māori concepts of spiritual reality”; H. Potatau, “The Māori and his background”.

Indeed, this interpretation fits well with the entry on *Mauri* in *Te Mātāpunenga*, the compendium of Māori customary law being prepared by Te Matahauariki Institute at the University of Waikato³². Because of the centrality of this term in discussions of Māori attitudes towards genetic modification, including, as we have seen, those reported in this study, it is appropriate to quote this definition here in full:

Mauri (also, **mouri**). This was a central notion in Māori philosophy, although in its abstract sense of “the essence which gives a thing its specific natural character” it had almost faded from memory by the 1960s³³, only to make a very strong resurgence in recent years, especially in discussions on genetic modification and the natural environment. The word is difficult to grasp because it encapsulates two related but distinct ideas: the life principle or essential quality of a being or entity, and a physical object in which this essence has been located. Williams defines the abstract sense term first as “life principle,” and equates the human manifestation of abstract mauri with “the thymos of man”. The Greek notion of the mortal, but immaterial, *thymos*, embracing consciousness, activity, rationality and emotion (in contradistinction with the immortal but more quiescent *psyche*) probably parallels Māori thought on this aspect of mauri (and its contrast with the notion of **wairua**) as accurately as is possible in a brief English definition. There is certainly no single English word to express this concept.

Joan Metge’s definition, quoted above, covers the wider sense of the abstract connotations of mauri well; it is important to remember that the kinds of “thing” which the mauri integrates include ecosystems and social groups as well as objects and individuals.

From the abstract senses of mauri come the expressions **mauri ora** (vital or living mauri – sometimes equated with “person”), **mauri rere** (fleeing mauri – “panic stricken”), and so on. The concrete representations or depositories of the **mauri**, particularly that of a cultivation, productive area of forest, fishery, community or social group, were also called **mauri**; when both the abstract and physical symbol were being discussed at the same time, the term **ariā** might be used for the concrete aspect of mauri. (It should be noted that in some recent writing, the terms *mauri* and *wairua* seem to be used interchangeably; this was not the case in the nineteenth century, by which time the notions of “life essence” and “spirit,” still combined in the cognates of *mauri* in some other Polynesian languages, had been separated in Māori thought). This is an ancient term, derived from the Austronesian *hudip “to live,” through Oceanic *ma’udip (incorporating the stative prefix *ma-*) to Proto-Polynesian *ma’uri “live, life (principle), alive”. In modern Polynesian languages, cognate terms occur in Samoan (mauli, “seat of the emotions”), Hawaiian (mauli “life, seat of life, spirit,” also Maui Ola, a name for the god of health who is also called on to protect the integrity of a new household) and Rarotongan (with a similar range of meanings);

³² Richard Benton, “Te Mātāpunenga: Introducing the Titles,” 2004, p.4

³³ Joan Metge wrote in the revised edition of her book *The Māoris of New Zealand* (1976) that while still believed by “many older Māoris,” this notion “no longer has general currency, probably because it was not reinforced by Christian beliefs, as *tinana* and *wairua* were” (p.57).

the term has been refined and deepened as a technical philosophical notion in Aotearoa.

The fact that all things have a *wairua* raises the question of how it is affected by genetic modification. Few commentators addressed this question explicitly since discussion of spiritual effects referred mainly to *mauri* (although, as noted, these two terms were often used interchangeably). It was also noted by some that, by and large, the implications of transgenic modification for *wairua* were largely unclear:

I haven't thought through the relationship of mauri . . . to wairua . . . to genetic modification. The problems we face is, there wasn't [a] known . . . thinking [on this issue].

Another respondent, however, confidently outlined the relationship of *wairua* and *mauri*, and the possibility of effects introduced by the act of genetic modification:

Participant: So what then is captured [in the transfer] really is the wairua. You capture the wairua and you double up on the wairua, but the mauri stays there — it doesn't move . . . Mauri will not duplicate, but the wairua does. If we are talking about wairua, that can transform into many pieces, but the mauri will still be over there within the origin[al] . . .

Interviewer: Your mauri is not diminished by giving away a gene?

Participant: No. Because a gene is only a part of me. That is not my mauri.

What is clear is that notions of *wairua* and *mauri* are very closely linked in modern Māori thought, and are occasionally regarded as synonymous. Further, as the above quotes suggest, when distinctions are drawn between the two terms, the *wairua* and *mauri* emerge as 'not quite the same thing' as opposed to being clearly distinguished as completely separate entities. Moreover *wairua* is used to refer both to a metaphysical category and an active principle (and thus again introduces the potentiality capacity affiliated with *wairua* and like spiritual forces). It is also clear from the discussions above that the notion of potential transferability — of spiritual if not also of physical properties — is familiar to Māori thought and experience. Following the model of *wairua*, *mauri* and *tinana* expressed earlier, it is generally assumed by many Māori that where physical material is transferred, so too are spiritual properties. The questions remain, however, as to precisely what spiritual 'properties' are being transferred and, accordingly, what the consequences of that transfer might be.

4. Key Values Highlighted by Discussants

In this chapter we deal with values as such, that is, collectively held ideas as to what is good, desirable and proper, or undesirable, bad and improper. Values are also incorporated into social norms and institutions, through which underlying values and beliefs are expressed; we will deal with those, along with conflicts between competing values and beliefs in particular situations, in later chapters.

He Tangata, He Tangata

The expression “he tangata, he tangata” [it is people, it is people] is drawn from the Te Aupouri leader Meringaroto’s well-known answer to her question *He aha te mea pai o te ao?* “What is the greatest good in the world?” This is a convenient phrase under which to group the humanistic dimension of Māori philosophy as it has been expressed by many participants in this study.

This principle (hereafter *he tangata*) expresses a belief in the intrinsic value of human beings, both individually and collectively. Conceptually, it is one of a cluster of principles which includes *whānaungatanga*, an ethic of belonging usually in a kinship or solidarity group with a strong sense of the common good. The ethic of *manaakitanga* is a cardinal ethic encapsulating the reciprocal recognition and respect of another’s mana and may be glossed as love and honour, solidarity and reciprocity. It also expresses kindness, compassion, care and support, as in displays of hospitality. Each value derived from the principle of *he tangata* can be conceived here as a morally prescriptive code for ordering social relationships. In the context of the GM debate *he tangata* emerges as a dominant theme for two main reasons: one, it is used to make statements about humans in reference to others and to pose ethical questions about affiliated rights and obligations. For example, *he tangata* expresses an imperative to help those who are sick (especially family), but it also questions the manner and extent to which those rights and obligations might be fulfilled. Two, it is often used in conjunction with notions of *tiakitanga*, *te ao tūroa*, and *whakapapa* (discussed below) so as to consider the place of humans in the world, especially the relationship between human and nonhuman organisms. Interestingly, in philosophical discussions, *he tangata* is often contrasted with *whakapapa* because *whakapapa* in its widest sense emphasizes relatedness between human and nonhuman organisms while *he tangata* posits a distinction between them, including (in many situations) the primacy of humans. The interplay between these two principles — especially in the context of the GM debate — has significant implications for Māori notions of what it means to be human in today’s world.

Aroha/Manaaki ki te Tangata

The principle of *he tangata* describes the imperative to alleviate suffering or ill health, expressed in terms of *aroha* (love, compassion, affection for or toward others or things

material or spiritual) and *manaaki* (again, love and honor, solidarity and reciprocity, care and support, displays of hospitality). In this sense, *he tangata* is interpreted by some as a reason for supporting GM technologies aimed at reducing human suffering. Insulin, for example, was often cited by participants as an acceptable product of GM technology, especially for Māori who, as a group, suffer high rates of diabetes:

[I am for] . . . scientific advances [that] aim to improve the life of others who are failing or diseased or whatever . . . I am [a] diabetic for example, and the gene, the human gene that is used to provide the insulin that I use comes from human beings — so I am already thankful, grateful for the people [who] have contributed that DNA/chromosome element — to give me the lifestyle I have.

I think if [GM] benefits someone's health, like helps them recover from illnesses or something, that's good.

If it is going to improve the life of this kid, or that person, or that old lady, yeah, lets do it. But I think where it starts getting scrappy, [is when] . . . rich people . . . want to have a dog genetically modified so[that] they have another dog like it . . . I am less supportive [there]. Where that tinkering around . . . is not [to enhance the] wellness [of] human beings [at] all . . . [it's] about at that stage [that] I start getting nervous.

These examples show that in cases where GM technology is used to prevent or treat illness it may be considered to operate in accordance with the *he tangata* imperative to care for others, and is thus an acceptable practice. But as the last of the above quotes suggests, in cases where the use of GM is considered gratuitous there is less support. In the same vein, the following extract on the one hand extols the virtue of curing humans yet on the other acknowledges that humans are and should be subject to their own mortality. This suggests that there are limits as to what can and should be done in the pursuit of health benefits:

Some GMO technology, . . . medicines for example, [are meant] to cure illness. I think it's a really honorable thing, to want to cure illness and create new organs... [but] people are just scared of dying I think. Why do we want to live for hundreds of years and not die? Why are we scared of dying? . . . these are natural processes. We don't like to talk about it but life and death is a natural process.

It appears, therefore, that particular GM applications may not accord with *he tangata* even if it is for medicinal use. If death is a part of the human condition, which *he tangata* describes, what are the implications of its extended postponement? (For those opposed to it of course, GM technology is itself beyond the limits of acceptable activity.)

Whānaungatanga: Pēhea Nga Mokokopuna?

As inferred above, one of the most common expressions of *he tangata* was in its use concurrently with the principle of *whānaungatanga*. In this sense, it manifests as a deep and recurring concern for future generations and can be summarised in the phrase *pēhea ngā mokokopuna?* [What about the next generations?] As the extracts below demonstrate, there is wide variance as to what this means in relation to GM. In the first example, there

exists an oppositional attitude to GM technology wherein the participant concludes that GM should not be pursued. It is difficult to discern, however, whether the opposition is motivated by “*pēhea ngā mokopuna*” concerns or whether it is an *a priori* attitude. In contrast, the second extract shows how concern for future generations could motivate an acceptance of a particular GM product:

It’s a fairness and justice issue, and not just for us, . . . we’ve got babies. Who’s speaking for them? They have rights too. Our unborn generations have rights. Who are we to desecrate this planet for the dollar?

I’m fairly certain [that] if it was my son or my grandson or granddaughter [who is] going to be dying of something, I would just say yes without even batting an eyelid . . . [if] there is some way of curing it, you try this genetically modified substance that [was] created in a laboratory.

He Tangata and Whakapapa

The amalgam of concepts of *he tangata* and *whakapapa* generate a series of philosophical questions about what it means to be human that GM technology, and especially transgenics force into sharp relief. *He tangata* is defined above. *Whakapapa*, while covered in considerable detail in Chapter Six, can be understood here as “to place in layers,” and as the recording and ordering of human and nonhuman descent lines and relationships. Each term can be both inclusive (by emphasizing the interrelationships of humans and, in the case of *whakapapa*, nonhuman organisms) as well as exclusive (when used to set humans apart from nonhumans by claiming that transgenics will somehow “contaminate” human *whakapapa*). The questions that arise from concurrent attention to both *he tangata* and *whakapapa* include.

- If *he tangata* distinguishes between human and nonhuman organisms, where does the distinction lie and how does it manifest?
- How does *he tangata* operate in the context of a *whakapapa* that includes nonhuman organisms and what are the implications of this for the crossing of human and nonhuman genetic material?
- If, as it appears, that *he tangata* recognizes human uniqueness (and certainly the importance of human survival), does it follow that humans are also seen as superior to or more privileged than other organisms?

In answer to these questions, some participants seem to be suggesting that while *he tangata* might recognize human uniqueness (and even the importance of human survival), it does not follow that humans are superior to the nonhuman world, or that any kind of superiority emanates from the human agent.

I think we can easily fall into the trap of assuming that we are the superior being on this earth, but for me I’m an integral part of te ao . . . in relation to other beings and fish or trees . . . I say my role as a protector, as a kaitiaki, is about ensuring that that ecosystem actually continues for future generations, not just human.

Other participants however, provide an interpretation of the *he tangata* principle in reference to GM in which the mixing of human and nonhuman genetic material crosses (in theory) an unacceptable line. Broadly speaking there seems to be a recognition of some essential incompatibility or distinction between human and nonhuman genetic material. The suggestion is that the ‘humanness’ of these persons either gifting or receiving nonhuman genetic material is somehow contaminated. This theme of contaminated humanness is repeated based on ideas concerning ‘kinds’ of *mauri* or different *whakapapa* (both of which are discussed below). Quotes concerning the principle of humanness and *whakapapa* in relation to GM are offered below.

I have some . . . body cells and it is like [GM is] taking that away from me . . . I want to protect [those cells] like a taonga . . . from our ancestors and I do not want to put my ancestors into a cow or . . . into a plant . . .

I can’t accept the mixing of [the] DNA of animals and human beings. I know that in the past some of our tipuna have been half man, half whatever, but that was in a particular context as well.

Where I have the problem is the human going into the cow. I don’t know whether that’s something to do with the fact that cows don’t eat meat, so would therefore will they allow it to be done to a cat or a dog? No. Just following the logic of it. But a human to human thing, you see, now I don’t know whether other Māori would have difficulty with transplant things. . . . you know, when you’re watching somebody die and a kidney would save them, then you say, for God’s sake, give them a bloody kidney.

I think if it wasn’t for the issue of the human gene thing, you know, take that out of the equation, it’s kind of like changing the diet of the cow to see if you can get a better milk product out of there. I don’t really see too much of a problem with that, but it still is an ethical issue because if you can do it in cows and by extension, can you do it in humans? And that becomes an ethical debate again. You know, to what extent do you enable trials to occur within humans?

Finally, despite the relatively consistent opinion that GM will interfere with and disrupt the integrity of one’s humanness or human *whakapapa*, participants were open to accepting modifications that enhanced human survival when no other options were convincingly available. In these cases, the decision to proceed with applications of modified human genetic material was assigned to the individual concerned.

I’m just thinking in terms of medicine . . . I might not have the same gut reaction to doing some sort of gene therapy to save some sick kid, although I would very much say that’s a parental decision but if it was my child then I would probably have a lot more difficulty saying no don’t touch it than I do have about [other GM applications]

5. Norms

Norms are the rules for acting appropriately in particular circumstances. Those we are concerned with here are the rules which apply, or are said to apply, to decision-making by Māori generally in relation to genetic modification. Norms are serious rules backed by some kind of sanction if they are disregarded. This may take the form of social disapproval expressed in various ways, but in traditional Māori thinking violation of some norms is likely to result in retribution not dependent on human intervention, since the wanton violation of *tapu* states, practices and phenomena will bring about *aitua* (bad luck) affecting the offender and, often, a wider circle of people and places.

I Ngā Wā o Mua

The principle *i ngā wā o mua* (in the days of the past; what our ancestors thought and said) refers to the importance of seeking to understand the present through reference to the past.

The contemporary importance of the past is manifest in the ubiquitous query, “What do our kōrero or historical narratives say?” or the aphorism “Māori are a people who walk backwards into the future,” by which it is meant that what one’s ancestors have to say is fundamental to guiding one’s way in the present and beyond. Because GM is a new technology, it can seem paradoxical that the past is being brought to bear on it. Yet, given the poor state of public knowledge about GMOs, it is logically consistent that many utilise analogous historical experiences to illuminate their thinking on this difficult subject. In addition Māori culture is perceived as an ancestral inheritance involving deep regard for ancestors; it is thus not surprising that it is in this context that *i ngā wā o mua* is most profoundly expressed. Ancestral knowledge, manifest in practice as well as in moral and intellectual thought, is the benchmark against which the wisdom of future action is measured. Because knowledge is a sacred inheritance, by possessing and maintaining that knowledge a connection to the ancestors is preserved. Embedded in this view is an understanding that Māoriness is at once forward oriented and historically rooted. While no study participants assumed in conversation a perfect continuity with the past, it was recognized that particular principles and practices endure, however contemporary their expression and current permutation. Thus, a main point of contention concerns those aspects of the past that are said to be applicable to present circumstances. One participant posed the dilemma as follows:

Māori people of the twentieth century . . . are not those same people who were looking at the reality when that . . . religious spiritual background had a relevance.³⁴

³⁴ This extract is taken from a broader discussion where the respondent suggested that modern scholarly analysis of ‘traditional’ Māori knowledge failed to address many of the social problems experienced by many Māori.

That the question is consciously addressed suggests an open minded and pragmatic approach to new circumstances, as well as to cultural inheritance. In this sense, the principle of *i ngā wā o mua* acknowledges Māori as a people who cultivate traditions and knowledge handed down from the past, yet who remain intellectually, socially, and practically capable of incorporating new knowledge and adapting to new circumstances, as shown in this extract:

We retain our knowledge, our whakapapa, our tapu. We can add to it for the benefit of a good use, not just for the sake of it . . . ³⁵

In practice, however, openness to new knowledge constitutes neither a willingness to accept it as necessary, nor an imperative for practical engagement. Rather it indicates a desire to understand in order to maintain control over that new knowledge so that it can be used in appropriate ways and, importantly, become the basis for evaluating or prescribing the appropriateness of new knowledge and the possibilities thereby generated. This is most commonly expressed in the comment that there exists no historical basis for interspecific or “cross-species” interbreeding, and thus no basis for such activities in the future.

Now, if things were meant to have been mated with something else then that would have happened, and because they haven't there's a reason why they haven't. Because if it was meant to have been it would have been. So that's the kōrero that I've heard and so the issue is taking the gene from something and putting it somewhere else that it isn't meant to be. ³⁶

Others expressed more directly the need to ensure that new knowledge and practices conform to, broadly stated, an ancestral moral order. In the following quote, concern lies principally with the problem of creating altogether new organisms that one is conceptually and morally unable to attribute to and discern visible links with the past. That is, maintaining and/or establishing continuity with that past is principally important:

I . . . look at what needs to be [done to] weave into genetic engineering safeguards [for] the survival of [our] people . . . to see where their sense of direction is coming from. If it is coming back, bringing in all those cultural things and weaving them into the new, then I don't have a problem but if [we] are going to jump ahead [with] the new with no connection to the past, then I might have a problem.

Overall, *i ngā wā o mua* is best understood as a search for precedent. Some participants pointed to cultural practices which they described as analogous to genetic modification,

³⁵ In this extract, the respondent discussed pollution and destruction of resources, in this case eels. In the respondent's view, Pākehā knowledge (i.e., science) and decision making is inherently present oriented, that is, it dispenses with old forms of knowledge and lacks foresight. In this view, the pollution and destruction of resources is linked with this lack of foresight.

³⁶ In this extract, the respondent was discussing whakapapa as a descriptor of 'natural' relationships between organisms. It was part of a wider discussion where the respondent talked about the 'unnaturalness' of GM technology. These points are taken up in more detail in the whakapapa section below.

such as strategic marriage to enhance one's whakapapa or the practice of tonu (literally, to bid or command) referring to the practice of arranging marriage.

Kia Tūpato and Kimihia te Mātauranga

In contemporary terms, *kia tūpato* (be cautious) follows most closely the 'precautionary principle' which holds that lack of (scientific) knowledge of the potential effects of a particular activity should not prevent taking action to avoid or minimize any possible adverse consequences. In this sense it is a form of proactive risk management. More broadly, it is linked to the problem of decision making in circumstances of uncertainty and how best to proceed under said conditions. Like 'he tangata' in relation to humanistic considerations, 'kia tūpato' is a convenient phrase to represent the views of Māori who counsel caution as the appropriate response to proposals involving genetic modification.

Within the larger cluster of thinking under the *kia tūpato* principle, several ideas predominate. They are that (1) GMOs represent a 'slippery slope' problem wherein they open the door to uncontrollable or catastrophic future outcomes; (2) the existence of considerable intellectual uncertainty and the linked quest or desire to seek new knowledge (also known as the *kimihia te mātauranga* principle); (3) the belief that GMOs preternaturally 'speed' up natural processes thereby erasing the opportunity to carefully observe the consequences of these new largely unknown products; and (4) the conviction that future consequences might be too great to justify the risk, alongside concern that historical precedents that normally help guide new risks are difficult to apply in the case of genetic engineering.

The Slippery Slope Dilemma

This is the belief that movement in a particular direction without adequate prior information or knowledge as to the possible outcomes, may have serious adverse consequences. In the first quote, the speaker discusses modifying pine trees to be self-pruning, and in doing so, the fear of uncontrollable or devastating future outcomes predominates; whereas the second speaker simply indicates a ubiquitous fear that something will go terribly wrong.

Participant 1: Is putting this gene in this pine tree going to give it some other characteristics that may be less favourable so that, are they going to turn into pine trees that we can't control in some way? We can't predict that [and it] may have adverse impacts. Are we going to lose kauri trees?

They can't fix it up if it goes wrong, if it goes horribly wrong, they can't fix it up, and I think that's the bit . . . that's where the caution comes in.

Participant 2: Well the first thing of course, I'm against, any kind of genetic transfers . . .

Interviewer: To transfer genes from one species to another?

Participant 2: Totally against that. It is against all Māori protocol.

Interviewer: Regardless of the species?

Participant 2: Regardless of the species.

Interviewer: And regardless of use .. regardless of where? In a laboratory, in a field ?

Participant 2: It's almost like my total . . . opposition to nuclear power. Whether it is research, whether it is using nuclear capabilities for research, regardless of the outcome of anything else. We do not know. Four generations down the line . . . and we do not know, four generations down the line, what the consequences are.

So there is the good and the bad bit. The concern is, who has that control that you only [use the gene] for this particular medical purpose. People are so greedy - they will go further. A bit like Hitler, a supreme race. That is what I'm afraid of and will the supreme race take over? The absolute best brains and this is going to be the new race and we will be wiped out, the uniqueness will be lost and then who will control them? It is the controlling factor that I am worried about.

Kimihia te matāuranga

The exhortation 'kimihia te mātauranga' [actively seek understanding] represents a corollary to the precautionary principle. While foolhardiness will bring disaster, ignorance is also dangerous. The two norms thus temper each other, producing the creative tension illustrated below in the section on 'Risk taking kōrero.'

The urgency and frequency of requests for further information was a feature common to virtually all of our discussions with study participants. This was clearly indicative of the poor state of knowledge about GMOs – including the full range of potential and risk -- across most people not only Māori during our research. Further, the need for more knowledge was regarded as fundamental to a precautionary approach. That is, there existed a pervasive sense of a 'too little is as yet known' problem and widespread conviction that decisions had and were being made to proceed in the absence of a sufficient knowledge base from which to proceed wisely and cautiously. Notably, however, many were optimistic that viable solutions to existing uncertainties of knowledge deficits could be found. Others pronounced a morally and culturally specific obligation to be creative and expansive toward new knowledge concerning GMOs; while some regarded acquisition of new knowledge (e.g. of GMOs) as signally important for Māori to become full-fledged members of the 21st century community. A sample of these *kia tūpato* and *kimihia te mātauranga* linked expressions follow:

Now, it may be that genetic food increases the life [expectancy], but it's the unknown answers [that bother me]. So until we have more information, until we have sharper research we will not know the answer. I am willing [to let] the investigatory processes continue in the belief that the more informed [we are the more able we are] to make progress in dealing [with questions of this kind].

Caution and control I think are central. But there is a lot of fear about losing control over this and missing opportunities, and all the rumours that are around that Japanese companies own all the genetic material, and the native plants and all sorts of things – have created fears and sort of wild debates in Māori ... for the last decade. So getting genuine [knowledge], like knowing and understanding what the issues are around the property and ownership of genetic material [would be beneficial]. These are things that will enable iwi to improve on the policies that they already have because at the moment they are in the dark.

It's an evolution of our reality and it's inevitable just as it was for my forebears. So I see bringing that image forward to the year 2000 is the same principle. I am here and I have a certain empowerment to ensure the realization of a survival vision for my descendants. So I have the same obligation to be, ah, creative, to be positive in terms of providing for new development, new technology. I would claim a more active role in the processes of it unfolding and developing.

I find my immediate thoughts [going to] the idea of toheroa research [using GM to restore toheroa beds]. I like to know as much about toheroa [as possible]. So before we can make comment or go any further, I would like to know the biology, I would like to know why [the reasons for decline, etc.]

Finally, an important feature of discussion involving the *kia tūpato* principle was the belief that GMOs somehow over-rode the normal safeguarding processes inherent in the natural evolution of biological phenomena across time. Natural selection and like processes were said to be nature's means for ensuring the elimination of poorly adapted individuals or species. GMO's were regarded as circumventing these natural processes and thus avoiding the time required to identify and eliminate maladapted outcomes.

There's something that distinguishes genetically modified organisms from the things that we have modified in the past and I think it's really the technology that makes it stand out. The technology that's used to splice and cut – that's one thing. There's actually a whole lot of factors to me that makes GMO stand out. It's the technology, and there's also a temporal issue here where in nature things have a way of taking their own time to develop and that has to be that way because of the synergy between everything. Once one thing changes that sets in motion a whole ping ping ping ping throughout the ecosystem. With GMOs we just take something from here, plop it in there, and there's no context in it. It's just created. And it seems a very brash, a very arrogant way to create something. Because you just take in isolation of everything around it. And there's got to be an inherent danger in doing that. It's just plain arrogant.

Risk Taking Kōrero

In the vast majority of interviews, the search for historical precedent focused upon those kōrero (myths or stories) wherein specific instances of risk taking as well as acts analogous to trans-species modifications could be found.

Risk taking was generally characterized as a necessary antecedent to survival, and risk itself was defined as the introduction of practices that involved knowledge belonging to the realm of the unknown or the unknowable. Further, the distinction was made that while comparatively clear rules existed in the past for seeking permission to engage in risk and thereby enter into the realm of unknowable and hence uncertain outcomes, no parallel set of rules exists today (i.e., persists on a widely held basis) for the seeking and granting of permission.

What I see is that the real difference [between today and yesterday] is [that] Māori asked and sought permission first from the realm that you don't understand and don't see. If they didn't ask for permission first through *karakia*, they could not have access to that knowledge or that information and experience [in] the realm of risk-taking. Our history as Polynesians, as Māoris [is that we] have always been risk-takers. But the difference between being a risk-taker then as opposed to risk-taker now [is that] we sought permission first. If we went into a new realm and we didn't understand it, like genetic modification, we would seek permission from those of that realm who had the control of that environment.

Risk taking was regarded as all the more necessary when the fate of a revered or important food product was at stake. In the following quote the interview team was discussing the possibility of using GM technologies for conservation benefits. The interviewee had been explaining that the survival of crayfish as a valued food species were more important to them than the orca (whale) species that the Department of Conservation has been urging the speaker's home *iwi* to protect. Notably, however, the speaker balks at the possibility of GM applications to enhance the crayfishes' chances for survival.

There is a very pragmatic side to Māoridom; we're extremely pragmatic. Yet, DOC tells us about their *Karekare*, a very rare Orca, and we [tend to say] "yeah, so what?" — because it means nothing to us, we've never used them. It's irrelevant. But if, and as has been, our fish pots, you know, if they start getting threatened, if our crayfish pots get threatened, you just watch us try to protect it, and try to interrelate them [here, the speaker appears to be supporting selective breeding to improve the species' chances of survival]. But I don't know that we'd ever go this far [i.e., genetic modification]

Pragmatic considerations in reference to risk taking were often qualified by the need to better understand the limits of that risk taking, to what risk managers often refer to as defining the thresholds or boundaries that establish 'acceptable risks.' This principle was glossed by one respondent as understanding the difference between *toa* and *tohe*.

When trying to understand the word risk and [when] talking about a calculated risk, what springs to mind is the word *toa*, *kia toa* [be brave]. It [suggests] bravery, restricts the boundaries, and tests the boundaries. That's a beautiful word. A powerful word. *Toa*.

There's another word called *tohe* [contest, object]. There's a fine line in the difference between these two words. Tohe is where the calculation is a bit too far to the other side, you know, *te raruraru* [trouble] as a result of tohe. The issue is to know when to move forward and when to move back. And to come up again, to test it again, there's a constant testing of those two.

Despite some reference to precautionary risk taking, it was the historical narratives or *kōrero* that were most often invoked when making sense of GM risks. The reference here was commonly the historical narrative involving the Polynesian hero, Maui. Maui is the celebrated demigod who uses his magical powers to create a world fit for human life. In his many roles he snares the sun, fishes up the North Island, obtains fire and the *kūmara* for human use. Metaphorically, Maui represents a being who balanced strong cultural prohibitions against benefits for the greater good *when necessity required that he do so*. Most of Maui's risk taking adventures, study participants often noted, were important and beneficial to human kind. For example:

It was Maui himself who dreams and sees these dreams. And what does he do? He modifies his grandmother. He takes her jaw. He puts her to sleep and modifies his grandmother and he uses her jaw. But then how did Maui know that this jaw would fit that particular portion of the fish . . . How did Maui know that? I mean all we have to do is examine our own stories. They will tell us a hell of a lot. Our problem is we've told these stories as legends and myths but they are our reality.³⁷

It was also noted that Maui went too far when seeking to overcome mortality. In the words of one speaker:

Maui's attempt to overcome death by re-entering the womb of Hine-nui-te-Po failed because in a very basic sense he had not asked of death "why do we need to know?" Maui's fate did not foreclose future philosophical questioning but it signaled the parameters and indicated that things which disturbed such fundamental harmonies as life needed to be proscribed unless compelling knowledge indicated the need for change.

GM poses unreasonable risk of doing harm simply by virtue of . . . transferring genes between species whose interrelationships are based on their differences. To tinker with that difference is to damage the interrelationship which in our [opinion] is unacceptable scientifically and unconscionable ethically.

In another interpretation of Maui's deeds, most of his risk taking actions are regarded as necessary and appropriate. But the speaker also points out the legacy of Maui's last unsuccessful deed and so the importance of determining the threshold between acceptable and unacceptable risks of GM.

³⁷ This extract was part of a wider discussion of historical examples of human intervention within the environment.

Maui was also a methodology on life. . . Maui was also a critical analyst, he was highly pragmatic, he was into improving the human condition. . . . Maui was also into managing the human environment but the lesson with Maui as well is that he died, and so the flick in the tail is that we have to embark on a good degree of critical analysis about this issue, about GM. We need possibly to look at the ways in which it can improve the human condition but if we step outside the boundaries too far the flick of the tail will kill us. So I think there are many messages from our own stories.

Finally, while it was often acknowledged that in many traditional stories of transformations of species including humans occurred, analogous in part to creating a GMO, participants pointed out that such transformations occurred only in the realm of the atua and not in the world of humans (see also subsequent discussion of *ira atua/ira tangata*, below).

Creative Responsibilities

One participant discussed what he calls humanity's co-creative partnership with God:

What is the difference between a tree and a canoe? The difference really is while a tree is standing in a forest as a tree, it's a tree. . . . when it's cut down . . . it's no longer a tree because the chips have been discarded, its shape has been altered, and it's something quite different. [And] if you put it into water as a vehicle of migration, it's going to be a different sort of thing. And if it outdoes its life and then rots somewhere on the beach . . . it will again have a different character. It seems to me that all of those characters are consistent with some of these issues of genetic modification. . . . To me the big thing here is the capacity of people [to create]. And if part of this creating process is a partnership with God, well that's another issue . . .

Māori [have] the potential to manipulate [their] own resources. And having said that, it seems to me that being part of the creation process is a natural aspect of being alive in this world today. It's part of the whole . . . creating process.

The point inferred from this excerpt is that human beings have the ability and therefore in some sense the right and indeed the responsibility, to manipulate or alter the environment. In this way of thinking, the environment is 'given' or 'created' (by God) in the sense that it exists prior to human existence, however, since humans have a "partnership with God" we are permitted to act in certain 'God-like' ways, which are to re-create or alter the environment in terms of a human determination or discernment of the will of God. As the highest form of rangatiratanga, the tino rangatiratanga principle encompasses this God-given and ancestral endowment.

Learning from the Past

In summation, the principle *i ngā wā o mua* is clearly present in interviewee responses including those focused primarily on risk taking. Implicit in multiple articulations of culturally appropriate risk taking is the desire to understand the technology, and in most discussions the relationship between appropriate risk and historical precedent. Thus the

question: “How does the cultural inheritance from the ancestors apply in the modern context?” is a salient one in the debate and in emerging efforts to make sense of new and uncertain knowledge. It was generally agreed that the lessons gained from past experience, both successes and failures, offer a pathway to guide future action whether as a prohibitive warning, or as a cautionary reminder to be careful: *kia tūpato*.

6. Institutions

Institutions are the means by which a society ensures that its core values and norms are put into action and (where appropriate) enforced. The institutions which we deal with in this chapter are those clusters of norms and values which the people we consulted saw as directing and supporting decision making and which remain under Māori control. These are ideas and customary procedures: *whakapapa*, *kaitiakitanga*, *taonga*, *tikanga* and *karakia*. Other institutions, such as courts, police, and armed forces, institutions available to support and enforce state decision making process, are not under Māori control, and are not considered in this analysis

Whakapapa

Few concepts are invoked as frequently by Māori in the GM debate as is the concept of *whakapapa*. Among Polynesians this concept is used to encapsulate their understandings of the world and of their place in it. This typically takes the form of an elaborate cosmogony beginning with the origin of the universe and of the primal parents, then continuing to trace the descent of living and non-living, material and immaterial phenomena including humans. Among New Zealand Māori this knowledge is encoded and recorded in the mental construct known as *whakapapa* (having an underlying meaning of “to place in layers”³⁸). In its most commonly applied form, that of recording human descent lines and relationships, *whakapapa* functions as a genealogical table or family pedigree in which the lineages connect each *papa* or layer (a metaphorical reference to each generation of a family³⁹). Most GM, however, concerns plants and animals whose *whakapapa* differ from those of humans in several important aspects. Firstly and most importantly they (animal and plant *whakapapa*) typically involve more than one species; in fact they may involve members of distinctly different scientific kingdoms of organisms (e.g. a *kūmara* and a rat can be found in the same *whakapapa*), along with nonliving phenomena such as stars. The clusters of entities within such *whakapapa* appear to act as ecosystem maps of important resources and food crops. They may also function as a “folk taxonomy” or classification based on perceived similarities (usually morphological) between some or all of the things included in the *whakapapa*.⁴⁰

Fundamentally, however, *whakapapa* are about establishing relationships. In the case of humans, this is necessary in order to understand one’s rights, purpose, duties and obligations that flow from familial and tribal relationships and from one’s location in the larger order of relations. In the case of plant and animal *whakapapa*, an understanding of ecosystem relationships helps define human rights and responsibilities towards one’s

³⁸ Cf. H.W. Williams, *Dictionary of the Māori Language*, 1971, p.259.

³⁹ M. Roberts & P. Wills, “Understanding Māori epistemology,” 1998

⁴⁰ See M. Roberts et al., “Whakapapa as a Māori mental construct,” 2004.

environmental kinsfolk. This reciprocal relationship forms the basis of *kaitiakitanga* (discussed later) by which human *kaitiaki* seek to balance appropriate use of and care for natural resources.

Definitional Attributes of Whakapapa as Articulated by Participants

We will first sketch briefly the multiple conceptualizations, meanings, and distinctions attributed to *whakapapa* in the context of participants discussions about GM. Most often the term *whakapapa* was used to describe the relationships that exist among humans, and less often among nonhuman things, and between humans and other entities. The following quotation is particularly instructive as it emphasizes the interrelationships (rather than any distinction) between human and nonhumans within a single *whakapapa*, yet also consciously resists explanations that reduce *whakapapa* to solely genetic relationships.⁴¹

. . . whakapapa to me is also . . . my relationship to my family and my hapū, to the whenua where I come from, to the moana, to the mana — . . . to me [whakapapa] is a whole range of relationships. It's not just DNA.

While 'relationship' is generally fundamental to most definitions of human *whakapapa*, so too are descriptions of genealogical or ancestral relationships and/or the use of *whakapapa* ("not just DNA") to explain the origins of people and things. Further, it will become apparent that *whakapapa* operates as both a framework not a value to describe social relationships, biological relationships, and as a means for distinguishing human capacities from those of superhuman beings, particularly as concerns their generative powers.

Whakapapa as Genetic and Ancestral Identity

A first key point is to note that there is general agreement on the belief that *whakapapa* is fundamental to conceptualizations of ancestry, and identity. It is the basis through which one locates oneself or other beings in the larger human and nonhuman world across time and space. Through that location one comes to know purpose, ontological history, and hence place in the larger order. The following quotes illustrate this conviction accordingly.

You see, whakapapa is about who I am. So I am a descendant of these people. Now if I take out some of my own genes or I have someone else's genes then what's it doing to that? What's it doing to my identity?

Whakapapa to me I agree is the biggest thing and you talk about *tono* - that is still whakapapa - regardless. You still know who your papa is. But when you are genetically engineered who is your father? - a cow, a fish - you know that is a real concern, it is a big concern.

⁴¹ It cannot be inferred from this quotation that the speaker definitely does not recognize such a difference. Another interpretation is that the difference is unimportant in certain circumstances.

The way the fiddling is going on, as I hear it, we can no longer identify the parentage of these things. That you will not be able to identify the parentages somewhere means that you have no power of using them. If you don't know what it is then it doesn't belong in this world. On the assumption that everything is derived from our whakapapas. Our whakapapas lay things out and everything should be open to whakapapa

Other definitional uses of *whakapapa* focus less on identity per se, and instead raise the possibility that there exists considerable misuse of the term both generally and in reference to GM debates. First, some suggest that the original meaning of *whakapapa* had changed as a result of acculturation, and as such the term is said to be inappropriately cast as similar to the (Western) metaphor: 'family tree':

. . . according to our tribal traditions [whakapapa] are actually laying one dimension over each other — that's the papa — the act of laying those dimensions over each other is called whakapapa. Now unfortunately, what we are doing today is we [Māori] are replicating the European concept of whakapapa which is coming down [like a tree].

Another participant [and Māori scientist] expressed the atypical view that *whakapapa* is a purely cultural construct lacking modern scientific validity and as such it cannot function as an explanatory model concerning our biological knowledge of the world.

It [whakapapa] is about family and working together, about loyalty, its about trust and its about wanting something better for yourself — all of those sorts of things, they are pretty fundamental to the world. But if we are going to talk about whakapapa as an explanation for the world then it just doesn't stand up under the 21st century of understanding where science has got to in terms of a knowledge system.

Other participants claimed that the term *whakapapa* properly conveys something broader than 'genealogy,' for which a more precise term should be used:

Participant 1: The proper term is *kāwai*. That is the proper term that you should be using — not whakapapa.

Participant 2: Is that for the human lineage?

Participant 1: No — anything lineage. *Kāwai* is actually genealogy. Whakapapa is wider than that.

The speaker did not elaborate or give specific examples as to the wider attributes of whakapapa. However, a similar point was raised in relation to the term *aitanga*. The root word is *ai*, which means "to copulate," "to procreate." *Aitanga* refers to progeny or descendants and is frequently used in tribal appellatives, such as Te aitanga a Tiki, the descendants of Tiki⁴². This distinction was drawn in the following conversation between two traditional knowledge experts:

⁴² H.W. Williams, *Dictionary of the Māori Language*, 1971, p.5.

Participant 2: . . . we have always known here in Mataatua, ngā aitanga Tāne.

Participant 1: The progeny of Tāne . . .

Participant 2: You don't have the te whakapapa mai a Tāne. You have ngā aitanga Tāne. But when you talk about people, anako whakapapa.

Participant 1: That's it in a nutshell. . . .

Participant 2: . . . because you talk about all creation, a Tāne — that's insects, butterflies, the whole darn lot. They all talk about ngā aitanga a Tāne.

The discussants continue to examine the distinction between *whakapapa* and *aitunga* in the following passages.

Participant 1: . . . when we are talking about the whakapapa of trees and plants, the dimension there . . . [is] quite different to the whakapapa of humans, because . . . the whakapapa of trees, for example, only happen once. The creation of trees only happen once and it was due to Tāne's search for a female element. Now as Tāne was searching, . . . he cohabited with a lot of strange beings, for example he cohabited with Kakaharoa and we get the toitoi. He cohabited with Huna, we get the flax. So there is a different whakapapa that is applied to trees and plants, for example he cohabited with Rerenoa and the result was rata . . .

Participant 2: So for trees there is only one — there are no different layers, they were one offs —everything is complete in each.

Participant 1: And that is why we call them our tuakana and treat them in that manner.

Participant 2: I think [that when] . . . [people] are talking whakapapa, . . . they need to be quite clear . . . [about the] type of whakapapa they are talking about. If they are talking about the [human] unions then stay with the [human] unions, and if you are talking about trees and animals and stuff, they have . . . a [different kind of] whakapapa.

Interviewer: Can you explain that a little bit more [particularly as it is] tied to what you were saying earlier?

Participant 2: If you are talking about people, you have whakapapa of different unions, but when you whakapapa about trees, trees come down, [but] they don't have a carry on.

Interviewer: A one off?

Participant 1: . . . they have seedlings and things like that, but they don't recreate in the way that we do.

It appears from this discussion that a fundamental difference between nonhuman and human *whakapapa* seems to be the way in which the two forms are generated. The former (*tuakana* or senior) once created through the *aitunga* process remain as such, and do not produce further progeny and in this sense remains static (this point is discussed later in the Flexibility, Stasis and Change section). The latter (the *teina* or junior) once formed, continues to produce the many layered descent lines that constitute human *whakapapa*. This difference is then reflected in the relationships described in each *whakapapa*. For example nonhuman *whakapapa* are concerned with relationships between groups of things often with a particular habitat — trees to birds, fish to reptiles or various kinds (species) of plants to each other⁴³. By contrast, human *whakapapa* are concerned only with humans; here the smallest unit is an individual human being, whereas the smallest unit in a nonhuman *whakapapa* is a class of entities such as various kinds (species) of shellfish (*toheroa*, *kutai*, *pipi*) or an even larger grouping such as spiders or insects. In the nonhuman case, the *whakapapa*-articulated parentage of the ‘entity’ shellfish is the same for all others of its type, but the parentage of an individual human is unique to him or her.

As if to emphasise these differences, the above discussants explicitly used *aitanga* and ‘cohabiting’ in relation to nonhumans, and used ‘unions’ in reference to humans. For the sake of further discussion, however, it is useful to assume that *aitanga* might in certain circumstances at least, be applied to human *whakapapa*. Based upon additional comments made by those with whom we consulted, it can be inferred that *aitunga* (whether for humans or non humans) refers to spiritual copulations in the realm of *ira atua*, whereas “unions” occur only in the realm of *ira tangata* and (obviously) only among humans.

Aitanga could therefore be interpreted as describing a spiritual or metaphorical genesis, or in the light of GM, a nongenetic form of parentage, whereas for humans there is an implied sense of physical (and hence genetic) parentage.

Further research and discussion on the relative merits of these terms (including *kāwai*) in relation to GM would not only be useful, but in relation to GM in New Zealand, essential.

Whakapapa and Biology

If the opinions and interpretations concerning *whakapapa* expressed by participants above is accepted, it seems that human *whakapapa* conceivably contain notions of genetic relationships while nonhuman *whakapapa* may not.

For example, although nonhuman *whakapapa* might be considered analogous to scientific classifications based on the concept of phylogeny in that they both seek to ascribe the origins of all living things to a common ancestor, the relationships that comprise these *whakapapa* appear to be based primarily on morphological, spatial (habitat) and temporal (seasonal) associations, and which might therefore include plants, animals and stars,

⁴³ Nonhuman *whakapapa* are generally *iwi* and/or place-bound such that the *whakapapa* of a species in one area is not dissimilar from that in another.

rather than the implied genetic relationships that underpin scientific phylogenies. The next quotation makes this point by arguing that while a *whakapapa* might comprise two species that are (from a Western Science perspective) phylogenetically distant, in Māori terms they are intimately related.

. . . there [are] two classifications. There's western science, and there's whakapapa. Western science means biogenetically they may be distant but whakapapa-wise [they] might be close [and vice versa].

In one case, a participant applied the genetically based concept of phylogeny to *whakapapa*. This speaker, a [Māori] scientist, explained that he has come to use the term *whakapapa* to mean the evolutionary history of an organism.

. . . when I'm using the word whakapapa I'm using the kind of strict evolutionary. . . [for example] in nature you're looking at an individual animal like an elephant or whatever that has a whakapapa that goes back billions of years and has channeled it and carried it through . . . to what you see now.

This modern use of *whakapapa* contrasts with the earlier description of nonhuman *whakapapa* as nonevolving — as having “*no carry on*” and thus being a “*one off*.”

Despite apparent differences between human and nonhuman *whakapapa*, many though not all references to human *whakapapa* are accompanied by strong genetic associations, as demonstrated in the following comment concerning organ transplants:

And I think that is when whakapapa is important and that child needs to know. It could actually come down to it that you get sick; why? Because the whakapapa of that [donated organ] isn't actually her whakapapa. So it is important that they do know about the whakapapa — especially when you donate organs.

In other situations the associations are biological and physical but not genetic per se. Rather, the impression is that introducing genetic material, donated organs, or like entities into one's human whakapapa consequentially alters the known human relationships, an alteration which might manifest physically. The common analogous case (used above and oft-repeated in interviews) is that of organ transplants. A poor donor match is explained in *whakapapa* terms as being the product of using non-*whakapapa* related organs. Because the introduced entity/organ was not from or located within the existing set of *whakapapa* relationships, future physical or spiritual illnesses or rejections of organs are said by some, to occur.

Tuakana and Teina

An earlier quotation introduced into discussions of *whakapapa* the importance of *Tuakana* and *Teina* (or *taina*), as does the following brief participant quote:

. . . tuakana and teina . . . is inherent in whakapapa . . .

In traditional terms the *tuakana*/*teina* categories refer to the relationship between siblings of the same gender and implies a set of duties and obligations, one to the other, in terms of the relationship. Further, it is typically though not always the case that the elder has more important or 'superior' rights vis-à-vis the younger. These terms may be applied as a classificatory device to identify and separate out the more important (in cultural terms) relations and properties from the less important. For example, in the following discussion concerning *whakapapa*, 'taina' is used to invoke the possibility of both beneficial and hazardous products as determined by *whakapapa* classifications which define both appropriate and inappropriate relations for coupling or procreation.

. . . the idea that all the rangatira trees come together and they produce medicines, good things and all the taina trees come together and produce poisons and that is how they [Māori] sort of understand and put the world together.⁴⁴

These two kinship concepts are used to categorise trees in terms of their capacities to produce poisonous versus beneficial pharmacological qualities. Another informant is equally careful to define tree species in ancestral terms:

"we call them [the trees] our *tuakana* and we treat them in that manner."

This idea is also reiterated amongst those who infer consequence from interference with the *tuakana*-line via non-*tuakana* entities.

It [genetic transfer] just doesn't stand up really to us. Why? There are human genes being put into cows or sheep to produce milk . . . [but] it just doesn't stack up in terms of the right way of doing things, because it is [not part of] the *tuakana* line.

More broadly, the suggestion here is that humans (perceived of as *teina*) stand in an ostensibly subordinate relationship with nonhuman organisms (*tuakana*). Embedded in this perception appears to be a set of moral prescriptions implied by the phrase "*the right way of doing things*." More broadly, the *tuakana-teina* distinction functions to emphasize both a sense of kin-like responsibility in the relationships between humans and other things in the environment, and to suggest how these categories might influence the acceptability/non acceptability of particular instances of transgenics. Most obviously, transfers from a *taina* into a *tuakana* might be considered unacceptable.

Stated categorically, the *teina* can never be a *tuakana* to the *tuakana*, just as the *tuakana* cannot be a *teina* to the *teina*. This then begs the question: In transferring a gene from one *tuakana* species to a *teina* species, are the *tapu*, *mauri* and *wairua* of the donor species also transferred to the recipient species? If so, what are the implications of this for the 'cultural' regulation of GM?

⁴⁴ Although the speaker doesn't actually use the word *tuakana* the sense of hierarchy is still present.

Does GM Impact Whakapapa?

Overall, it appears that the greatest concern regarding *whakapapa* in the GM debate involves the potential for GM to disrupt, alter, interfere with, or pollute *whakapapa*. Study participants offered a full range of possibilities on this point. Many were certain that GM would disrupt *whakapapa*, others were certain that it would not do so, while others still were uncertain or ambivalent as to the effects. Of those who determined an effect was likely, some interpreted it as negative and thus dismissed GM as unacceptable. Equally, others considered it as not unlike practices evident in the historical and cosmological record, and thus tolerated GM especially in those cases in which humans might be seen to benefit.

Whakapapa as Unaffected by GM

The following examples are typical of those holding the view that *whakapapa* will be unaffected by transgenics. The examples include the belief that (a) *whakapapa* describes relationships other than genetic ones and that (b) *whakapapa* is by definition a ‘template for cross-species ‘marriages’:

Participant: . . . what I was going to say about whakapapa is that the Māori argument against mauri and whakapapa, it doesn’t really affect genetic sorts of things. I actually think the old people had a template for cross species . . . what do you call it?

Interviewee: Manipulation or modification.

Participant: I am not sure if it is manipulation or modification, because their view was based on not a genetic or biological view, it was really a view, which I think was partly spiritual, partly metaphysical and partly physical, so that this fish actually marries this plant and they produce this other plant that marries this star and they produce a specific water, and that water produces a certain fish. You get what I mean? But that genealogy to me is seen as a template, but they did understand in a sense that this tree can marry into this tree which is a totally different species which produced this animal, but it is not based on the same rules of genetic modification . . .

Others in this category make the more general point that *whakapapa* is principally aimed at accommodating change including the introduction of new phenomenon.

Participant 1: I do not believe, that our people, are against change. In fact I know they’re not, because the way our whakapapa . . . operates is that it allows for flexibility — it certainly allows for change — and it certainly allows for development to take place

Another supported this argument with an interesting historical example but suggested that there were limits as to how much change could be accommodated.

Participant 2: . . . there are some interesting . . . old papers about howt they [people] are trying to extend the whakapapa. . . . There’s an interesting case from Otago . . . I think it was . . . when they saw . . . [a] monkey.

Participant 3: Off one of Cook's boats.

Participant 2: And they said "look at that monkey. We were wrong about ... which [animal] was Maui's brother in law. You know the dog? It wasn't a dog. It was that thing over there." This is a story ... [of how] Maui turned his brother-in-law into a dog. ... But of course when they started to see cows and horses and everything it got too much. It [whakapapa] couldn't keep expanding ...

Still others argued that something akin to genetic engineering and the concomitant modification of *whakapapa* has long been practiced.⁴⁵ In this sense *whakapapa* is said to be affected but such effects are an ordinary part of the evolution of *whakapapa* including the addition or introduction of new layers (or 'papa').

Talking about whakapapa. As soon as the canoes landed over here we started doing all the genetic engineering of that time, because if you were a puhi, that started off the whole beginning of a whakapapa. When the wars started to apply, all the puhi's were taken away and intermarried with others, and there starts your so-called whakapapa and genetic engineering. (Note: traditionally a puhi is a female virgin whose tapu and mana, and therefore rank, are very high. A puhi could be a betrothed woman or a much-courted unbetrothed young woman of rank (Williams 1975: 304).

...there was kind of selectivity in terms of producing the best descent line. That happened, not only by the natural process but human beings interfering with it. But can I drop in a very powerful negative element that people have not recognised. . . . there was a time when the gene structure of very powerful people who were assaulted and defeated in battle — were consumed. That was the end of that gene pool, and it was part of a Māori cultural process. So let us not forget that the Māori culture, pre-Christian, have cultural practices that not only tried to improve the gene inheritance, but actually were a party to destroying it.

And genetic engineering is really no different. So it is case by case, it's individual by individual, family by family, hapū by hapū, iwi by iwi. Some feel that it upsets the whakapapa and as uncle has said, if it means that my grandchildren live, I don't give a shit about whakapapa. Find me the cure that makes my grandchildren live, you know?

Finally, some treated GM products as gifts or *koha* and thus a disruption of *whakapapa* was beside the point.

Participant 1: . . . if you take the genetic material [or] data — from our taonga . . . I don't think you're disturbing its whakapapa.

Participant 2: And then [do they] become your whānau through whakapapa?

Participant 1 ... the answer is no. All [I] am giving is a koha.

⁴⁵ We do not claim that these are in fact cases of genetic engineering, but it is only logical that people use the analogous cases that exist in their experience and use that experience to evaluate the present.

Whakapapa as Affected by GM

The following extracts offer a representative example of how GM is perceived as a threat to *whakapapa* and hence to one's very identity.

Participant 1: You see, whakapapa is about who I am. So I am a descendant of these people. Now if I take out some of my own genes or I have someone else's genes then what's it doing to that? What's it doing to my identity?

Interviewer: And it doesn't matter whether that material is coming from someone within your whakapapa?

Participant 1: . . . No it wouldn't. . . . because that [still] involves manipulation, so that would mean that my offspring would have none of my whakapapa and so my whole thinking is very confused around it but it's sort of all related.

Where I come from, there is a family that has a history of a whakapapa line that has stopped, and as a result of that, people in the district actually refer to them as the whakapapa kore and so whakapapa is very important for Māori people and to have it interfered with genetically would be abhorrent, and moving onto the other side of it as well, things need to be pure - if your whakapapa is pure then Māori place a lot of importance on purity. I believe so anyway, others may have a different opinion.

Others regarded whakapapa as the appropriate medium for the consideration of change but nonetheless thought GM to be an unacceptable method for effecting that change.

I talk with my daughters a lot about taumau. You know taumau is arranged marriage and the reasons that I'd like to do that with them, although of course they're going "No! Don't think that way!" and that in a way is a form of manipulation, [of] whakapapa, but I don't have a problem with that. I have a problem with this [GM] as a different type of manipulation . . .

Finally, a number of study participants recognized that Māori cosmology contained multiple instances of 'modification' (expressed as the improbable mating of unlike species and hence the production of altogether new species or progeny). However, because 'modifications' of this kind took place in the realm of the atua, they were regarded as "off limits" to humans. Put another way, to practice GM is to create considerable dis-ease about the use of those powers by humans.

I would like to be able to say categorically that: no – I draw the line, nah absolutely not, but I realise that when you bring different scenarios in it sort of then becomes an ooh or um and you have to sit there and think about it. I have been sort of calling it genetic relationships as opposed to genetic engineering and looking at it from that perspective. I have also gone back in terms of whakapapa, back to the atua and for me the atua are the realms of the genetic relationships and I think for me as a human I share the atua and Tāne Mahuta with the children of the forest and such.

So those relationships were manifested genetically in a different space and world from where we are here and given that I am not too sure in terms of where I stand, when you really start breaking it right down — is that whether I or others are in a position to make that choice sort of way down here, where we are here today in terms of taking a gene from an animal and placing it in a human, and visa versa — or in a fish to a vegetable — because they come from different atua. That is how I understand it and I do not feel comfortable with the crossing over of those whakapapa from where they have come down. Sort of like the root of it is without atua in those creations - I don't feel comfortable about those cross-linking

In the creation of the world of Māori a whole lot of things were set in place. It wasn't genetic modification, it was the tohunga talking to gods. It was not a cross over. It was creation time. And each species were given their own rights their own autonomy for protection of each other. Because we are from the same parents. And so we have to look after the interests of animals, vegetables and must not allow a cross over that could be dangerous to the species and not created to the crown ... Now briefly, that's where I am.

Interviewer: So here's an example of a new species (for Polynesians) that now is included in the whakapapa- the whakapapa of the kūmara.

Participant: Well it is entirely different. It remains the kūmara. It has not been crossed with a chicken and so we get species of kūmara. Right. It has come out within the group change. Now having a new species of kūmara, produced by crossing, its almost like Māori and Pākehā marrying. For heavens sake, nothing wrong with that. You're part of the one species, and to have the kūmara crossed with other kūmara plants, fine. But if the scientists decide, that you are going to take this bit of kūmara and get the gene and transfer that over to fish, because, somehow there is a gene there that will help fish to last forever on a shelf, well that is wrong. Then you are crossing.

Interviewer: It's wrong because of the crossing of the species and not necessarily because you are trying to make something that will last longer than it might normally?

Participant: It's wrong because we're crossing of the species. I have never accepted the argument: look at the end result.

Ambivalence Regarding Effects of GM on Whakapapa

Strikingly, the salient feature of at least one-half of all discussions regarding *whakapapa* and GM is the finding that most are uncertain or ambivalent about the implications of GM for *whakapapa*. The following are typical responses of this kind; each posits an effect on *whakapapa* but are indeterminate as to the implications of that effect.

Participant: . . . For me there are two different issues. There is the genetic modification, or engineering, interwhakapapa - between two or other whakapapa [i.e. between individuals of different species] - and intra whakapapa, [i.e. between individuals of the same species] and I think they are both quite different issues.

Interviewer: Is one more acceptable than the other?

Participant: Well, I don't know about that, but I think where we talk about body part and marrying and interhuman relationships, I think that is different from when you talk about [mixing] whakapapa from different species.

Another voiced ambivalence about changes within human whakapapa:

Participant: I don't know if I would use the word violation but that [whakapapa] is the guardianship of family genes, family law, family traditions, family name, land, you know that's been part of the continuum and so any change to that is a very significant thing. Change might mean selling off the family land, adopting out a child, adopting in a child, and changing the genes in your family [which] would be significant . . . [because] it alters that continuum. It may not be a violation. Again, you could use a transplant analogy . . . [where] taking a kidney from one sister and putting it into another does change the continuum but that's not a bad thing. It means that at least in one sense the continuum continues.

Others wrestled with the implications of cross-species transfers of "like" organisms e.g. two kinds of shellfish:

Interviewer: For this specific application,⁴⁶ if someone came to you and said, this is what we want to do and this is why. What would you think about it in terms of whakapapa?

Participant 1: What I would tick off first is that is it within the same whakapapa in terms of being kai moana.

Participant 2: But is it actually toheroa or is it actually mussel now?

Interviewer: You're saying that toheroa and mussel come from the same whakapapa. Does that make it okay?

Participant 2: I am not saying that it makes it okay, but that for me, it's the first issue. [The second is]

...so you have got a toheroa here and a mussel there — they are the same atua. I'm talking about whakapapa now — have you really got a toheroa here or have you got a toheroa with part mussel now? You are actually inventing a whole new species, so I actually think you have got a new whakapapa.

As the dialogue above suggests, in some instances, it appears that transfers within one whakapapa might be more acceptable than transfers between species that do not share the same whakapapa. However, there is some uncertainty about the end product and what that therefore means for whakapapa, or indeed just what sense of "whakapapa" applies to cases like these.

⁴⁶ The interviewer was discussing the transfer of genetic material from one species of mollusk to another.

Kaitiakitanga

Kaitiaki is a word derived from the verb “*tiaki*” – to guard; to protect; to keep watch over, with the prefix “*kai*” denoting the doer of the action. Hence a “*kaitiaki*” can be translated as a guardian, and “*kaitiakitanga*” as the act of guardianship. According to Rev. Māori Marsden⁴⁷

tiaki can also mean, to keep, to preserve, to conserve, to foster., to protect, to shelter and to keep watch over. The prefix *kai* with a verb denotes the agent of the act. A *kaitiaki* is a guardian, keeper, preserver, conservator, foster-parent, and protector. The suffix *tanga* added to the noun means guardianship, preservation, conservation, fostering, protecting, sheltering.

Marsden is also adamant about the necessity of distinguishing between guardianship and stewardship in reference to a Māori understanding of *kaitiakitanga*. “Stewardship,” he notes, “is not an appropriate definition since the original English meaning of stewardship is to ‘guard someone else’s property,’ whereas the notion of private property in this context is foreign in traditional Māori thinking.

The *kaitiakitanga* or ‘guardianship’ principle is enshrined in New Zealand legislation within Section 7 Part II of the Resource Management Act (1991), which then provided the basis for the HSNO Act as set out in the introduction. To restate briefly, the HSNO Act (1996) is closely modeled on the RMA in terms of its purpose which is to avoid any adverse environmental effects of a particular activity (e.g. genetically modified organisms). Māori resource managers responsible for ensuring the *kaitiakitanga* of their natural resources under the RMA, therefore apply the same principles to the HSNO Act. *Kaitiakitanga* is therefore inextricably linked with concepts such as *tinu rangatiratanga* (without which the practical implementation of *kaitiakitanga* is constrained or impossible) and *taonga* (see the next section) but in this section it will be discussed primarily as a “stand-alone” principle.

The following quotes establish its importance in relation to applications of genetic modification:

... *kaitiakitanga* is about ... the mediation of ... the environmental, [the] spiritual and the human. And it’s about [the] management of humans, as much as environmental stuff. ... you’ve got to ... do it with integrity.

kaitiakitanga ... is a really big responsibility in our lifetime, to make sure that we care for this planet, and GMO is definitely a part of that thinking so that we make wise decisions, and that means getting well-informed ... I don’t think a lot of us are well-informed.⁴⁸

⁴⁷ “God, man and the universe,” 1975.

⁴⁸ The speaker expressed some reservations about GM and wanted more information and further discussion.

These quotations indicate clearly that the responsibilities and obligations of being *kaitiakitanga* is as much an attitude to life as it is a particular form of human behaviour. It is concerned with decision-making and action specific to the management and safeguarding of the physical, human and spiritual worlds. Consistent with the emergence of genetic modification as a new and thus as yet poorly understood phenomena, opinion varies as to just how the principle of *kaitiakitanga* might inform GM decision-making. Some argue that there is no “ready-made” traditional thinking to draw upon, though that does not mean that traditional Māori thinking is therefore irrelevant or that it is incapable of dealing with the issues that biotechnology raises. Rather, it is argued that because the implications of GM require full and careful consideration, more time is needed for Māori to become sufficiently informed in order to make appropriate decisions.

In the quote that follows, the speaker indicates the necessity of a guardianship posture toward all genetic material, and suspends permission to manipulate that [genetic] material, but leaves open the possibility of GM in the event of consultation.

...[I ask myself] is there any Māori thought in this area, and there kind of isn't. So, if you went from first principles, Māori would say that all genetic material is a taonga. I mean, it's been given to us it's ours to look after. But it's not actually ours. You actually don't own it, but you're its guardian. ... [it's] something to be treated with reverence which automatically means that you can't just go ahead and do ... [anything you please]. There needs to be discussion and consultation and some thought put into it. And I don't think Māori would be different from anyone else in that respect.

In contrast to the above view, others hold that *tiakitanga* is necessarily opposed outright to the kind of interventions that GM involves:

...from the point of view of *kaitiakitanga* – you know, the preservation of whakapapa within food plants, within natural ecosystems, all of that which I would say well no. I think that those are silly things to do. And they don't take us anywhere and they in fact undermine our long-term benefit.

Interestingly, both views express an inclination towards long-term planning, from which it can perhaps be inferred that *kaitiakitanga* entails the same. The first three quotations also show that *kaitiakitanga* is as much about protecting humans as it is about non-human organisms or ecosystems. Following this, an argument can be made that the principle describes an imperative to care for humans. In this sense it is associated with values such as *aroha/manaaki ki te tangata*. (The earlier section on *he tangata, he tangata* (Chapter 4) examined these principles in more detail.) Problems clearly arise, of course, with efforts to ascertain the “balance of competing interests” (human interests vs non-human interests or human vs. other human interests).

Rāhui

Reference was made in many interviews to specific customary practices used to uphold the responsibilities of *kaitiakitanga*, notably the implementation of *rāhui*. This institution

enables a temporary prohibition or a ban to be imposed to protect resources. One early ethnographer describes several types of *rāhui* practices including political *rāhui*, pollution *rāhui* and conservation *rāhui*: the last two being of particular relevance to the protection of natural resources.⁴⁹ Pollution *rāhui* were put in place after (for example) a drowning, whereby the river or sea becomes contaminated by the *tapu* of death. Imposition of a *rāhui* allows time for the waters to become cleansed before being reopened for use. Conservation *rāhui* allow for protection and /or replenishment of resources when depleted. Traditionally, to aid in their regeneration, a *mauri* stone was placed in the designated area accompanied by appropriate ritual and prayer. The purpose was the protection of *mauri ora*, the life-force in animate entities and/or forms of life such as plants and trees. They owe their continued existence and health to the *mauri*. When the *mauri* is strong, fauna and flora flourish and when depleted and weak these forms of life become sick and weak.⁵⁰

In the context of GM, *rāhui* might be employed in several ways. First, a temporary prohibition might be placed on experimentation in order to create a space for discussion and decision-making, as with the moratorium. A *rāhui* might also be placed on certain kinds of experimentation, such as field trials or releases while laboratory work continues. A *rāhui* could also be a way of achieving a certain goal, such as replenishing a resource, without recourse to GM. This last use of *rāhui* is suggested in the next two quotations, and is evidence of a line of thinking that queries whether the desired outcome of a certain GM application might not be achieved in another way. In the first example, the speaker resists the idea of solving the problem of toheroa depletion via genetically modifying the mollusk to reproduce more rapidly. His contention is that the problem is derived socially and should be solved through better guardianship. In the second and third examples, *rāhui* is linked to a larger set of concerns, each aimed at guardianship of key cultural assets be they the whakapapa of a species or the knowledge necessary to maintain the land and its resources. In addition, both arguments are couched in terms of ‘natural’ and ‘unnatural’ methods (discussed more fully in the a section below entitled ‘GM is Unnatural’):

Participant: Can’t we just let the process be, and go with natural selection. Natural - I mean we were the ones that affected the numbers, us as human beings went there and pillaged. I disagree with Māori pillaging, because I think we’ve got our tapu, and our noa, and I think that’s why we had sustainable amounts of toheroa, when we were here, and no one else. Because we knew how to naturally let it breed, have a feed, only have so much and wait until next season - have another feed etc. I think if I go with my heart, just let it be, let it come back naturally, why speed up the process. We’ve got to pay for it now, we let it happen - now let our generation pay for it and in twenty-five years time hopefully it’s built back up again and that our next generation can have the feed.

⁴⁹ Elsdon Best, “Notes on some customs and superstitions of the Māori,” 1898, pp. 83-88

⁵⁰ M. Marsden “God, man and the universe,” 1975; cf. E. Tregear, *The Māori Race*, 1904, p.198; R. Firth *Economics of the New Zealand Māori* 1975, pp. 259-260, 262; E. Best, *The Māori*, 1924, Vol. 1: pp. 39, 203; F. Porter, *The Turanga Journals*, 1974, pp. 226-227

Interviewer: But in discussing whakapapa, for instance, when you are talking about protecting land and species that is not so much a whakapapa principal involved, but rather the kaitiakitanga.

Participant: There is a relationship there which requires us to exercise care and respect for those resources. ... a lot information transferred from one generation to the other is through the use and access of traditional resources whether it be gathering food, cooking it, preserving, exchanging it or whatever - the names, the place where it could be got. That is very, very important in terms of the cultural knowledge that people hold. It is about protecting those activities and ... [with] rāhui, at times you might not take [the resource]. So I think there is a lot about the knowledge base, prayer as well as the relationship. So in our worldview, we can take and eat our relations of those other departments - in certain seasons and there are times when we can't.

Familiarity and Usage

The question of what things might be subject to *kaitiakitanga* is of fundamental importance here. Study participants frequently debated whether Māori are guardians of everything or just some things. Some consider *kaitiakitanga* to be a very wide-ranging obligation, as the next quotation shows:

I have conservation interests and so I wouldn't want to see the integrity of either humanity or of wild nature disrupted.

Others contended that *kaitiakitanga* might rightly be contained to a more restricted area of application, within realms such as tribal *rohe* (native plants) or tribal *whakapapa* lines. The next quotation indicates an imperative to act as *kaitiaki* in situations that involve particular organisms; whereas the use of the term *taonga* in the subsequent quote suggests using the *taonga* designation as a means of determining where *kaitiakitanga* does and does not apply.

... DOC [told] us about ... Karekare [where] there was a very rare orca, and we go "yeah, so what?" because it means nothing to us, we've never used them. It's irrelevant. But if ... our crayfish pots get threatened, by hokey you watch us try to protect [them].

If the local people say we have affinity with this and this is a very ... [precious] taonga regardless of whether it was native or not, it shouldn't matter. It's how it's perceived through the iwi's eyes as opposed to was it originally, you know, was it native? Was it introduced?

Finally, the last quote makes it clear that *kaitiakitanga* does not involve prohibition on the use of key resources. Rather it means that they must be used wisely and sustainably.

I've heard a lot of Māori talk about ... [why we want to change the] water or trees, that [were] given to us for our use. Now why are we changing it? ... I'd like to know as well, the water would be a good example – I think if a guy wanted to build a dam

and he said well that water just runs straight past down the stream past your place and out to the sea and it's wasted anyway so why can't this Pākehā just dam it up and use it when he wants to, for feeding stock and for irrigation. And ... the argument [in opposition] was that it [would] desecrat[e] the water. ... [but] I said ... if you just divert water and hold it you'll not desecrate anything. When you walk through it and crap in it and all that, that's desecration. But you do not desecrate water by drinking it, using it, or washing with it.

Taonga

The forgoing discussion as well as the ongoing Wai 262 claim and the terms of the HSNO legislation suggest that the notion of taonga is highly significant in the GM debate. However, the term taonga was rarely explicitly invoked in the interviews. Rather, it often featured implicitly or peripherally, especially because it links with many of the other values identified in this report, especially kaitiakitanga, the Treaty/Te Tiriti, and whakapapa. In discussions where it was used, however, two main concerns relating to the use of taonga in GM experiments arose. First, what makes something a taonga, and second, how should taonga be treated?

What Makes Something a Taonga?

As might be expected, there were various opinions as what gives an object or 'thing' (including intangible phenomena) taonga status. One way to interpret such diversity might be to say that it indicates significant discontinuities between individual understandings. While we acknowledge that this may be the case, however, we suggest other factors may also be involved. In a theological discussion on taonga, the Reverend Marsden lists four kinds of value that a taonga might possess⁵¹; utilitarian value, historical-social value, cultural and social value, and spiritual value. We argue, therefore, that both individualized understandings *and* appeals to multiple forms of value contribute to the wide range of opinion presented below.

Many consultants invoked Marsden's four values (or similar ones) in discussing the implications of GM technology for taonga. For one consultant, 'significance' was the key theme. In the following extract, the consultant discusses the 'significance' of kūmara by explicitly invoking two forms of value. On one hand, kūmara has utilitarian value because of its importance as a food staple. On the other, kūmara has spiritual value because of its connection to atua:

[kūmara is] significant to Māori people. . . . I mean, for instance being . . . such an important diet food, I mean that's what people pretty much live on, and then relating it to the Gods and all that sort of stuff, it's very, very important so that's a good issue, 'whether it's native or introduced.'

The extract makes the interesting point that taonga don't necessarily have to be rare or 'special.' In this view the importance of the kūmara is, at least in terms of its utilitarian

⁵¹ M. Marsden "The Woven Universe" 2003

value, due to its current ubiquitousness in Māori life. This in turn imparts an implicit notion of cultural value in the sense that culture is as much about everyday things as it is the extraordinary, revered, or unique. However, historically the kūmara was far from ubiquitous – its cultivation was technically difficult and had to be hedged around with complex ceremonial requirements and restrictions. It was extremely important nutritionally, constantly at risk and thus a taonga to be cherished as life itself may depend on it.

The next excerpt is explicit about the historical value of taonga, since as noted taonga is equally a legacy of ancestors.

Whenua tuku iho for instance have been given to Māori people from their ancestors

This can lead to a kind of timeless, or overly historicized view of taonga, but it also begs the question: When does a thing become a taonga? In other words, if taonga have always been taonga, can things that have not previously been taonga ever become such and what are the implications of this for the relationship between this cultural principle and newly created GM entities? The following extracts address this point in two different ways. The first discusses how GM can create new taonga by modifying old ones:

Even when you do harakeke — you might have a tutu [fiddle/muck around with] and you come up with a new taonga.

Two important points arise from this view. First, the practice of GM and the appropriate treatment, or use of taonga, are not necessarily antipathetic, and second, new taonga can be created, either deliberately or accidentally. The second extract (below) suggests another way that things can *become* taonga over time. Taken from a discussion of a hypothetical scenario in which kauri genes are inserted into pine trees to produce a self-pruning tree, the speaker raises two points. The first is that the transfer of genetic material between taonga and non-taonga is problematic. This is a fairly unequivocal position, however, the second point, that exotic species can come to be considered native, suggests a more open approach.

This one I think is a little more complicated because a) you've got the issue of the kauri tree being taonga and then introducing it into the pine tree which while not a native [species] almost qualifies as one.

The second point indicates that a 'thing' can change category, in this case a non-native can become native or taonga species through sheer force of its importance to particular iwi. The significance of this point is demonstrated in conjunction with the next extract in which a study participant argues, in line with the Wai 262 claim, that native species are taonga by definition:

We revere them [toheroa]. We did talk about it being native species as well as [the second modifying species] being a non-native species. I mean, by bringing in another, like a non-native species, would that decrease the wairua or would it decrease the mauri of the taonga? It should be [decided upon] purely by how it's perceived by the iwi. The taonga status.

If taken together, it can be concluded that the categories native and non-native, and also taonga and non-taonga are not immutable, that things can possibly move between categories over time as historico-social and cultural values change.

Indeed, this has happened in effect with the classification of imported taonga, such as the kūmara as equivalent to native flora. Most kūmara cultivated these days are from post-contact strains, and even the ‘traditional’ kūmara were brought to New Zealand from East Polynesia in the early stages of Māori settlement (and from Peru to East Polynesia not long before that).

[In response to distributing GM carrots to possums to control their reproduction and hence reduce their numbers] I think probably to most people it’s more acceptable than poisoning ... isn’t it, I mean it has the same effect I suppose but it’s probably more acceptable. But I noticed that this was about a GM that was done overseas as well. So that’s important. If we were doing it here on kūmara or our own [native] crops [and not on carrots] that might be different.

Regardless, one major problem for appeals to the notion of taonga in decision-making, especially in the context of nationally significant decisions, is the regional aspect of the taonga, that is, a thing can be a taonga for one hapū, iwi or other group but not for others. This problem is discussed in the next extract:

I think toheroa is a really important species especially for the coastal tribes. I mean, being, speaking for myself, from an inland tribe, I know that way back when it was a trading, it was a mechanism for trading, it was a delicacy, so if one coastal tribe had toheroa they would swap because it’s a delicacy they would swap with an inland tribe for something of one of their delicacies like wood pigeon and stuff like that so I don’t know if they’d be too pleased about that at all.

How Should Taonga Be Considered?

Most of those who actually referred to ‘taonga’ argued that they should not be subject to GM. The following extract demonstrates this thinking, with the added caveat that taonga are or should be exclusively ‘owned’:

And that’s my belief too that if something is sacred it was given to you, especially for people, and so it belongs to you and shouldn’t belong to anybody else. And not to tamper with it.

The interviews addressed a range of contextual variables with a view to divining the boundaries of acceptability, and the necessity of consulting Māori in reference to use in GM of taonga species. One study participant argued that Māori would have an interest even if a taonga was genetically modified overseas. It was not clear, however, whether this meant that all overseas modifications of taonga would be of concern, or just those that were later imported into New Zealand:

If it was kūmara and even if it was done overseas then Māori would view that as a taonga so that it would require more input I think.

Others held that taonga should not be subject to commercial ‘exploitation,’ as the next extract indicates:

I guess I just feel that the kauri is very special and there’s some sort of reduction that happens when you commercialise it. It’s a feeling of a sense of loss.

This seems to conflict with the notion of taonga as everyday things, since kūmara (and previously kauri trees) are commercial crops and yet maintain a taonga status. Moreover, it ignores historical examples of Māori commercial activity such as the trade in harakeke and kauri in the early 1800s.

Others took a different view, arguing that ‘traditional’ thinking might need to develop in order to properly address GM technology and its implications:

Again I looked [for] any Māori thought in this area, and there kind of isn’t [any]. So, if you went from first principles, Māori would say that all genetic material is a taonga. I mean, it’s been given to use, it’s ours to look after. But it’s not actually ours. You actually don’t own it, but you’re its guardian. And that will be particularly so with indigenous people but in a more general world sense I think as well. So that’s not something to be throwing around. That’s something to be treated with reverence which automatically means that you can’t just go ahead and do stuff. There needs to be discussion and consultation and some thought put into it. And I don’t think Māori would be different from anyone else in that respect.

Indeed, the idea that further discussion was necessary was a very common response. In the following extract, one participant suggested that the genetic modification of taonga should be discussed on a case-by-case basis and that the iwi for whom the thing was a taonga should make the determination. The interesting idea here is that there might be a hierarchy of taonga in which some are too sacred to modify while others may be treated as available for negotiation.

Well, if the iwi says that it’s not degrading mauri then and if . . . if [the] iwi says look it doesn’t have a high enough taonga status, then it wouldn’t be a problem

A final interesting point was raised as to the intellectual property concerns. Once again, this feeds into the Wai 262 claim, but it raises some interesting points. For example, is genetic material from a taonga itself a taonga? Who controls the material? If material from a taonga is implanted within a non-taonga does the new organism become a taonga? Further discussion is clearly required on each of these issues:

I think you couldn’t attempt to resolve the second two without dealing with the issue of the intellectual property of the kauri tree. If you couldn’t deal with that then you wouldn’t be able to go on with the others. And again it’s the whole issue of the sequencing of the gene for the pohutukawa tree and then trying to patent it. Can you patent a gene?

Tikanga

First and foremost, it is difficult to separate discussions of *tikanga* from those of *kaupapa*. As will be illustrated in Chapter 7, the idea of ‘intent’ and ‘purpose’ commonly surfaced in references to *kaupapa*. It was equally common to find simultaneous references to *kaupapa* and *tikanga* as in the proposition: “*if your kaupapa is right and your tikanga is right, [one’s] chances of negotiating through difficult territory [are invariably enhanced].*” But for our purposes here, we will separate the discussion of these two decision-relevant concepts, and thereafter address the pertinence of *karakia* to the debate on genetic modification and ‘right’ practice.

Virtue, Ethics, and Values

While there are no specific Māori terms for virtue, ethics and values, the term *tikanga* can be justly said to embody them all. *Tikanga* speaks to ideas of right, correct, true, and/or just rules of practice. *Tika* refers to the nature and ethos of things, whereas *tikanga* is the way of living according to what is considered correct and appropriate, morally, spiritually and socially at any given time. Henare has identified a cluster of ethics which constitute not a hierarchy of ethics per se, but a way of linking humanity and the world in a relationship of reciprocity and respect.⁵² They can be stated as follows:

- Tikanga te ao mārama (ethic of wholeness, evolving, cosmos)
- Tikanga te ao hurihuri (ethic of change and tradition)
- Tikanga tapu (ethic of existence, being with potentiality, power, the sacred)
- Tikanga mauri (ethic of life essences, vitalism, reverence for life)
- Tikanga mana (ethic of power, authority and common good, actualisation of tapu)
- Tikanga hau (ethic of spiritual power of obligatory reciprocity in relationships with nature, life force, breath of life)
- Tikanga wairua –wairuatanga (ethic of the spirit and spirituality)
- Tikanga tika –tikanga (ethic of the right way, of the quest for justice)
- Tikanga whānau — whānaungatanga (ethic of belonging, reverence for the human person)
- Tikanga tiaki –tiakitanga (ethic of guardianship of creation, land, seas, forests, environment)
- Tikanga hohou Rongo (ethic of peace and reconciliation, restoration)

⁵² The Changing Images of Nineteenth Century Māori Society, 2003.

- Tikanga kotahitanga (solidarity with people and the natural world and common good).
- Tikanga manaaki (love and honour, solidarity, reciprocity)

In the context of this study, it was uncommon to encounter definitions of *tikanga* elaborated to the above degree. However, the meanings attributed to *tika* and *tikanga*, namely, ‘right practice/ethical conduct’ were remarkably consistent across respondents. Some examples follow:

It’s like a guide to what you do and don’t do.

[Tikanga is] something that allows someone to go onto a marae [for instance], a tapu place, and then they go through the protocol, the law. They are then free to learn and to behave like everyone else from that marae.

Or, in some cases, tikanga simply meant ‘traditional’ practice.

We come from an iwi which is very strongly tikanga based. I think its probably one of the main ones that still hangs on to all its traditions and the language is still pretty strong.

Basic definitions of *tikanga* as ‘right practice’ were generally accompanied by qualifying provisions. Most notably, study participants cautioned against the representation of *tikanga* as a solely programmatic or procedural problem as concerns appropriate stages of physical action for the management of GM products. That is, procedural consideration were primary, as in the ‘right’ practice for visiting a marae, but multiple concurrent conditions for *tikanga* were deemed simultaneously relevant. These included the proposition that knowledge of proper conduct can or at times should be the ‘property’ of specific persons as designated by his or her *whakapapa*, a provision echoed below in reference to *kaupapa*. The following passage offers an example of the expectation that knowledge of *tikanga* should not necessarily be available for wider consumption but rather respected as tapu by virtue of the cosmological origins with which that knowledge is associated.

The knowledge is not being kept tapu. The knowledge is going out to people who it was not given to. Traditionally then with that dilution you cannot fix it [make ‘it’ right]. Because what I am talking about is that . . . a lot of people there in the Māori world today that are at the high business peak point level have not got the right to be there traditionally. They have put themselves there . . . They seem to be teaching someone else to do something which is not really as good.

Some regional differentiation was also manifest in the proposition that women, not men, were the traditional custodians of tikanga and as such the appropriate source of decision authority.

I talk for the ones up here in Waimana — the creators of the kawa [tikanga] were our old woman, and the reasons being that they were the women who held the survival of

Tuhoe. Now they would create and they would make changes to their culture, so long as it bettered the survival of their people. The women are the power base behind the tribe, always have been. They set the rules and the protocols. The men are only the mouthpieces. It's the women. In answer to your question about what is it that would disturb me about transferring one gene to another, I would have to hesitate and say I have to go back to my kuia. Because they carved the kawa [tikanga] for us — for our survival. [If it] will save the nation then they will agree.

Tikanga was also looked upon as a multifaceted practice requiring a careful balance of multiple physical and metaphysical forces. The following comments were made during a discussion about an hypothetical GMO, used to enhance the recovery of shellfish populations in a Northern iwi's estuary.

You have to take into consideration the balance. If you upset the balance in one iwi then its got to be made up somewhere else, whether that is physically, you want to totally grasp the concept of Māoritanga when you are working with this but what you are actually trying to do here is when you are taking an oyster and you are changing it physically but on a spiritual level you have created an imbalance physically so spiritually there is an imbalance as well. So how do you fix that? Tikanga will show you how to fix that.

The salient point for others was the need to comprehend *tikanga* as the basis for moving forward in uncertain territory. In this sense, *tikanga* was interpreted by some as a process that enhances the potentiality for wise development or 'growth' by maintaining the integrity and wisdom of operation. The suggestion is that *tikanga*, in this developmental sense, is part procedural and part reflexive or self-monitoring, an idea manifest in the phrase: 'it keeps you telling the truth.'

There was a question [earlier]: What is the difference between taonga and tikanga? Some say that a taonga has something that is [already] cemented. Tikanga [involves] something that you can grow... Tikanga to me is something that keeps you telling the truth, that is what tikanga is.

The articulation of *tikanga* as 'truth' — or the principles and procedures through which truth becomes evident — was also echoed at the meeting of Māori theologians. In this later context, caution is invoked in references to the procedural sequence that constitutes *tikanga*. Procedure as such can be easily rushed or disregarded, and thus the potentiality for truth violated.

In all things there are tikanga, principles, process and guidelines [for] preventing and managing that which is desired or good. But it can in fact violate if that tika doesn't go through. [It] is a matter of putting stages into place so that in the process they should be the natural fruition, the natural attainment of that which was desired, providing the person had the bravery and courage to take the initiative. Violation [can] come about when [this] does not happen — because stages are rushed [or] the truth is not revealed [or] there is still a concealing of truth. A camouflaging of truth. A camouflaging of benefit so that . . . doesn't do his job in terms of revealing the

reality. There could be failure in terms of communication and information and integrity of the information. We can contribute to this [debate about GM] through the constant reminder of tika: to acknowledge that which exists, to acknowledge that which exists or to acknowledge origins . . . how did they acknowledge it and the whole issue of modification is the acknowledgement of nō hea. [from whence something originates]

Tikanga, Ritenga, and Kawa

Henare⁵³ has found in prior work that one also commonly encounters the simultaneous use of *tikanga* and *ritenga*; the latter refers to forms of behaviour and is thus linked to *tikanga* as the specific practice. Consistently, a small subset of study participants sought greater linguistic precision for the term *tikanga*, recognizing that, popularly this term has come to encompass both *ritenga* and *tikanga* when *ritenga* was the more appropriate term for the ‘conditions’ meant to guide the staged prescriptions known as ‘*tikanga*.’

Participant: Ritenga is the provision of certain things. You have a tikanga, the ritenga is the conditions that you will place on that arrangement.

Interviewer: If we were to look at a Māori process for genetically modified organisms, would we be looking for a tikanga including a ritenga? Tell me about the process using those words? For instance, if you had to [guide] rule the local rūnanga on genetically modified organisms, what would you decide?

Participant: The tikanga is that we will go there and conduct this meeting in a fair and orderly manner for the benefit of [iwi affiliation]. So, the tikanga is that this is how we will go down there and conduct the thing, the physical practice. So there is an order, structure to our interactions. The ritenga, the provisos, should this happen, this is the counter. Should this topic arise _____ will answer it. Then _____ will answer it so that we know where we are.

Further, in deference to regional differences in meaning, it was suggested by a few participants that for some southern iwi, *tikanga* historically referred to the rules for interaction between two parties whereas ‘*kawa*’ referred to the sanctification and regulation of protocol for broader contexts. It was suggested, equally, that *kawa* had disappeared from the popular lexicon due to its affiliation with the sanctification of practice, whereas the more ‘neutral’ or pragmatic term, ‘*tikanga*,’ had been tolerated by colonizing agents as an ostensibly less threatening principle of behavioral or procedural governance.

Only Southern Māori people have kawa. We use it for that rule that regulates protocols and behaviour. That what kawa is. Kawa meant that you sanctified certain obligations [whereas tikanga] is for a neutral interactions that you and I have. In order for you and I to abide and not break, just you and I or an arrangement between you and I, this is tikanga. I suspect that the missionaries had a lot to do with it [namely,

⁵³ M. Henare, “Ngā tikanga me ngā ritenga o te Ao Māori,” 1988.

current preference for the term *tikanga*], they grabbed that word [kawa] and threw it out because kawa meant that you sanctified certain obligations.

Finally, the necessity of securing and abiding appropriate *tikanga* was often coupled with references to the consequences of failing to do so. Specific mention as to the precise nature of consequences was uncommon, but the general tenor of concern is well captured by the following as is the strong sense of the enduring temporality of the consequences:

It has happened to me and I have seen it happen to other people. When you do not do things right — tika — you can get hit. The severity of how hard you are hit depends on the severity of the wrong that you have done. Sometimes there can even be death, some can travel through generations. So to be aware of these things that we can teach to future generations of what we do know . . .

Considerations for the Development of a Tikanga for GM

Considerable optimism existed for the possibility of abating controversy and struggle manifest in GM debates across study participants given the setting in place of a ‘right’ or ‘tika’ practice.

I believe that you have to set principles of tikanga. If your kaupapa is right and it is a good right, I believe that you will get the blessings of the parents. That is one of the principles which is to come under the umbrella of the belief. I believe that you will [then] have a working relationship.

If you can lay the kaupapa correctly and ensure that you incorporate the right principles, bring benefits and not harm to people, to land, [to] the gods. [If you can] satisfy those concerns then an appropriate tikanga can be developed that enables one to move forward.

Māori are being forced, if you like, to develop a new tikanga and way of thinking about these organisms.

The possibility of a *tikanga* for GM was further supported given (a) the exercise of caution, and (b) the assurance that a ‘GM’ *tikanga* was a ‘*tikanga* of the people’ and not a corporate *tikanga* per se.

Part of that is hopefully, that we’ll have more a sophisticated tikanga based framework or values based framework which allows us to say that this is pretty frightening and is against what we all were to believe and its against what we represented for a long period of time and we are not ready to renegotiate that end of story. But at the same time it is important that the rūnanga of _____ have the information, which says for the minimum investment of _____ [dollars], this could be the [for the] benefit of [iwi] and benefit for Māori, the benefit for NZ.

Again, I go back to the corporate tikanga, and the [Māori] tikanga. When you try to mix the two together — it doesn’t work. Even when you try to work in parallel or contiguous to one another — it doesn’t work, because every time the corporate

tikanga will always impose its will on the [Māori] tikanga. Now if you were to take tikanga and give it back to the people — that is where it should be.

In large part, *tikanga* is too encompassing and pervasive a value in the Māori world to expect study participants to characterize it with precision. As such, clarifying just what a *tikanga* for GM would look like is not easily addressed. Nonetheless, throughout the research period myriad stated and inferred conditions were suggested as possible underpinnings for such development. The following sections offer some insight on this point. Included within are ideas about appropriate limits to be placed upon the modification of organisms (including categories of unacceptable modification) and primary metaphysical considerations (most notably the pertinence of *karakia* and its links to *kaupapa* as well as properties such as *mauri*). A more quantified reading of these limits is also available in the Phase II (survey-based) report. We do not mean to assert these next findings as a definitive structure or decision framework for the management of risks posed by genetic modification (although a decision framework will be suggested in phase III of this project). Rather, we consider this the first speculative articulations of an emergent *tikanga* focused primarily on the conditions under which participants were and were not willing to consider GM applications.

Karakia

The concept of intent or motive discussed in chapter 7 in relation to decision-making processes, is also linked to the theological or spiritual processes through which positive outcomes might be assured when transferring genetic material from a donor to a recipient organism. Motive, in this case, is regarded as something that needs to be properly embedded into the modified organism. It is assumed that the organism itself possesses agency (loosely will or intent and well covered in the above section on spiritual matrix: *mauri, hau, wairua*). That agency is linked to the incantations or *karakia* whose purpose it is to establish that very important motive or intent. Although relatively few participants paid detailed attention to *karakia*, the point was elaborated considerably by key traditional knowledge experts engaged in this study. What follows here is their definition of *karakia*, a discussion as to the kinds of metaphysical risks it may (and may not) provide for, and its specific role in reference to the manipulation of genetic material.

Karakia, first and foremost, is the invocation or prayer through which permission for the transfer of genetic material might be sought from the realm of the Atua. More specifically, *karakia* is the invocation itself whereas *pure* is the ritual practice in which those invocations are situated. Further, in the opinion of some of the participants in this study, it is through *karakia* that genetic material might be transferred for a particular benefit. Illustrations of these initial definitions in the context of discussions with participants are as follows:

If you go back to our cosmology or our creation stories, almost everything is created through *karakia*. The separation of the earth [and sky] was done through specific *karakia* to allow the release of something [the atua]. So before anything was done even before Tāne or any of those atuas did anything, there was always a *karakia* to set

in place their action. Everything was done through *karakia* and there was always a prime motive involved.

Whether [you are dealing with] one species or transplant from another, the difference in the Māori experience is *karakia*, through *karakia* we always sought permission. The difference today is that we no longer think of those realms therefore we no longer ask permission.

There were two divisions. *Karakia* as being the chants and spells, and pure being the actual ceremonies, the rituals. . . . It's the prayers that really give the properties of [say] a plant the power to be able to work. I think that is one of the things that we have to be mindful of when dealing with plants, fauna, etc., and the trans[genetic] crossing of species.

[In reference to gene therapy:] If they [his patient] were Māori then the gene would need to have been given freely, probably with *karakia*, and you would need to take the product freely with *karakia*. I mean, you would be taking on part of that person. Like a transplant.

We will, however, have grossly under-represented our informants if we suspend our discussion of *karakia* here. Rather it must be understood that, fundamentally, genetic modification is about the transfer of properties from a donor organism to a recipient organism. Therein, *karakia* is the process through which are regulated the benign, malevolent, or benevolent forces that are involved in this transfer. *Karakia* is thus important not just for what it is (as incantation, prayer, ritual practice, recitation of a creed and principles for ensuring a desirable outcome etcetera) but for what it allows for or provides as concerns the well being of the modified organism as well as the larger world of which it is a part.

Principally, *karakia* allows for creation, for the possibility of a new object or in this case a new organism. More specifically, it allows for the way to be cleared; for things to be properly set in place (made 'tika') so that something good might then follow. The practice emphasizes both the physical and metaphysical properties of all objects including genetically modified organisms, it allows for their proper existence and thus its very ability to function appropriately in the world. The following four excerpts from study discussions illustrate these points in some detail. Each emphasizes the importance of *karakia* in endowing an object with its defining purpose and motive, and hence its *mana*. The third excerpt emphasizes, in particular, the management through *karakia* of an object or organism's purpose and hence its well being in the human and nonhuman world.

I am talking about how things — mental and the spiritual things — and the power that can [be unleashed] or happen. If we are to talk for Māori people, *karakia* is the most important ingredient of the existence of cultural things, whether it be Christian or whatever — as long as there is a prayer, incantations or a ritual that is involved then these things would exist. Māori people have that, but very few I think that I know of, engage [in this regard]. They are tardy — some of them don't go to church but they

still believe, but the most important thing for people involved in that sort of thing [genetic engineering] is to ensure that their well-being is safe — not only the person, but the environment

[When a] house is built or a child is born, a tōhunga would go and [through karakia] put a mauri down for the welfare of that house or that child. It might come in the form of a visible object that represents the life force of something. It doesn't mean to say that it is actually the life force. But a chief or child might be born and they will go and ask the tōhunga to go and create a mauri that will protect a child. So he will get a specific tree trunk and then he will make that the mauri, but how do you make it the mauri? Through karakia. By incantations, by prayers. What does that do to that? If you pray for this particular object to be infused with the hope, which then — how I see it — it allows the mana or the power of us or whatever the God or the deity is that the tōhunga has faith in, allows that mana or the hau to come into that particular object and dwell there for a specific motive, so we are talking about motive here. So, when you get this plant and marry it with this thing here to create something then there is a motive behind it and karakia is always designed for a specific motive, and in this case it was to create this tree trunk as a mauri and to karakia on that mauri to allow the hau of the atua to come and indwell in that thing, and that allows the well-being and welfare of that child or the house.

In the first of the three following quotes, references to *karakia* emphasize the ties that bind the human and the superhuman world and the necessity to ensure that link remains unbroken. In the second quote particular emphasis is placed on the importance of *karakia* to genetic manipulation wherein *karakia* is the means through which one comes to a more complete understanding of the impact in the physical world based on parallel knowledge of and alignment with the spiritual world. In the third and final quote, the link between the spiritual world and the functioning of objects in the physical world is illustrated by way of reference to the “Rata” story. In that story, the intention to use a tree for a new albeit appropriate purpose is thwarted because of the failure to invoke appropriate *karakia*. The Rata story is often cited in reference to GM research as it highlights the perceived failure of scientists to seek permission through *karakia* to create new entities.

The karakia keeps that thread from the spirit realm to the object in alignment [with] what it was supposed to be. If it gets tampered with, it gets cut off — like a whati, [that thread is broken]. In the Māori world, if you do a karakia, or you sing a song and you break it in the middle or forget something or there is a gap between it, you can guarantee — or the old belief was — you're a gonner . . . because you have broken that line.

It [a modified organism] can only be changed or diverted or whatever through karakia, because that [the ability to modify or assert an object's purpose] is all in the [realm of the] atua. I have heard Māori say I am part ira atua and part ira tangata. If that is right then we should have the mana then to reach into this realm to do whatever needs to be done in this realm, but that can only be done through karakia. . . . This is how I see it — without karakia in a sense you can't see the manipulation going on in the background which you have to understand to be able to see how it fits

in the natural or [physical] world, because what ever is happening in the natural [world], you can guarantee it is happening spiritually. So if you want to affect something you have to go and do the karakia, like for me what I reckon is that if you want to manipulate that plant then you go to the spirit realm and manipulate the plant in the spirit realm first and set that up before you do it in the natural realm.

On the finished product, they [the tōhunga] would [always] do a karakia to give it whatever mana it needed and then they would perform whatever ritual needed to the atua to allow that atua's hau to come and dwell in it. The same with the past. You see Rata, that was one of the things he didn't [do], [he didn't do the right] karakia to ask the tree for the right to cut the tree, so he cut it and the next day he came back, the tree was back up again, so he did it again and he kept doing it until he realised that he hadn't been doing the right incantations.

Karakia and the Management of Transfer

As already noted, ideas about the transfer of genetic material and the creation of a GMO were often discussed in reference to the parallel case of organ transplant (parallel in the sense that it offered a viable analogy in an area of medical intervention more familiar to most speakers than GMOs). As transgenic GMOs involve the laboratory-based passage of genes between different species, genera, or even kingdoms to create a genetically modified organism, they are fundamentally about transfer. Molecular biologists no doubt conceive of the transfer of genetic material as the act of inserting the genetic material from one organism into the DNA of another. But for some of those Māori with whom we consulted, it is essential that these 'material' transfers must be carefully managed spiritually. Such 'management' is sought through *karakia*'s capacity to appoint powerful spiritual forces that traditionally for Māori include the *mauri/hau/wairua* complex — a complex that determines the shape, identity, purpose, and vitality of a thing including whether or not it will become a powerfully negative or positive force.

Karakia in the context of “transference” was explained by participants as serving six principal ends: (1) to consult with the spirit realm about the appropriateness of a particular GM application; (2) to ensure the compatibility of donor and recipient organism; (3) to free the transferred material from incumbrances in the form of countervailing (benevolent or malevolent) forces; (4) to ensure the wellbeing of the new organism (due in part to assignation of a new mauri); (5) to satisfy the spirit realm; (6) to ensure the properties of the organism will do the work/fulfill the purpose they are meant to do.⁵⁴ Quotes to illustrate each of these points follow:

Ensuring Compatibility

Interviewer: What if you required a kidney transplant? What happens there with the mauri?

Participant: There has to be a karakia.

⁵⁴ We do not mean to assert that these are the only ends it serves, but rather those mentioned by consultants.

Interviewer: For what purpose? What is that karakia going to do? What is the intention?

Participant: To ensure that the operation goes well, the recipient or the donor becomes compatible in mind, as well as [in] the organs.

Consultation With Spirit Realm (on the Subject of GM)

All I am saying is that I would get all the papers on this idea. Then I am going to pray now to my god and that god will tell me whether this is good for my people and how to maintain it and if that was me, that's what I would do. And if I saw a big No, then I would have to have faith to believe that it was the right decision I would have to make, but then the process for me, if someone came and consulted me about it, that's what I would do and then I would have to give it to the people — they're the ones who make the final decision in the end, and say well look guys, this is what I've seen, this is what the spirit realms tells me, it is really you people who have to make the decision, but I am saying no. In actual fact, I will just pray some more and find out what you should do — okay, so if you are not going to do this then god will give you something else to replace it and it would be a 100 times better. But the problem is to me, is that half of those fellas is they're all in it for the money anywhere. They are not going to actually listen to me because spirit things don't really matter to them.

To Free Transferred Material From Encumbrances

The whakanoa process is to free whatever it is from any restrictions . . . restrictions like tapu or things that have been causing problems. The whakanoa process would be to do karakia, to eradicate it, get rid of it. There are two things that happen with noa and kau. Noa frees you from spiritual and mental encumbrances and kau frees you from physical encumbrances.

To Ensure the Survival of the New Organism via Assignment of Mauri

Interviewer: You were [talking] about a mauri. Does the mauri get transferred to the new thing —or is it only the wairua of it? [Participant agrees]Therefore, for it to survive in any way you would have to give it a new mauri ?

Participant: You have to give [it] a new mauri.

Interviewer: And is that through karakia?

Participant: Through karakia.

Interviewer: Therefore this one isn't affected — the original one, because that... the mauri, does not get transferred.

Participant: The wairua gets transferred — not the mauri.

Note that, symptomatic of the fluidity of these concepts in contemporary discourse, the *wairua* is given by this discussant a transformative role in relation to the mauri.

I think the *karakia* is very important to satisfy the ears that hear the process. That is really what *karakia* is about. If I was to stand up and say *karakia* — if I wanted an issue put across, I will stand up and make sure that I delivered that in a time of prayer, so the ears of the people who are against my issue will [not] start some thing. (They will say] ...now what? We will have to agree — he has gone and told God about it.

So the *karakia*, in the process of the transformation of genes is very important to the ears that drive the hands to do the process. It is only making sure that they are of one mind from the start to the end. And at the end of the process, to give it back in that same order of prayer to make sure that nobody goes away saying other things than what they have worked on. One mind at the beginning, and they should be still one mind at the end — and they should still be one mind when they leave. So no one becomes selfish and that is what the importance of *karakia* is. The *karakia* first is to get all the ears to focus in, honing in on the one *kaupapa*, and the next drive is to have set them all in place. Now its their individual *wairua* towards the *kaupapa* that drives it.

To Ensure the Properties of an Organism Will Do the Work Intended

I think that is a purpose when we talked about *karakia* and some of the essence, the depth of all of our stuff comes to those two terms, the *karakia* and the pure. It's the incantations because a lot of the stuff they are using [for] medicinal purposes (what ___ was saying) [is] that people grab the plants and extract from [them] its properties. But to make it work, [you] need the prayers and the incantations. It's the prayers that really gives the properties of that plant the power to be able to work and I think that is one of the things that we have to be mindful of when dealing with the trans[genetic] crossing of species.

Maintaining Cultural Integrity

Karakia are seen as essential elements in a very serious process, one which is essential to ensure the possibility of success and safety in such matters as genetic modification, but with the success and safety dependent on the *mana* and disposition of those involved

Two final points are relevant to this discussion of *karakia*. The first is that we cannot overstate the urgent request of participants that *karakia* not be treated superficially. The above passages explore the central importance granted *karakia*. But equally strongly participants rejected any suggestion that concerns about the transfer of genetic material can be superficially managed by way of *karakia*. It is therefore necessary for those engaged in GM or its regulation to avoid any impulse to trivialize ritual practices, including any attempt at some form of token inclusion in the process. This would be a deeply disrespectful interpretation of *karakia* and would likely only serve to undermine the legacy of tradition, skill, knowledge, and rightful *mana* with which the practice and practitioners of *karakia* are endowed. As one of our informants puts it:

Talking about *karakia* — you can't just do a *karakia* and it will fix it (a malevolent GMO). [The point is:] Who is doing the *karakia*, and the motive [they have] in mind. You might have people who say “lets just do a *karakia* so that we can just add these two plants and get a benefit because I am going to get paid for it, so I will just do a *karakia*.”

Thus the performance of *karakia* is not to be seen as a panacea or guarantee of safety in an otherwise uncertain world. This point is succinctly made below:

I can do a *karakia* with all the powers and all those things invested in what you do to try and make it safe, but there is no guarantee. There is no guarantee because the powers that may resist that thing may be too strong — stronger than me. The same thing with genetic engineering — there are some things that you may be able to change but in that change you create all [kind of] other problems. The same with some of the *karakia*, some people say ‘okay lets do a *karakia*’ but sometimes some *karakia* invite the other spirits. I might be saying ‘okay lets have a prayer here to make sure that we are safe and I will do this prayer’ taking into account that there are other spirits sitting in this room that don't agree with it and say no, we don't really want that to happen, we will allow it for three, but for the fourth one we don't want it to happen — I don't know that.

7. Principles Relevant to Māori Decision-Making Processes

We have already seen, in the discussion of the principles of *kimihia te mātauranga* and *kia tūpato* (Chapter 5), that a creative tension exists among norms and values when these encounter new and complex issues such as the genetic modification of organisms.

This section of the report outlines norms and institutions centred around Māori decision making processes and the resolution of such conflicts. Māori decision making, a concept that is as broad as it is deep, touches upon principles fundamental to Māori self-determination including autonomy, democracy, and governance. The legal or regulatory basis for Māori participation in decision making was covered in relation to genetic modification of organisms in Chapter 1. Here we address participants' thinking about decision making as it concerns how decisions about GMOs are made, and also about what constitutes a culturally legitimate and defensible decision framework.

Most thinking about decision making fell into **five categories** including (1) ideas about the appropriate locus of decision authority, (2) the relevance of the debate to Treaty principles, (3) the validity or quality of information available on GMO research, (4) judgments about the purpose and the recipient of benefits of different GMO applications, and, prominently and (5) considerations of *tikanga*, *kaupapa*, and *karakia*. The last three institutions are discussed in the preceding chapter in relation to the process of modification itself and the capacity to mitigate its effects).

Tino Rangatiratanga and Te Tiriti o Waitangi

Within the GM debate, the principle of *tino rangatiratanga* is closely related to the principle of partnership implicit in *Te Tiriti o Waitangi* as both evoke participation and control in decision-making processes. *Tino rangatiratanga* as absolute power and authority refers to the person or group who has the power to act with ultimate authority when necessary. These two principles diverge, however, in that the partnership conceived of in *Te Tiriti o Waitangi* and in the English version applies primarily to New Zealand's formal political and legal institutions and structures while the *tino rangatiratanga* principle operates in the broader and deeper sphere of group and individual human rights. This distinction can be difficult, and in some cases impossible (and inadvisable) to draw since there is a significant area of intersection between the two principles. This section will therefore discuss the partnership of *Te Tiriti o Waitangi* and *tino rangatiratanga* principles both in connection with and in isolation from one another.

The interrelatedness of the two principles is particularly apparent in discussions about control of *taonga*. Many participants expressed concern that without adequate legislative protection foreign biotech companies might gain control over resources native to New

Zealand or genetic derivatives thereof. This view is predicated on the notion that Article 2 of the Treaty guarantees to Māori control, or *rangatiratanga*, over valued *taonga*, habitats or resources. For example, the following extracts, the second of which explicitly connects the principles under discussion, demonstrates the view that in the context of GM, *tino rangatiratanga* is (at least in part) about the control of resources:

As far as I would like to make a comment on tino rangatiratanga ... I don't know much about economics and intellectual property but I believe that Māori should maintain and keep total ownership of flora and fauna.

The warning all the time is, you have to make it on the basis of Treaty - tino rangatiratanga — to protect the taonga.

This view was held by multiple study participants; each suggested that Māori ought to possess a right to veto GM applications, particularly those concerning *taonga*, though how such a right might actually be exercised was not discussed in any depth. The following quotations demonstrate thinking on this point. The first advances possible grounds for the veto of decisions and the second discusses the 'right of veto' in more institutional terms:

Participant: The power to veto should be able to be made purely on cultural grounds. They have to be, I think, to appease let's say the general public. They have to be seen to be sound cultural grounds so that perhaps puts the onus on us as Māoris [sic] to say okay we don't like this, why don't we like this and let's find ways of letting other people know that. This is why we don't like this.

Interviewer: Do you think you have to substantiate the grounds on which you make a veto, [that] it's not just enough to say "we don't like this?"

Participant: Yeah, we should, but ... you shouldn't have to defend much but just be able to say [for example] "we don't like, we don't want you to put mussel genes into the toheroa because it reduces the mauri of it" and that should be [it]

It's more than right of veto, because right of veto is kind of reactive. It's proactive control, it's kind of determining the agenda, about what's going to happen, and having the resources to [carry] that agenda [forward], rather than having a veto, and responding to someone else's agenda. So it's control and the resources to make that control effective.

The *tino rangatiratanga* principle was also raised in discussions of the right of individuals to make decisions. In the next quotation, for example, one person talks about *tino rangatiratanga* as the right to pursue particular avenues of medical treatment:

... we only need to look at Seventh Day Adventist's use of blood transfusion. The likes of the Hollaway case, of parents having the right [to decide] on cancer therapies, and realise that if we are going to be true to our own tino rangatiratanga if you like, it also needs to support others and the rights for them to make decisions.

Following this argument, *tino rangatiratanga* can be as much about the right to choose to accept GM technology as to reject it. Exercising one's individual *tino rangatiratanga* is discussed in the following quotation but Article III of the Treaty/*Te Tiriti* is invoked as the overt grounds to choose GM based medical treatments

I've discussed this on maraes and the Hepatitis Foundation has discussed this all up and down the country and the bulk of Māori support it. So ... I think that the key view is that ... Article III ... says that the Māori should have access to the rights of ordinary New Zealanders, [and] if ordinary New Zealanders are going to have access to this then so should Māori which I think is logical ... Mine are fairly pragmatic [opinions] which are ... based I think on the Treaty, in particular Article 3 and the view that Māori are citizens of New Zealand and so therefore have the rights etc and should be treated as any other New Zealand citizen so these are standard methods of medical diagnosis and therapy and they should be available to Māori. Most Māori I know that I've talked to about this agree with that, but that is from a medical perspective. Most Māori doctors that I've talked to agree on that one too.

From the above quotes it seems that the *tino rangatiratanga* principle is interpreted and applied by participants at two decision making levels: at the collective level (as "Māori" or *iwi*, or *hapū*) where partnership rights in decision making are conferred by way of Article II; and at the individual level, where the freedom to choose is conferred by way of Article III.

More broadly, the rights of individuals to choose was frequently invoked throughout this study and it finds its political expression in participants' frequent invocation of their Article III rights. This principle of Article III rights – equal protection under the law - is one that has an important bearing on the decision making processes discussed below.

Te Tiriti o Waitangi

This principle of partnership was clearly articulated in the widely held view that Māori should be involved at all levels of official decision-making processes surrounding applications to GM research:

I actually have had a look at [the] HSNO [Act] and I was a little bit concerned that there was the opportunity to make the decision about whether or not Māori should be consulted. And who's making that decision, and what are the grounds for making that decision? And sure, part of it was like why aren't you consulting about everything? And it's not necessarily up to [the government] to say no, this isn't of much importance to Māori. So that is the first thing and I think probably the Treaty Act gives us the right to be involved absolutely all along the way.

As the following quotations demonstrate, however, others expressed doubts about the government's ability to deal with Māori concerns, despite the provisions of the HSNO Act:

Interviewer 1: Part of the HSNO Act is rooted ... in the idea that GMOs could introduce something like cultural stress. ... I'm curious as to what you think about the idea of trying to avoid [that] ... What does it mean to create a species that introduces ... something like a cultural stress for Māori? Wouldn't you agree that that's part of the intention of the Act in the way that it's written?

Interviewer 2: Well, if one takes it at face value, I guess Sections 6(d) and 8 are based on the notion that we recognise that Māori have a right to have a special interest in this legislation

Interviewer 1: And a right to be protected from detrimental effects in the cultural sense of the word?

Participant: Yes, I mean, in that sense it's welcome if it has that outcome... recognition of the paired nature of the two strands of interest in the Treaty and the attempt to secure a partnership. I have great difficulty answering that, and nothing to do with the way you put it, but it's just that I've attempted to work within government and I know what happens. I know that it's, again it's obfuscation. It's obfuscation by a fine word and fine definitions. But really the root cause of those problems are not addressed.

Why? Because that Act says you take into account, they have been taking into account what Māori have been saying for over a hundred and ninety odd years but they are still carrying on what they are doing, so, you know it, and those are the real concerns for Māori and that is one of our biggest impediments, just the actual legislation. How we can address that is by constitutional changes.

A final interesting invocation of the tino rangatiratanga principle is demonstrated in the next extract, in which the interviewee laments how the legal processes surrounding GM technologies are forcing new, and somewhat uncomfortable interpretations of what tino rangatiratanga means and where it applies.

And these are our kin we're talking about. You ask me, do I own my mother? I'd say heck no and I would never speak of it that way. And yet here we are going around saying I own this, I own that, I own that, I own that. When we go to the Māori Land Court, or any Court, it's like "Yeah, I own this land". It's rubbish. Māori have never owned it. How can you own your father or your brother, and yet this is the track that this GMO technology is taking us down

Individual and Collective Choice

Opinions regarding principles of consent and/or achieving consent for specific GMO applications varied. Many participants including those who espoused the right of individuals to choose (often referred to as Article III rights) acknowledged (although not necessarily agreed with) the fact that consultation with Māori under the HSNO Act is interpreted as involving consultation with groups rather than individuals, thereby providing representative legitimacy. This situation enables the Article II rights of hapū and iwi to predominate, but does not totally negate individual rights. In those applications

(admittedly a minority) to genetically modify an organism which are publicly notified, individuals have the right to make a submission and be heard in support of that submission.

Turning to collective rights, the necessity of a ‘deliberative democracy’ model when making decisions about GMOs was widely supported in interviews and focus groups. This model holds that decisions should be achieved not via the aggregate vote of a collection of individuals but through a process of civic engagement wherein people come together to learn, deliberate, and debate the means for achieving a common good. Citizens engage in deliberation not so that each can determine or refine one’s individual interests, but, rather, to articulate a collective intent that may or may not embody individual preferences. In the words of a Māori resource manager:

I don’t think it’s actually good to ask individuals. I think it’s really good to get a group together of, say, kaumatua, who have some kind of understanding. Give them as much information [as possible] in a way that they understand it, and then just debate it through and actually come up with either a “no” [or a “yes”] but an informed [no] or [yes].

Most readily invoked the necessity of this or like forms of Māori participation in the debate and in so doing endorsed some form of inclusive discussion, although ideas about the particular shape that such practices should take were as yet largely ill-formed.

One of the things that we have to get our heads around, is how far and how broad an inclusive process should be. The value of inclusion is very important to Māori and sharing those things [about if, when, and under what conditions GMOs are acceptable] are very important.

Despite widespread support for principles of open debate and inclusivity, there existed considerable ambivalence about (a) consent defined by majority opinion, (b) the appropriate balance between traditional and nontraditional decision processes, (c) the historical legitimacy of consensual versus authoritarian decision making, and (d) the appropriate balance between hapū- or iwi-level decision-making rights (or *tino rangatiratanga*) versus the authority of decision making at the supra-iwi or nation-state level (e.g. by Trust Boards or Rūnanga).

The spectrum of opinion included those who assigned decision authority to a paramount chief, to individual hapū or iwi though to those who believed that even minority voices must be adhered to, and/or who assigned decision making authority to a knowledgeable body comprising relevant cultural and technical expertise. Something akin to the last mentioned group exists in the form of Ngā Kaihautū Tikanga Taiao (NKTT) a statutory committee appointed under the HSNO Act to advise the ERMA on matters pertaining to Sections 6 (d) and 8. However, members of this group are not appointed as representatives of iwi nor mandated to act on their behalf; moreover their role is advisory

only. Hence the extent to which their advice is taken into account by the Authority is questionable.⁵⁵

The following quote illustrates the position that a centralized knowledgeable authority represents a Māori approach to decision consultation:

Well if you wanted to do it from a Māori perspective I think you'd have a group of people who were informed about medical and technical aspects of it and that that group of consultants should be informed by kaumatua and others who are aware of things like tikanga

The Will of the Majority or Guided Democracy?

Alternatively, a select few but vocal participants spoke to the likelihood of minority opinion failing to achieve appropriate representation in the face of conventional approaches to democracy wherein decisions are contingent on majority opinion. They also feared a 'tyranny of the majority' in reference to the perception that Pākehā were predominantly "pro-GE" and Māori predominantly "anti-GE" and thus the former were likely to overwhelm the wishes of the latter.

If there is consensus and everybody comes out and says yes to something and the "no's" have decided to go along with it, then that's acceptable. But if there are still people saying no, then the majority opinion doesn't work because those who say no have the right to take alternative action.

The problem we face all the time, being a minority, is the power of the Pākehā. That's their majority . . . they use the majority to justify. Māori do not work that way traditionally or culturally. For example, it took my tribe 20 years to get consensus to take and use our old lands. [It] took years of arguing until they all said yes, but they added a rider. Not more than 10% of our land. It's not realistic but that was the consensus. And my job is to carefully measure that we are not using up more than 10%. Otherwise I have to go [back to the group]. If it takes 21 years, that's what it takes.

Others contested as naïve the idea that consensual decision making was inherently 'traditional' and instead argued that, traditionally, decisions would have rested in the hands of the paramount chiefs and/or that modification itself would have been guided by a *tohunga* who then bore some responsibility for the outcome. The following two dialogues reflect this position; each took place during two mutually independent small-group interviews.

⁵⁵ NKTT is not meant to be formally 'representative'; rather it is an effort to ensure that the views of Māori competent in the domains of culture and science are heard at the decision making level.

Dialogue 1

Interviewer: But before that, lets go back to the subject of genetic modification.... How would the paramount chiefs [have managed these questions] ?

Participant 1: I think it is a fantasy. People tend to think that Māori had democracy, they didn't have democracy, they allowed people to speak [but] at the end of it, the rangatira got up and said I heard everybody and this is how we are going to do it. It is purely subjected to the rangatira. He said, I've heard your point, I've heard your point, and after considering it, this is how I will do it. But after having said that, he had to live and die by it because he made a judgement, a decision on it and that is how it went. You have a big rūnanga and each chief would get up, one after another, it probably would go for three days and at the end of it the ariki would get up and say I have heard it all. They would have considered it carefully and said this is how we will operate it.

Participant 2: Today is different because not everyone recognises that person's authority . . . but if I went back to that time that is what they [did] — ask everyone, hear their point and I reckon if he wasn't a tohunga himself, he would also consult the tohunga who would also listen, give him a bit of advice and go and do his karakia [to ensure or enhance the possibility of a positive outcome].⁵⁶

Dialogue 2

Participant 1: I was going to ask about a democratic process, like [name deleted], he is paramount chief at [iwi name deleted] — he has listened to all parties and he has made a decision — our people are going to do this, right or wrong. As a paramount chief he makes the decision and if people say they are going to live in a Māori world view, then really that shouldn't be discussed with all. The chief has his advisors and then he makes the final decision on the basis of the whole people — right or wrong, and he will live or die with that decision, but that is not the process that happens now. It is like every man and his dog is a chief and jumps in and have their say. So it is quite hard to . . .

Participant 2: So maybe you need a tama kaimoana process. A tama kaimoana process is kill first and have a look who it is after. For the simple reason, if we are talking about genes, if we went ahead and did it, and it was a success then talk about the success, but if it went wrong — nobody knows about it anyhow, so that is kei te pai. He is right, we had to. . . right or wrong. He was to make the decision even if we knew it was not going to work, but we still had to do it because he was the chief.

Conditions for Productive Consultation

A recognized scholar of Māori tradition consulted during this project made the point that successful discussion on matters of importance required that meetings be held on marae

⁵⁶ A discussion of karakia has been given in Chapter 6.

and that everyone unanimously agree not on the outcome, but on the topic or purpose of the meeting (the *kaupapa*). Further, in the absence of that unanimity, he suggested that movement toward decisions would not be likely to occur.

In the past at meetings held in marae, there was never a voting system. [But] there was always unanimous agreement on whatever the subject was. Otherwise the mauri of the kaupapa cannot move. Mauri does not only belong to human beings [or] whatever, it also belongs to the kaupapa. For instance, the kaupapa for this [meeting] is about genes. Now if we start talking about other things other than genes, then they would say, ‘hoki mai ki te mauri o te kaupapa.’ [Problems set in] if you start to drift off. So the mauri really identified what the subject of concern is.

The frequency of marae-based opportunities for deliberation on central political and social issues was consistent with the equally strong support for vesting decision authority in individual hapū or iwi. Similarly, most resisted strongly the suggestion that any one iwi impose its decision on another. At stake in the upholding of iwi decision sovereignty was both the *mana* of individual iwi and the belief that decisions were traditionally made, and should heretofore remain at this level of social organisation.

In getting our people together, uniting them for issues like water that need to be looked at, [we are careful] not to take away the mana from each tribal area, but to come together to support each other. A confederation of tribes is something that they had in place before colonialists came and the mana went back to the hapū and it was the hapū that spoke. You see, what happened is when we were colonised they started to choose certain kings and queens which is foreign to us because each area has their own chief. The people from each hapū, tribal areas, Ngāti so and so, Ngāti so and so, would meet and they would discuss an issue and it’s not an issue that we take lightly because it’s the word of each chief of each hapū. [But now] we are fighting against a system foreign to us which is policies of the government; we’re trying to make them see that these were the things that have broken down. Like the courts — we have already moved to set up our own system for the courts so that we can hold our own courts and that’s done on a marae.

Multiple critical comments were made about the current ‘urgency’ for insight from people across Māori society on the subject of GMOs; these thoughts tended to be coupled with ideas about the appropriate venue and process for consultation. Salient among these concerns were the need (noted above) to consult on the marae; the need to create opportunities for uninhibited (and often private) collective deliberation; and the need to provide education support as necessary. Under the “principle of reasonable cooperation” as defined by the Government in 1989 in its statement on principles for Crown action in relation to the Treaty⁵⁷, it would seem that any consultation between Māori and Crown agencies on GMO issues should address these procedural matters if its outcome is to be accepted as legitimate by all parties. The following three quotes articulate these concerns:

⁵⁷ Department of Justice (NZ) 1989

Instead of being told what's happening and [told] 'you have to make a decision now,' here's what we want to do. Come out to the marae; say: 'this is what's going on' [and then], come back in two weeks after [we've] had a good chance to mull it over and then have a good chat amongst ourselves. We'll come back to you with the decision but we don't want to be pressed into doing it on the spot. We want to have the time to think about it and the opportunity to say "could you come back and explain [this] to us — [provide] a bit more of an education [on] points [in need of clarification]"

Western business is driven by deadlines and the need to progress and make decision by certain times. Whereas Māori thought is not driven by any sort of time deadlines which can be very frustrating and sometimes unrealistic, but their focus is entirely on the process — doing it right.

The timeframe. This always concerns us. With this kind of initiative, all of a sudden you have a timeframe that really doesn't fit in with the timeframe that Māori need to be able to get information. That's the main thrust of our submission — until we find out and have the time to find that out, we're [going to resist these new technologies]

Claims as to the importance of time, deliberative opportunity, and the iterative evolution of discussion and education underscore the point about the 'importance of process.' The ubiquitous call for 'good process' while rooted in traditional concepts of *tikanga* (discussed in chapter 6), appears also to be fuelled by the newness of the technology and potential implications of GMOs. That is, the very concept of cross-species transfers was largely unfamiliar and unexamined and as such previous models of thought and principle could not be applied easily.

This [whole topic] has issues in it which are not easy because to my knowledge there aren't any models to deal with it. That's where you'd need to have a group of kaumatua, in a wider sense, wise people — they might be old, they might be young, a mixture — to talk through these issues because I don't know how [to do so].

Moreover, for this speaker (a medical doctor) and many others, the decision outcome (e.g., the decision to proceed with modified pine trees or the production of pharmaceuticals) was peripheral to the decision process itself.

It's like lots of things in Māoridom. The results of your decisions are almost secondary. It's the process that's more important. And if the process is done well then the decisions will come. Whereas Western thought concentrates more on the decisions, getting the decisions right, and the process is second. Māori would say, "well, we have to spend time talking about this" and maybe it would take 12 months and be frustrating and would drive everyone crazy but the process would be right and the right decision would come. Everyone would have a stake in it, and everyone would buy in even if they didn't agree with it, they'd buy in. Even if you don't necessarily agree with the outcome, you go along with it.

Thus far, our findings indicate that widespread support exists for the importance of 'good' process. Opinion however, remains diverse on the subject of how and to whom

decision authority should be assigned and the appropriateness of deliberative-democratic versus majority-rules or expert-driven models of governance. Four final clusters of ideas tended to dominate thoughts on decision making. The first three sets of ideas include discussion of the *tikanga* (right process), *kaupapa* (purpose and benefit) and *karakia* (prayer and practice concerning the control and mitigation of the effects of transferring genetic material from one organisms to another). The fourth cluster of ideas addresses the importance of context and scale when applying a decision framework, and the thresholds or limits to GM applications, beyond which study participants were uncomfortable in proceeding.

Kaupapa — From Intent to Ethics to Rules for Operation

In virtually all interviews and focus groups, the importance of ‘*kaupapa*’ was invoked as central to the acceptability (or not) of GM technologies. This point cannot be stressed enough as the vast majority of those interviewed tended, first and foremost, to situate their decision or responses in reference to *kaupapa*. *Kaupapa* – an agreed on agenda and conception of the matter to be resolved, remained the initiating point for all other dimensions of the decision problem (e.g., the possibility of alternative debates about physical risks, etc.)

Across multiple interviews and focus groups, *kaupapa* was used most frequently in the sense of ‘purpose,’ or more specifically, to denote the reason for the proposed GM activity, including its purported benefit (often in reference to ‘who’ would benefit from the outcome modification). Less frequently, *kaupapa* signified ‘will’ ‘intent’ or ‘motive.’ These responses typically emerged when participants were asked about the possibility of a particular GM application — such as modifying pine trees to become self-pruning. In ‘think aloud’ responses, most would begin their deliberations with a clear reference to the *kaupapa* indicating this principle is paramount in deliberations about the acceptability of GMOs.⁵⁸

Consider first the following examples of *kaupapa* defined as purpose or benefit. Each of the following sets of ideas place the question ‘why’ or ‘to what end’ at the center of the decision process.

[in reference to insulin production] I’d like to know that there is a good reason for doing it this way rather than [production of] the drugs some other way.

[in reference to using GM to restore toheroa populations] I think it’s [about] the integrity of the reason we want it [the toheroa] back . . .

[In reference to an hypothetical discussion about restoring kauri forests through the insertion of a ‘growth promoter’ gene] Well, my first question is why would you want to do it? Do you really want faster-growing kauri?

⁵⁸ As noted below, most people expressed some limits or boundaries as to the acceptability of GM technology, while a minority purported that all decisions were context dependent and that no definitive limits could be reasonably drawn.

It does have a lot to do with the intended purpose. The purpose is important

There is a purpose in all things, so the purpose of this is a reason, and that must not be overburied, it has to be focused [upon] right up front. What is the purpose? And there could be lots, . . . to give motive to extend life, or . . .

The first question for me will be what for? What for and then who for and then what if? I guess the ‘What for?’ for me would be if it is to better the standard of where that standard is now and if it means progress, then who for? Who is to benefit out of the progress? Whether it be because it would be a benefit to the old, if it is going to better the old . . . so there would need to be a benefit, and if others could use that benefit, who is it for?

If there are any benefits . . . declare what they are and let’s see what else you can and must [do] before we give you the stamp to go forward with it. We want to be parties to the benefits of it, that’s fair enough.

Is it going to have benefits? Do I think it’s going to have benefits? [Interviewer asks: Does it matter who benefits?] I think that I would be more protective around Māori.

Notably, applications regarded as frivolous or unworthy were typically those aimed at personal benefits.

There is a difference between sustaining life or improving life. But if some rich fellow has the dough to play around with, and says ‘what a good blue-eyed baby I was, I want this [in my child],’ they are using scientific tools to produce something that is not for the ill and the sick, but for fun. I do not agree with that

If the purpose is to improve the life of this kid or that person or that old lady, yeah, lets do it. But I think where it starts getting scrappy, is [when] rich people want to have a dog genetically managed (i.e., cloned) so [as to] have another dog like it. At that stage that I am less supportive, where tinkering around is not presumably wellness for human being at all. It’s at that stage [that] I start getting nervous.⁵⁹

Articulations of *kaupapa* as ‘intent’ also signaled the importance of the quality of the rationale underpinning the modification. But ideas about intent suggested, equally, the importance of agency — the will or capacity to act. Intent or motive (and the agency inherent therein) was regarded as an integral property for those proposing the modification in the first place. It is important, however, to not overstate this point; the motives of the human agent were widely regarded as central to decisions about GMOs but not sufficient for ensuring a positive outcome:

I haven’t worked out that for myself yet but I have heart. To me, if I have [made my decision] in the spirit of goodwill and honesty and integrity, the outcomes will be positive. Up to a point, I am quietly persuaded of that.

⁵⁹ This comment was offered in reference to modifying cows to produce a protein that helps fight multiple sclerosis. This same comment appears in Chapter 4 in the context of *aroa ki te tangata*.

[On kaupapa as linked to tikanga] We come together at several times and we work out effective principles of what is right and what is wrong. I think if that can be done here in this case then we are starting to get a protocol happening for future developments and there is a protocol at our marae for visitors to go through. If we can become like the tikanga here then we can negotiate our way down that river to get to our goal. We need to come underneath the umbrella and if you do that and your kaupapa is alright then what you are doing is a reason for that .

There are no absolutes . . . it [intent] does make a difference to me. It does. It's something about intention. There's thought, word, and deed: I think intention is an energy.

I think theologically you have to believe in something that exists which has a mind and purpose and a will and it seems to me that those three things are essential. Those three things are essential to the control of everything that's created and if you don't use that, we're in serious trouble. I think if you don't use your mind, you don't have a purpose, if you don't have a will to either control or not, then you have a problem. If you believe that the gene hasn't got a mind or a purpose or a will then it hasn't got the relationship, it hasn't got the power upon which it can be related to anything

Similar antipathy was expressed toward GM applications in which the purpose was aimed at profit (particularly, corporate profit by international companies) and the satisfaction of individual desires.⁶⁰

First of all what is your kaupapa? Is your kaupapa for the benefit involved with these creatures or is it for money?

These ideas suggest that there are higher-order versus lower order purposes to be considered.

Others, still, spoke of purpose in ethical terms such that some aspects of genetic engineering were posited as transgressing core responsibilities to future generations, to the poor, and to the maintenance of traditional knowledge.

Who benefits economically from this whole process of growing [GM] potatoes [to avoid] soft rot?⁶¹ How does this alter the quality of life of the poor who won't be able to buy those potatoes? These are the ethical questions that arise. And does humanity have the right to alter nature in this fashion whereby we can take something from a frog and put it into a vegetable? Do we see nothing wrong in doing this . . . or are

⁶⁰ Later, in this section, we explore the limits or boundaries people did in fact assign to different GM scenarios in order to elicit the thresholds (e.g., modification of taonga or native species) beyond which people were not willing to go.

⁶¹ These comments were offered in the context of a speculative discussion about a modification based on transferring an anti-fungal gene from frogs into potatoes to avoid soft-rot.

there other considerations that have to be taken into account? Why do we need to grow potatoes at this level in order to be able to mass produce them? Who benefits from this mass production? As a schoolboy [observing commercial agriculture], it used to amaze us that they could plant on a specific day and they could harvest on a specific day. For us, we planted on a specific moon and we harvested on a specific moon whereas these people worked it on the clock. So there was no correlation with the natural. Everything was done to human mechanistic means and those are the prime ethical questions that have to be raised.

Our purpose for being here is not just to look after the here and now, the what's-in-it-for-me kind of thing. To me it's all based on the fact that it is our accountability to the long-term future

People can think about the wonderful intentions they have, the potential to feed the poor and help the sick and the dying but I actually think what's really driving it is commercial patenting, putting patents on these developments and then being selective about who you might give it to. [My] fear is that this is the dominant kaupapa that's driving this. Is it [the purpose] one that has all these wonderful altruistic motives and no sense of personal gain? [If that were the case,] I think people would be more trusting [and willing to] weigh and balance the risks. But that's not the world we live in.

Overall, the urgency and frequency of *kaupapa* references (under which are subsumed ideas about purpose, intent and integrity of reason) emphasizes the fundamental importance of *kaupapa* to the everyday thought processes and higher-order principles through which people approach the question of public acceptability of GMOs.

8. The Response Continuum

Information provided by interviews conducted as part of this aspect of our research has identified a number of key cultural values and concerns regarding genetically modified organisms. Phase II of this project (a national survey of Māori opinion on the risks posed by GMOs) sought to reveal the distinctions people make across a variety of different GMO applications between acceptable and unacceptable categories of modification. Nonetheless it is possible from this first phase of work to discern a great deal about the range of distinctions and reasons underpinning participants' responses to GMOs. One end point of this continuum is marked by strong anti-GE opinion, with active support at the other. Before embarking on a more detailed examination, a few broad generalizations can be drawn.

First, we find that while GMOs are enormously controversial and inspire considerable dis-ease, it cannot be said that the broad diversity of perspectives across Māori society are in the vast majority anti-GE in an absolute or unqualified sense. They are, however, profoundly cautious, and deeply resistant to an ill-considered headlong endorsement of GMOs. In addition virtually all participants struggled to make sense of the meaning of genetically modified organisms and how to situate them in regard to (a) traditional concepts of relationships in the human and nonhuman world, (b) a complex matrix of spiritual and ethical concerns, and (c) the purpose and identity of these products alongside their uncertain safety. That is, virtually all participants voiced multiple concerns about GMOs including a reluctance to proceed with any blanket endorsement of this technology. For this reason there was strong support for the *kia tūpato* or precautionary principle until time and more understanding might enable other options to be explored.

While able to express some of their concerns in cultural terms (as illustrated in Chapters 3-7) many participants also gave equal importance to fears about scientific uncertainties and long-term effects.

To be precise: of the 90 people consulted across interviews and focus groups, fewer than 15 represented themselves as overwhelmingly and unequivocally anti-GM. More typically, participants were uncertain and ambivalent about GM products and/or they tended to react negatively to specific applications but not necessarily to the practice as a whole. For instance, it was common for someone to represent him/herself as against placing anti-freeze genes from Antarctic flounder into strawberries to create a frost-resistant berry (of dubious economic benefit) but supportive of manufacturing insulin by inserting a human gene into a bacterial cell (a widespread medical benefit especially for Māori).

Individual choice was an important principle espoused by participants, as covered in the section on decision-making principles.

In addition to the perceived impact of GMO's on key values such as *mauri* and *whakapapa*, participants also identified a number of other issues as important factors influencing their views on the acceptability or not of a particular GMO application. These are: the purpose of the application including who benefits; (medical benefits aimed at saving human lives rated more highly than purely economic and/or food-crop products); the nature of the perceived difference between the donor and recipient organism (conceived variously as the relationship, or compatibility, or taxonomic distance) between the donor and recipient; interference with taonga species (which includes all native flora and fauna), and the location of the research (field trials and releases being of more concern than laboratory based GMO's).

What follows is elaboration of the evident rationale behind those who reject GM outright as well as the explanations and/or conditions offered as to why particular GM technologies are supported.

Human Genes

Few aspects of GM appear to inspire a more profoundly risk-averse response than does the suggestion of using human genes. Participants often either flatly rejected any use of human genes in the production of genetically modified organisms or indicated that it was the use of human genes that inspired the greatest discomfort.

I don't worry about the native tree, I have to say I do worry about the human genes.

Particular abhorrence often accompanied the idea of consuming the byproducts of transferred genetic human material in agricultural and (on occasion) medical products.

For myself personally, I am not happy about it, I am against it really, in having human genes put into animals and vice versa. I am really against it.

It is something I will not accept and I am against it — the genes falsely crossing from animal to human.

I think it makes a whole mockery of a human being — this interaction and interchanging. The greatest thing in the world is our uniqueness, and our European bureaucrats and other so-called specialists and scientists have been tampering for so long and they often wonder why people are going mad and stupid.

The psychological spiritual effect likely to be caused by ingesting this food (referring to the transgenic cattle at Ruakura) is . . . a major area of concern for the well-being of Māori.

The implication of crossing species of plants and/or our genes being shared with animals is totally foreign to those values which identify us as Māori.

Discussions with a number of participants reveal that a motivating factor underpinning this aversion is the notion (here expressed in lay terms) that transgenics somehow includes the transfer of half of all of the properties of the donor and not just a tiny piece

of its genetic material, into the recipient organism. Hence in the minds of some, placing a human gene into a sheep somehow creates a half sheep half human hybrid. Conventional cross-breeding between two distinct species appears to be the basis for this misconception. This is understandable as it is normal human behaviour to apply that which we know something about to that which is less familiar in order to make sense of novel information.

Thinking about GMO's frequently involves the misapplication of partial information into this arena. However, the process amplifies existing intuitive fears about the unknown by appearing to provide factual evidence for one's concerns. Hence in relation to the insertion of a human gene into a sheep or a cow, the ghoulish conclusion is that one will be drinking milk that is half human and half cow. Interestingly this response was not limited to nonscientific participants; of the five medical doctors interviewed, two were generally supportive of most GM applications. However, three were less sanguine about the use, for themselves (not patients) of GM medical products. In the following three examples they regard the use of human bacterial cells in the production of insulin as acceptable but are not comfortable with ingesting 'edible' medicinal products made from a GMO involving a human gene.

See, Māori would view that as ingesting at least part of the animal. You know a lot of people, a lot of lay people would see it that way. I'm not sure I'd want to eat it either

No, I can't, I couldn't eat it. I could take a drug that was manufactured but I don't know that I could eat one. That's too close to cannibalism.

The thought of drinking milk of a cow that has been genetically engineered [to produce proteins in the milk that have pharmaceutical properties] is too repugnant to think about because for me, it is tantamount to cannibalism and the violation of tapu.

The following example is a brief excerpt from a conversation about the use of human genes in the production of insulin. The participant had agreed that the use of human genes in insulin didn't sound 'all that bad' and agreed, equally, that such use has been put to good end. Nonetheless, the use of human genetic material continues to haunt her thinking about GM.

Interviewer: So having explained to you how the insulin was [produced using] a human gene, a human gene grown in a bacteria cell to produce insulin which helps in particular, Māori. . . . what's the difference between that then and [putting a] human gene into those cows [at Ruakura], and then producing [a protein in the cow's milk to combat] multiple sclerosis. . . . How can we say no to that one and yes to the other? What's the difference here?

Participant: Yes. I think if they didn't know before hand, it wouldn't matter. It wouldn't matter.

Interviewer: If they had never known that that a [human] gene was going into a cow?

Participant: If they didn't know where the gene had come from and put into the cow.

Interviewer: Ae. So its still that human being bit though isn't it?

Participant: It is still a human one.

The proposition that use of human genes was also offensive (even degrading) to one's ancestors was also commonly cited as a basis for resistance to the use of human genetic material.

I was talking with my uncle this morning and he agrees when he says that your DNA comes from your tupuna, goes to you into your kids, no one else, so that means no animals allowed, you don't do it . . . and that's what we are all saying, it's a no to those out in the field and in the laboratory. Plants too. I mean, you don't give it to plants. No. Well it's just like um, if they do put your DNA in a plant you will be eating a cabbage and it could be . . . That's how we see it and if they are putting it in cows it could be one of your cuddie bros . . . and it is cannibalism

I am against this stuff, I am not only doing it for myself I am also doing it for the future. . . . I would have to get permission from my ancestors and all that because I believe that for me that each of ourselves, our body selves come from our ancestors . . . that is why I want to protect my genes like a taonga and this is a taonga from our ancestors. I do not want to put my ancestors into a cow or whatever or into a plant because I would support this for the benefit of my children and their children. I guess all they are looking for is cures. There is always an answer for everything but we do not have to turn to [this] to get these answers.

As outlined above, in the minds of many lay persons, both Māori and other New Zealanders there is the notion that creation of a GMO involves more than the transfer of a single gene; but that it involves the mixing of equal portions of both species to create a hybrid organism. For Māori added to that is the culturally embedded preoccupation with *whakapapa* i.e. the belief that genetic material represents one's ancestors both spiritually and materially. For this reason several participants expressed a strong desire to ascertain the history, in particular the source of the genetic material involved in the transfer. When examples of modification — such as the use of human genes in the production of insulin or other pharmaceutical products in cows and sheep — were raised in interviews and focus groups, questions and comments about the gene's origins inevitably followed. Such queries included but were not limited to questions about the identity, ethnicity and corporeal status of the donor.

Where are they getting these human genes, are these people like alive or have they passed on [who are they]?

How would you feel if the organ donated was the only one you could get for your child was from a rapist or mass murderer? Would you still take that?

Do they know that the insulin they're using is from someone else's genes, and if they did would they still be using it?

Where does the gene come from?

Of concern also was whether or not permission was granted for the ‘gifting’ of that gene in the first place.

One question that Māori might have is where does the gene come from? [I would] just be interested, does it come from one person? Did that person give permission?

If it was given freely, if it was given as a gift then I don’t see where that’s eating them. But if it was taken without permission or unwillingly then that would change things again.

Does it [the gene] come from one person? Did that person give permission?

If they were Māori then the gene would need to have been given freely, probably with *karakia*, and you would need to take the product freely with *karakia*. I mean, you would be taking on part of that person. Like a transplant. That would be important. Why would it be different if they were not Māori? Maybe it wouldn’t be. I wonder.

In the following excerpt, the participant indicates that concerns about permission apply to both human genetic material as well as nonhuman. (The quote is taken from a meeting with Māori theologians during which the hypothetical possibility of transferring an anti-fungal gene from a toad (below referred to as a frog) into potatoes to prevent soft rot) was discussed.

The critical point for me, coming into this, [is] whether we seek permission. We no longer go to a live form of that frog, we just go and take it. We no longer go to [it] and say [to] the *mauri* of the frog, can I intervene with you? Can I go into your DNA? May I have permission from your *mauri* to interact with your DNA? You know what I’m saying? And I just wanted to add that as a final comment.

In this next and final excerpt, the interviewer questions the participant more fully on the importance of a gene’s origin, its ‘humanness,’ the significance of permission-granting and, also, the *tapu* quality of human genes. The participant consistently finds difficulty with the use of human genetic material.

Participant: Well, it’s the *tapu* nature of genes from humans is one thing.

Interviewer: But everything is *tapu*.

Participant: Well, yes, but if everything was *tapu* in that sense we wouldn’t eat anything. Because everything has a place in its own *tapu* but, I guess from my perspective as a Māori, human genes have a special *tapu* and that is an issue for me.

The interviewer then summarizes the participant’s position based on points made elsewhere in the interview:

Interviewer: I have wondered [about the specifics of] the problem with human genes. I mean, we need to explore that because ERMA's never fully understood that. So for you, it is where it came from, and then probably did this person give permission in the first place, and if they did the problem would be if it was a close relative, you could be eating one of your own relations. So let's push that further then... so what if it was freely given, and what if it was a Scandinavian woman who had freely given the gene and it's a copy of her gene, and therefore not a close relative at all. Would that make it different?

Participant: No, it would still be, it does make a difference, but it's still an issue, because it's a human gene.

One rationale for the widely held resistance toward the use of human genes can be found in the following quote taken again from our discussion with Māori theologians. In this instance, the group had been debating the claim that [human] genes are *taonga*. The speaker dismisses '*taonga*' as misinterpreted and instead posits that the more significant point is the gene's origins *and* its subsequent trajectory across multiple descendents. Central to his explication is the idea that as the genetic legacy is passed or exchanged from person to person so too is the *tika* (glossed here roughly the appropriate treatment, respect, etcetera) accorded that person. The '*tika*' is said to 'surround the first person' and must be understood equally to 'envelop' the second person/descendent, and so on ad infinitum. Therein, the speaker argues, lies the '*taonga*-ness' of genes. The precise quote is as follows:

I believe what we can contribute to this is the constant reminder of tika — to acknowledge that which exists, to acknowledge that which exists or to acknowledge origins . . . how did they acknowledge it and the whole issue of modification is the acknowledgement of *nô hea*. Because it's no good to me this issue of *taonga* because what may be a part of it is a part of someone else or something else. And that *tikanga* demands respect for who the first person was, and [that respect] transfers over to who the next person is or becomes as a result so that *tikanga* surrounding the first person and which therefore must transfer to envelop the second person as well and everything about the first person, that's where this *taonga* is. Everything about the first person is acknowledged and respected *tahuti ki kau* then there is still that respect.

Knowingly or not, the speaker is touching here on the fundamental importance of the concept of 'gift exchange' in Melanesian and Polynesian societies. A finding long recognized by anthropologists and cultural historians, gift exchange is particularly significant to group formation and the strength of intergroup ties. More recently, however, it has become clear that exchange is not solely about gifting and kinship *per se* but is, following Strathern, Carrier and others, the central dynamic of social life.⁶² This argument has been eloquently applied to property relations so as to explain both how gifting as an expression of exchange, following Mauss' classic work, 'functions' not only to define people and their relation and obligation to one another but also to explain the

⁶² Marilyn Strathern, *Property, Substance and Effect*, 1999; James G. Carrier, "Gifts, commodities and social relations," 1998

identity [and history] of objects.⁶³ In this case, the central object in question is human genetic material. For participants quoted above, genes are not conceived of as simply the sum total of their component chemical parts and thus essentially a ‘neutral’ phenomena. Nor is the gene conceived of as owned by or the possession of the current owner. Following Best, Mauss, and subsequent theories of exchange, the spirit of the exchanged gift is said to be passed with the gift.⁶⁴ If the original owner is not properly recognized and/or repaid accordingly, serious harm might result. More recently, Henare⁶⁵ has argued in a reinterpretation of ‘gifting,’ that it is not just the spirit of the object or gift that must be recognized but the spirit of the original giver. Having reinterpreted the original source of writings on the ‘gift’ (in the form of letters between Tamati Ranapiri and Eldson Best), Henare identifies both the *hau* of the *taonga* and the *hau* of the giver, and the relationships established with the recipient or recipients of the gift as centrally important. The *hau* of the giver is in the gift (*taonga*) together with the gift’s own *hau*. It is the *hau* of the giver, says Henare, that seeks to return to its source and is therefore a cardinal motivation in gift exchange.

The points here about gene transfer as embodying the gifting of a genetic legacy including the vitalizing spirit or *hau* which is said to be imbued in all things and passed from *taonga* or object to object), is not an esoteric or trivial point as concerns contemporary discomfort with GMOs within Māoridom. Rather, it may help explain and contextualize why it is that the exchange or transfer of genetic material, particularly human genetic material between organisms inspires the discomfort it does. Objects are not simply their material properties, rather they are the sum total of **all** the exchanges (and the vital forces affiliated with those exchanges) that have preceded its current status in the world. Carrier’s writing about property relations, puts it thus:

Objects are not considered abstractly as neutral things; neither are they defined solely by the power that their current possessor has over them. . . . Instead, the previous possessor has a claim on the object and its fruits even after it leaves his or her possession, a claim that if denied can result in death. This relationship can be contained in the histories associated with the objects in question. The object is invested with a durable relationship with those who possessed them in the past.⁶⁶

Similarly, the human self, and the genes that constitute that self are conceived of as the sum total genealogically of all that has preceded the self in the contemporary period. [Hence the importance of remembering both one’s ancestral *whakapapa* as well as its cosmological origins, a point elaborated in detail below.] The logic, following Salmond, is that *as* every one person is the sum total of all prior human relations that have produced them and *as* the ‘I’ is never just the individual but the living face of all of those ancestors, any gene originating from one person and transferred to another organism

⁶³ James G. Carrier, “Property and social relations in Melanesian anthropology,” 1991

⁶⁴ Eldson Best, *The Māori*, 1924; Marcel Mauss, *The Gift*, 1950, Sahlins 1972, Raymond Firth, *The Economics of the New Zealand Māori*, 1972; Weiner 1992.

⁶⁵ M. Henare, “Tapu, manu, mauri, hau, wairua,” 2003.

⁶⁶ James G. Carrier, “Property and social relations in Melanesian anthropology,” 1998, p. 87.

contains a part of the history not just of that single individual but of all of their ancestors.⁶⁷

We do not mean to suggest that people explain their discomfort in reference to theories of exchange as a philosopher or anthropologist might. But we do mean to suggest that there is much to be learned here as to why, for many Māori, a human gene is never ‘just’ a gene; why it is that the ‘source’ of that gene is so crucial to GM debates; and why it is that the capacity to trace and locate the origins and passage of transfers implied by transgenic processes are and continue to so very important to the debate.

Food

As with the use of human genes, opposition to GM food products was also particularly strong. Consumption of such foods stimulated strong feelings of repulsion and/or dread particularly if they might contain a human gene. For example participants said

I disagree with the whole idea of supporting what science wants to do to our food chain especially, and to everything else around it.

[In reference to an example of feeding possums carrots genetically modified to suppress the possum’s reproductive capacities —] I think the bigger risk here would be if those carrots and potatoes were grown in New Zealand. Well that’s what it will, it gets into the food. Cross contamination of carrots. I think the thing is going to be grown overseas and then . . . Of course they will fall, they will fall off the truck and get planted, don’t worry about it, probably. Back to the food chain Back to the food chain, so the sanctity of the food chain Yeah the sanctity of the food chain.

I think the only thing when it’s something like relating to kai, anything that has been added on or genetically modified in our food is a no, no. That’s all I am here for because we disagree with the apple and pear being mixed because that its not the same kaupapa you know. An apple belongs to all the apple family and it, even the Wanganui people they are dead set against anything modified or engineered in vegetables and all the kai.

Legislation needs to be introduced effectively banning any GM of food sources and flora and fauna as defined in the Wai 262.

I am against this genetic engineering, especially with food. Food to me, like most people I guess, just doesn’t taste the same. Like potatoes for instance, [most] are quite tasteless. I mean that’s just one vegetable. I am against most of it — genetic engineering

Well I wouldn’t eat a potato if it had toad stuff in it. Because it’s like eating an animal. Its not supposed to be in there.

⁶⁷ Cf. Anne Salmond, “Ruatarā’s Dying,” 2000. Scientists would agree; the individual nucleotides or groups of nucleotides in each gene can in many cases be traced back to ancestral organisms. This is how modern phylogenies are constructed or confirmed.

For some, the resistance to GM food was more ambivalently stated:

Interviewer: So you would be against any genetically modified food.

Participant: I didn't say that, what I said was if I was going to make the choice to eat it I want to know what I'm doing, and I would probably prefer not to actually, unless I was really convinced.

Food and Field Trials

Whilst many accept the necessity of humans to manipulate their environment including for the cultivation of food crops – it remains the case that many also draw the line at field trials and the release GM crops. The underlying premise is that releases in particular (and the field trials that prepare the way for them) represent the single most tangible expression of loss of control over the food chain because of the potential for cross-contamination to occur from GM to non GM crops. Equally there were concerns about impacts on ecosystems from GM crops and the effects this might have on 'natural' evolutionary processes. In this context, ecosystems are generally conceived as vulnerable to GM impacts or put another way, the impacts of GM organisms on ecosystems was almost always perceived of as negative.

In the example cited immediately below, the speaker (a scientist) makes the point that it is not simply a question of being totally 'pro' or totally 'anti' GM but to consider that genetic manipulation may be regarded as a potential key to possible benefits, most notably medical ones. However, his concern is for the longer term risks and potential outcomes, using existing conventional genetic modification of corn and maize as an example.

Insulin is probably a done deal, we are not going to go back on that. . . . but [another] part . . . is whether we have crops growing in the open field. . . . I think in these areas the Commission has real choices about that. You could say for example . . . lets keep on with insulin but we don't want anything growing in the field. That would be a recommendation that we could make and I think would fit in with what you're saying about a kaupapa of management. So its not a kind of all on or all off.

I don't have a problem with playing about with genetics in the first place. Because I mean there are all of those instances that I was describing to begin with that are potentially beneficial and I don't necessarily rule out production of food. The whakapapa of [some] organisms are already quite seriously interfered with, tutued about with over a long period of time. Those organisms are now far from their original lineages. Corn, for example, corn can't keep itself going without our help. Neither can our maize. So working at that level to alter the whakapapa further using genetic methodologies is not a problem to me. It's just that the outcomes in terms of the integrity of agricultural systems, of landscapes, of the kaitiakitanga of landscapes and of kai moana or whatever else [is] problematic. The issue of biosecurity around this is very unclear.

It was also the case that some considered the production and maintenance of foods to be insufficiently regulated and thus doubted the capacity of existing regulatory authorities to ensure the safety of GM foods as compared to the clinical trials and safety regulations surrounding medical products.

I have a real concern when it comes down to the food supply. I think a lot of the people that I hear talking about things actually know diddly squat about nutrition. And they know diddly squat about actual cause and effect and the relationship between what you consume and what happens in an organism. I used to work in the pharmaceutical industry, so I'm used to doing clinical trials and one of the things that interests me is why we in the pharmaceutical industry have to go through these really rigorous processes when we have given somebody a medication, and yet they seem to have bypassed those regulations for food, and I don't understand what the difference is.

Natural v Unnatural

Ubiquitous claims as to the basic 'unnaturalness' of GM products also drove many to reject transgenic modifications. This was particularly although not exclusively the case when study participants were considering the development of food products or the modification of native species. The 'naturalness' distinction holds that acceptable practices are those which seek to mimic nature and/or are nonanthropocentric in origin. Yet the principle is usually ambiguously articulated and when pursued (in discussion between interviewer and participant) to its end point the logic of the argument was frequently lost. What is clear is that notions of 'natural' and 'unnatural' includes some (but not all) forms of technology, in particular novel biotechnologies that have the potential to threaten the existing status of humans (e.g. the cloning of humans) and their existing relationships with other species (e.g. creation of GMO's by overcoming the natural boundaries between species that exists in 'nature'). Maintenance of the existing order and relationships as established in traditional cosmological accounts of the origins of all things seemed to lie behind and motivate the resistance to humans 'tutting' around with genes, and thus usurping the role of atua. Representative examples of this train of thought are offered below.

[Speaking to the possibility of modifying a kauri tree with a pine tree gene to produce a faster growing stock:] I definitely have a different feeling. I wouldn't like to see pine trees used to modify kauri because that pollutes the kauri. It's the notion of polluting or tampering with, well actually contaminating, the gene stock of the kauri [that bothers me]. I think that goes for all native trees actually. Modifying the gene of the kauri in this habitat within New Zealand is a no-go. Natural hybridization is fine.

I think it's just that Māoris [sic] don't like things being tampered with. They just like things to be normal and natural. Just how it comes.

Well I wouldn't eat a potato if it had toad stuff in it. Because it's like eating an animal. Its not supposed to be in there.

Interviewer: What's not natural? Explain to me what you mean by natural?

Participant: Mixing genes together. Yeah, from different species. It wouldn't happen normally, if no one touched it. That's how it's meant to be.

It doesn't follow any law of nature that I know about. That is, it comes back to this thing that you're fiddling with things, there is no way that I can perceive in my head that mother nature will ever do that sort of thing

In the next example, the speaker posits the 'naturalness principle' as basic to the recovery of a threatened species. More poignantly, she wrestles with the possibility of restoring *toheroa* beds via GM technologies and admits to this as a compelling but emotionally dry intellectual argument. Ultimately, however, her heart embraces the naturalness principle which emerges as the higher order guiding ethic in her deliberations.

I agree, I mean the [possibility of] restoration of the *toheroa*, it is great, but the way you're going about it, I have trouble with. My brain's going it sounds all right, [but] my heart's going: no way. You know, I can't explain my heart, but I mean I can explain my head. My head's going great, get some more back, I want a feed. But my heart's saying, can't we do it naturally? Can't we just let the process be, and go with natural selection. Natural - I mean we were the ones that affected the numbers, us as human beings went there [and] pillaged. I disagree with Māori pillaging, because I think we've got our tapu, and our noa, and I think that's why we had sustainable amounts of *toheroa*, when we were here, and no one else. Because we knew how to naturally let it breed, have a feed, only have so much and wait until next season - have another feed etc etc. I think if I go with my heart, just let it be, let it come back naturally, why speed up the process. We've got to pay for it now, so we let it happen - now let our generation pay for it and in twenty-five years time hopefully it's built back up again and that our next generation can have the feed.

For many, the key to the assigned 'artificiality' of GMO's is the necessity of laboratory – based human intervention in the process, and the concomitant fact that such offspring are not the product of natural cross-fertilization.

Genetic modification: I think you have to be able to include the words artificial in it. So, as opposed to simply breeding a faster racehorse by combining this mare and that stallion I think that's different in most people's minds and certainly in the minds of Māori as opposed to doing something in the lab.

This 'natural cross-fertilisation' argument is extended further by some to an attempt to articulate the boundary between acceptable and unacceptable practices in more quantitative terms as has been noted. For example, there is evidence especially from scientifically trained Māori that the 'taxonomic distance' between the donor and the recipient organisms was an influential factor in deciding whether a particular intervention was legitimate. Thus gene transfers between closely related species or genera (e.g. from one tree species to another) were likely to be viewed more favourably than between

organisms belonging to separate kingdoms (e.g. between a plant and an animal). Once again however, this trend was strongly influenced by the purpose of the application.

Participant: You don't get the extent of a trans-genetic jump from natural cross-breeding. You don't get elephants[mating with] tigers

Interviewer: Do you see within species modifications as the same as cross-species interventions?

Participant: I guess within a species is technically possible within nature but between species is definitely an order of magnitude further out from the norm which is not to say that it's bad but it's much more clearly artificial, much more clearly driven by man, driven by technology.

Interviewer: This notion of order of magnitude – can you [elaborate]?

Participant: I still haven't made up my mind about the whole GE debate. Breeding different types of wheat that are resistant to locusts or blight, that seems most intrinsically okay from the man in the street's perspective I think. But taking the genes for some enzyme or characteristic from a bacteria and then putting it into a monkey or something like that... These are two poles, if you like.

[In the next example, the speaker is asked about the acceptability of creating a frost-free strawberry via the transfer of an anti-freeze gene from an Antarctic flounder.]

Participant: A difficult one that. I just have difficulty with that Antarctic flounder and having some transgenic . . .

Interviewer: Why?

Participant: It breaches that . . . Well I'm just using a framework, and across those lines, that goes across the lines from Tangaroa [Atua of the sea] to Tāne [Atua of the forests], so that's an issue.⁶⁸

Situational Acceptability of GMOs

As noted at the beginning of this chapter, just as few study participants offered their unqualified support of GMOs, so too did few reject them outright under virtually all circumstances. Rather, it was indicated in the vast majority of circumstances that a very limited class of GMO procedures was potentially acceptable. Support was most notable when discussing promising important medical benefits, when the production of GMOs was contained to laboratory settings, when a crucial conservation benefit might be provided, and when no other viable option existed for addressing a particularly important

⁶⁸ The participant here evokes a whakapapa-based classification which separates sea creatures (realm of Tangaroa) from those of the land (realm of Tāne). However, she also explained in the interview that her knowledge of scientific classification led her to interpret these realms as 'kingdoms' of genetically distinct organisms.

environmental or health related problem. Combinations of these variables could, equally, confound conditional acceptance. For instance, a GMO promising medical benefit was more likely to be accepted if sufficient consent was achieved from the appropriate parties or if the development of the product could be contained in a laboratory setting. Conversely, while GMO products offering significant conservation benefits were often tentatively supported, clear expression of anxiety accompanied the related (and usually necessary) field introduction of such products.

To end this chapter, we provide a sampler of views expressed on these topics, supplementing those already presented in previous discussions.

Support for Medical Benefits and GMOs

The progression in terms of scientific advance with the aim to improve the life of others who are failing or diseased or whatever - I am for that. I have no worries about being a consenting party to the improvement of a lifestyle of other people, not only my children now -everybody's kids need that right to improve a lifestyle.

I'm just thinking in terms of medicine. I do have this gut reaction to saying no [to modification of kauri trees], but I might not have the same gut reaction to doing some sort of gene therapy to save some sick kid. I would very much say that's a parental decision but if it was my child then I would probably have a lot more difficulty saying no don't touch it than I do have about the kauri tree.

Multiple sclerosis. There would be lots of people of my attitude and hey, if it is going to improve the life of this kid or that person or that old lady, yeah, lets do it.

I think if it benefits someone's health, like helps them recover from illnesses or something, that's good.

Interviewer: You take a human gene that produces a human protein and you put it in another animal so that you can then extract that protein from the milk, purify it and make use of it as treatment for human disease. [Like] multiple sclerosis in the case of the cattle at Ruakura or in the case of the sheep, cystic fibrosis. So what do you think about that? What do you think about those sorts of uses for genetically modified organisms.

Participant: That's fine.

Interviewer: How come?

Participant: Well it doesn't affect the whole population, like the potatoes or the toheroa. It's only for specific people so that's fine. Yeah and if they want to use it then its their choice.

The exchange quoted above provides an excellent example of the tensions potentially inherent in a case-by-case approach. The participant supports a human gene transfer on the basis that it involves only the individual, and there is no possibility of impacting on

others or the environment. At the same time the participant does not approve of clearly analogous procedures affecting everyday life. It underlines the importance of individual choice, as discussed in Chapter 7. The next quotation emphasizes the principles of ‘He tangata.’

My views on genetic engineering - is that like everything else, unfortunately there is good and there is bad. The good side I see as a mother, if my child is really ill - it sounds awful - but if you take the cells of human and put it into a sheep or whatever, but it is going to save my daughter or son's life - I will do it. That is my true judgement and feeling on it. Even though I know it is wrong and tapu and mana and all that, at the end of day that's my child.

Qualified Conditional Support for Conservation Benefits

In the natural process some of these things are getting lost. Take the huia for example, I have not seen one and if we take the weka where I grew up in Gisborne the wekas were all over the road, like the pukekos are here. But if I go back to Gisborne, I don't see a weka at all. And it isn't because Māoris are eating them, you know there is a natural process that is gradually killing them. So, yeah I would prefer a scientific input to save those declining species . where possible, I'm for that. Even the kiwi, you know, some of the species that they had to put on the islands for survival I think we should be trying to ensure their survival rate for our mokopuna.

Personally, I'd say well if it's gonna save the species cause the ultimate we're looking at here is the loss of toheroa altogether in the long run. It's declining too fast, I think the preservation of the species if this were the only way to do it, it would be worth doing it just for that. But then of course there are a lot of implications, things that will come into play after.

On the East Coast where I come from, what they didn't have was a way to stop a thing called black blight – and it wiped out hundreds and hundreds of Māori farmers. Literally wiped them out, sent them to bankruptcy – and that is why we don't grow it at home anymore because there is this fear of this thing called the black blight. Nobody knows how to cure it. If you can find the cure to black blight you would actually be able to get kūmara growing back on the East Coast again. I think if it is for survival of the species - I'm for it.

Situational Acceptability of Laboratory Containment

[Upon comparing GM produced medicinal proteins in cows milk versus insulin for diabetics] They're both medical, they've both been modified, but some people are dying out there of cystic fibrosis and multiple sclerosis, others are dying of insulin, but one GMOs in a test tube, the other GMOs in the paddock.

No, there's ways of doing it where you can slot it in, you can be precise if you want. In the laboratory, although I have treated humans with products thereof so I think those are very low risk options and in fact they are often preferable amongst other

things. You can usually define pretty clearly the purity of the material that you make, so in insulin for example or the Hep B vaccine these are very well characterised.

Now they're looking at stopping trees from breeding. And straight away that rang alarm bells for me because you can't do that in a test tube in the laboratory. You have to be doing that out in the open. And my concern is if you're dealing with native flora and fauna, I'd hate to have our native trees become – what's the word?

Interviewer: Contaminated.

I remembered through many of these discussions [about the safety of GMOs] we kept saying “if only cows were the size of E. coli.” Because the activity was going on in E. coli[a bacterium] all the time, sometimes even at secondary school level people were doing genetic engineer experiments with E. coli but they were invisible and didn't run around paddocks and you couldn't apply those arguments like what if the bull got out. ... Nobody ever said “what if the E. coli got out”. But they do say “what if the bull got out”.

9. Concluding Discussion

Scientific endeavor can be characterised as gradual progress interspersed with revolutions. Many of the more famous examples of scientific revolutions come from the Renaissance, which for this reason is a period often referred to as the “Scientific Revolution.” These include the replacement of Ptolemy’s (2nd century A.D.) geocentric theory of the solar system with the heliocentric theory of Copernicus (1473–1543) and Harvey’s (1578–1657) demonstration of the fallacy of Galen’s (130–200) ideas on blood circulation. A more recent example is Darwin’s (1809–1882) theory that natural selection of inherited rather than of externally acquired characters (as proposed by Lamarck 1744–1829) is the driving force behind evolution. Public engagement in this particular “revolution” in the biological sciences is still evident today — particularly in America — in legislative battles between evolutionists and creationists over which explanatory system should be taught in schools.

Interesting parallels have been drawn by Kuhn⁶⁹ between political and scientific revolutions, and dated though these observations might be, they have relevance today in regard to the current public debate about GMO technology. As this author observes:

Initially it is crisis alone that attenuates the role of political institutions, as we have already seen it attenuate the role of (scientific) paradigms. In increasing numbers individuals become increasingly estranged . . . and behave more and more eccentrically then, as the crisis deepens, many of these individuals commit themselves to some . . . concrete proposal for the reconstruction of society in a new institutional framework. At that point the society is divided into competing camps or parties, the one seeking to defend the old institutional constellation, the others seeking to institute some new one. (p. 93)

Kuhn goes on to point out that:

When paradigms enter, as they must, into a debate about paradigm choice, their role is necessarily circular. Each group uses its own paradigm to argue in that paradigm’s defense.

. . . Yet, whatever its force, the status of the circular argument is only that of persuasion. It cannot be made logical or even probabilistically compelling for those who refuse to step into the circle. The premises and values shared by the two parties are . . . not sufficiently extensive for that.

. . . To discover why this issue of paradigm choice can never be unequivocally settled by logic and experiment alone, we must . . . examine the nature of the differences that

⁶⁹ T.S. Kuhn, *The Structure of Scientific Revolutions*, 1970.

separate the proponents of a traditional paradigm from their revolutionary successors.
(p. 94)

GMOs provide fertile ground for conflict between different paradigms. In New Zealand this has manifested in a “clash of cultures” revealed in the approach taken both as to what constitutes evidence, and the reliability that might be placed upon it. This was brought to a head in relation to the cattle application referred to in the introduction, in which one of the three experiments involved the field testing of cattle containing a human gene, the purpose of which was to produce a protein in their milk that may be of benefit to sufferers from multiple sclerosis. The hapū involved, Ngati Wairere, strongly objected to this experiment on the basis of spiritual values and beliefs (in addition to more tangible concerns such as disposal of the carcasses). In its decision, the Authority made several observations about the nature of the difference between taking into account the relationship of Māori and their culture and traditions as required by S.6(d) of the HSNO Act, and the same requirement under S 6(e) of the Resource Management Act (RMA) 1991. As it points out,

the RMA cases have involved what might be regarded as tangible or physically distinguishable tāonga, whereas in the present instance the Authority is required to assess the weight to be given to tāonga which are spiritual beliefs in themselves, rather than something physically distinct to which spiritual values attach.

They further comment

the Act itself does not provide a sufficient framework within which to address the concerns raised by Ngati Wairere. . . . It is not surprising that Ngati Wairere and the applicant were unable to reconcile the issues involved. They do not lend themselves to point-in-time decision making. . . a broader approach is required to provide the context in which the HSNO Act can operate in dealing with these kinds of issues. . . .
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There is clearly no single “Māori” view as to the merit or morality of genetic modification or its likely effects on the health and wellbeing of people or the environment. However, strong currents of opinion were evident in the views expressed by our discussants and consultants. In so far as a consensus could be discerned, it would be in the direction of the precautionary principle, with a guarded acceptance of GM research and interventions directed at improving human health, coupled with an aversion to GM foods, and an ambivalence about “unnatural” combinations, especially but by no means exclusively those of animal and human genetic material.

No-one should be surprised about confusion or inconsistency in expression of some of the “tradition-based” philosophical objections to genetic modification or acceptance of it on the part of those people we interviewed. Much of the “Māori knowledge” to be brought to bear on these things would, in traditional terms, have in the past been inaccessible to ordinary people, and one of great changes in Māori society is that

⁷⁰ ERMA decision on GMF 98009, 21 July 2000.

everyone is now consciously aware of many of these once esoteric concepts, and is free to articulate them (however confused or erroneous their grasp of the ideas might be by the standards of an 18th Century *amokapua*). Furthermore, the element of wā, the time and space needed to come to a consensual decision, is necessarily truncated and frustrated in any brief, time-constrained encounter.

Indeed these last points were made by Moana Jackson, speaking at the Hastings Regional hui for the the Royal Commission on Genetic Modification in February 2001, in reference to a written submission he had made to the Commission as an Interested Person:

The late Sir James Henare once said having to be reactive all the time is one of the hardest things for our people. It often limits how well we can address an issue because we are always rushing to meet someone else's time frame or someone else's ideas of what is important. Every time we are asked to give a perspective we are already responding to something that has been decided or the main ideas already set in concrete. It is no wonder that we sometimes get confused ... because neither the time nor the issue is our own. GM ... is one such context As a result our people have often been asked questions impossible to answer in timeframes impossible to keep.⁷¹

There is very little confusion or dispute, however, about the applicability of the precautionary principle. The lesson of Pandora's Box, paralleled in Maui's untimely end, has been well learned by Māori. There are tradeoffs in the search for new knowledge, and one should not lightly assume that humanity will ultimately come out on top. Māori on the whole do not idealize and romanticize science – instead, they show a thoroughly scientific scepticism about the claims of the proponents of genetic modification, particularly in relation to food production and other commercial applications.

One very important aspect of Māori thought on issues such as genetic engineering is that people are likely to consider the matter from an organic, substantive, as well as an ethically- or purpose-driven point of view, rather than from a purely pragmatic or positivist viewpoint. Moreover, opinions embedded in a Māori world view have and elsewhere pay great attention to relationships, the whanaungatanga that exists among people, and between people and other phenomena. It will in this sense take into account how the proposed action or process is likely to affect the relational world, now and for generations to come. The phenomenon under review is thus not isolated, seen only in relation to itself, but rather apprehended in terms of its relationship to and likely effects on the fabric of the universe. Which is not to say that people's motives are never mixed, or that material or other inducements may not cause more noble considerations to fade into the background. It does mean, however, that on many issues Māori may be the New Zealanders most likely to take broader and longer term issues into account, and illuminate aspects that others have not thought of or see as important.

⁷¹ Transcript prepared by RCGM secretariat of the proceedings at the Hastings Regional Hui, Omaha Marae, 10 February 2001.

The preceding chapters outline, albeit imperfectly, aspects of the conceptual framework which contemporary members of the Māori community bring to bear in assessing the issues surrounding genetic modification, and in articulating and (where possible) implementing decisions arising from their assessments. These are very complex issues and people will not make up their minds about them in a hurry. The values and norms brought to bear on topics such as this are linked inextricably to a way of proceeding that gets to the apparent heart of the matter but also encompasses the periphery: a method of thought and action which can lead to better and more fully-informed decision-making than the linear and often myopic thinking that all too frequently characterizes institutional paradigms and processes. It is important therefore that the views expressed by those people that participated in this research be listened to carefully by the scientific community, relevant government agencies and by decision makers. Through this and other means it may lead to the development of more effective processes for incorporating Māori values and the concepts which underpin them, into the decision-making process. It is our belief that this will not only be of benefit to Māori but to all New Zealanders.

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Appendices

Appendix A. Summary Of Iwi Responses to Applications to the ERMA.

Recommendations by Ngā Kaihautu Tikanga Taiao (NKTT) the Māori advisory committee to the ERMA are also provided for each application.

1. October 98. GMF 98004. Field trial of GM sugarbeet (Applicant: Crop and Food, Lincoln)

Iwi consultation: (Representative of Taumutu Rūnaka) Noted impacts on mauri, kaitiakitanga, mahinga kai, heritage sites water and customary rights.

NKTT report: No final recommendation to approve or decline.

2. Oct. 98 GM 98007, 98008. Field trial of GM potatoes (Applicant: Crop & Food, Lincoln)

Iwi consultation: (Representative of Ngāi Tahu Trust Board)

Require annual progress reports and an assurance that the tubers and pollen will be contained.

NKTT report: concerns about potential impact on native flora valued by Māori (*Solanum aviculare* or *poroporo*); concerns about potential for x pollination; possible impacts on public health and environment; uncertainty of any benefits to NZ; uncertainty of long term impacts of GE.

No final recommendation to approve or decline.

3. Nov. 98. GMF 98002 Field trial of GM Petunias.(Applicant: Crop & Food, Palmerston North)

Iwi consultation: (Te Kaunihera Kaumātua o Rangitāne ki Manawatu)

Want ongoing opportunity for monitoring, discussion, reports.

NKTT report: concerns about potential impact on native flora valued by Māori (*Solanum aviculare* or *poroporo*). Suggest trials to ascertain if cross pollination can occur; possible impacts on public health and environment; uncertainty of any benefits to NZ; uncertainty of long term impacts of GE; suggest further consultation with other mana whenua in Palmerston North.

No final recommendation to approve or decline.

4. Nov. 98. GMF 98001 Field trial of GM sheep (Applicant: PPL Industries Ltd, Whakamaru)

Iwi consultation (1) Poukani: concerns over potential to impact adversely on their own agricultural interests (sheep and cattle farming) via introduction of new

diseases. Also unclear if this technology welcomed by overseas markets and animal welfare groups. Don't want NZ agriculture to get reputation as "tampering with nature". Concerned it will affect our "clean green" image. Prefer it to be a small focus industry. Raised ethical issues concerning use of human genes in animals but have no comment to offer on that at present.

Single most over-riding factor is the potential benefit to humankind. If the end product will benefit sufferers of disease (e.g. cystic fibrosis) will support the industry. Secondly, any project that introduces employment and industry into an area is welcome.

Pleased at the consideration given to feelings and concerns of local communities. This goes some way towards recognizing iwi rangatiratanga over own whenua.

(2) *Ngāti Raukawa*: Expressed concern at cross species gene transfer representing an unacceptable breaking of a sacred belief; and at the risk of transgenic material entering human food chain. Breaking of sacred beliefs could not be mitigated, but some might be prepared to compromise in context of any improved quality of life and healing that might result. Took no position for or against application. Did not want this to be held as a precedent.

NKTT report: transfer of genes particularly human genes between species in conflict with traditional beliefs values and customs; concerns about the purported benefits; concerns about the consultation process; insufficient information to make a decision concerning a Māori perspective
Recommend decline of the application.

5. Dec. 98 GMF 98003. Field test of GM apples.(Applicant: HortResearch Mt.Albert)

Iwi consultation (Ngāti Whātua). No issues.

NKTT report: transfer of genes particularly human genes between species in conflict with traditional beliefs values and customs; concerns about the purported benefits; concerns about the consultation process.

No recommendation to approve or decline.

6. July 99. GMF 98009. Field test GM cattle (Applicant: AgResearch Ruakura)

Iwi consultation and submissions: (1) Ngāti Wairere (Maree Pene): Grounds for opposition: contrary to tikanga and kawa. (Maria Henry): grounds for opposition: affront to kaitiakitanga; inadequate consultation and time frames; support moratorium as suggested by the Mataatua declaration. (Jacquie Amohanga). Grounds for opposition: effects on key values e.g. whakapapa and mauri. Risks & uncertainty about informed consent of human donor; all this and breach of tapu relating to ancestral waahi tapu will cause adverse effects e.g. spiritual imbalance and physical illness (mate Māori) on human health (taha wairua, taha hinengaro,

taha tinana & taha whānau). Disposal of carcasses could contaminate land, water; culture and traditions. Must respect rangatiratanga and mana of Ngāti Wairere and not impose precedents from other iwi on them. (Malibu Hamilton) Grounds for opposition: risks of escape, contamination, disposal. Donor ethics i.e. informed consent; possibility of animal products entering the food chain. Patenting -who benefits?

(2) Rūnanganui o Waitaha. Transgenics /mixing of mauri culturally offensive, totally unacceptable. Violation of wairua & tikanga. Implications for Treaty rights, and for Intellectual Property Rights (IPR).

(3) Kapakapanui. Oppose on grounds of offense against tikanga and mauri; ignores Wai 262 and IPR issues; dangerous precedent; inadequate consultation and discussion.

(4) Wai 262 claimants: concerned about protection of Rangatiratanga and Kaitiakitanga over taonga including tikanga Māori. Improper for one Treaty partner to engage in GE while claim of other partner (Wai 262) still to be heard; GE of flora and fauna might preempt claim; gives pre-eminence to science and cost/benefit analysis; issue has national implications for culture and health; inadequate time to debate them.

NKTT report: concern about the sheep application approval acting as a precedent; note need for wider and more informed debate among Māori on transgenics especially those involving human genes.
Recommend wider debate and research before this application is approved.

7. July 99. Field test GM Maize.(Applicant: Pioneer NZ Pukekohe)

Iwi consultation (Huakina Development Trust). no issues.

NKTT report: concerns about the consultation process [Note Ngāti te Ata not consulted; had issues]; concerns about cross pollination with maize varieties used by Māori; concerns about long term benefits.
No recommendation approve or decline.

8. Oct. 99. Field test of GM Roundup Ready (RR) wheat (Applicant: Monsanto)

Iwi submissions:

(1). Ngāi Tahu: opposed for reasons of (a) Whakapapa, RR wheat crops planted in the South island will disrupt the rarangi (network) and spirituality of whakapapa which will affect the iwi (Ngāi Tahu). (b) Kaitiakitanga; Ngāi Tahu has kaitiaki obligation to safeguard well being and mauri of taonga species. Is it acceptable or unacceptable to

transfer genes from one organism to another if neither species is a taonga species? What if GM safeguarded or enhanced the well being and mauri of a taonga species? Would that be acceptable?

(c) Rangatiratanga (the right to manage and control use of native flora and fauna in a manner acceptable to Ngai Tahu). Allowing GMO's into Ngai Tahu rohe against their wishes nullifies the rangatiratanga of the iwi and will be a breach of Article II of the Treaty.

Summary: Ngāi Tahu Interim policy on GM (15/6/99) opposes the release of any GMO into the environment and the granting of any application for a GMO in field trials or containment until Ngāi Tahu concerns about the impacts on social and cultural concerns related to Whakapapa, Kaitiakitanga and Rangatiratanga have been satisfied.

(2). *Tremane Barr (Ngai Tahu)*: contrary to (a) the tikanga (e.g. rāhui, tapu) established to protect mauri of all things; only gods can create life, not humans; (b) whakapapa - the principle whereby order is established, creates order in space and time, provides basis for managing environmental resources; DNA the physical manifestation of whakapapa. GE usurps the power and responsibility of the gods.

(c) whanaungatanga - a political, cultural and economic tool.

(d) Kaitiakitanga - the obligation to maintain and protect the mauri of all other species.

GE a betrayal of past & future generations and an insult to the mana of kaitiaki. GE a threat to mana of iwi and hapū and their ability as kaitiaki (e). Mauri - binds the body and spirit together at birth; this done by the power of Io. GE places this power in the hands of humans which is wrong. Traditional kōrero pakiwaitara (stories) e.g. of Māui seeking to overcome mortality are a warning of the consequences of human arrogance in seeking to control nature. (f) Science – transgenics breaches natural boundaries/constraints/barriers around species. Is not the same as traditional cross breeding which combines genes within a species. Potential to harm the environment through increased use of “Roundup” herbicide may result in herbicide-resistant weeds. (g) Benefits - no benefits to consumer, only to Monsanto. Designed to make farmers reliant on Monsanto. False promises of benefits; who is liable if things go wrong?

(3) *Kapakapanui*: risks of gene escape and effects on environment e.g. weediness, and on human health if consumed. Offense to mauri & tikanga, Impact on biodiversity and IP including the Wai 262 claim.

(4) *Angelline Greensill*: adopt precautionary approach until it can be proved no risks to human health from consuming GM foods. Poses risks to environment, contrary to tikanga and beliefs; should await findings of Wai 262.

(5). *Te Kōkako consultancy (Waitaha)*. RR wheat will have adverse effects on whakapapa, kaitiakitanga, wairuatanga and mauri. Could also be risks of contamination of environment (via cross pollination) and of human health via consumption of GM wheat products.

NKTT report: draft report only as application by Monsanto subsequently withdrawn.

Comments: transgenic research highly likely to cause cultural offence to Māori as Māori are responsible for the protection of the mauri of all of the descendents of Papatuanuku.

9. Oct.99. Application GMF 98011 to field trial GM pine trees (Applicant: Carter Holt Harvey). Subsequently withdrawn.

Iwi response: Tūwharetoa: (1) Tikitu Nathan: at this stage considers mixing of bacteria with mauri of a tree unacceptable; needs further discussion on cultural & spiritual implications. Concerned about the adverse effects on the mauri and whakapapa of Tane Mahuta. Will affect principle of whanaungatanga with our atua and tūpuna. Western scientific values should not prevail over kawa and tikanga of Ngāti Tūwharetoa; doubts that science will protect taonga. Tikanga relating to protection of taonga includes whakapapa and whanaungatanga. (2) George Asher: mixing of mauri will result in an unnaturally transformed organism not sanctioned by natural process. Humans have no authority to interfere in the tikanga or kaupapa ordained by the Poutiriao (spiritual guardians of each realm of the natural world) Transgenics compromises whakapapa and interferes in the principle of whanaungatanga which has been established to maintain order in the natural world.

NKTT report: none as application withdrawn.

10. Mar. 2000. GMF 99004. Field test of double-muscled sheep (Applicant: AgResearch Ruakura).

Iwi submission (1) Ngāti Wairere. Opposed to alteration of whakapapa; (2) Angelline Greensill: adverse effect on mauri of humans if meat consumed; conflicts with traditional beliefs.

NKTT report: consultation with and metaphysical effects including longer term cumulative effects on health of humans as raised by Ngāti Wairere not adequately addressed. Doubts about purpose & benefits. Suggest scientific and ethical precautionary approach until more information available about issues of concern to Māori.

Recommendation: decline the application.

11.Oct. 2000. GMF 99001& 99005. Field test GM pine trees (Applicant: ForestResearch, Rotorua).

Iwi submission: Hapū of Ngāti Whakauae; Tūhourangi.

(1) School principal. traditional precedents exist for transformation of humans into animals e.g. Irawaru/dog; Māui /pigeon. Māori thus familiar with new creations. Māori not risk adverse: separation of Rangī & Papa demonstrates this, that humans

can't be kept in ignorance, must be allowed to grow, develop & explore. Māori also noted for ability to grasp new technologies. Question is: what is the tikanga /process/guidelines? Be careful: if we have control over things, do not abuse that power or tikanga. Another question: who benefits? Also concerns over use of human genes and the future of these organisms. Must be ongoing monitoring and consultation.

(2) Anaru Rangiheuea. Fears about the unknown nature of this thing; about the risks to the forests they and their fathers worked hard to plant.

(3) Kiri Potaka-Dewes. Historically Māori have never had control over these pine forests, just labourers; need now to have control & management over the forests and the new technology. Need better consultation and direct access to the decision makers.

(4) Tūhourangi speaker. Io Matua Kore put in place all things on this earth each with its own mauri. The stories laid down our tikanga; our taonga tuku iho; our whakatauaki; we are kaitiaki of those things handed down. Should pay tribute to Greenpeace who reminds us of our responsibilities as kaitiaki of this earth.

(5) Eru Potaka-Dewes. Concerned about the “unnaturalness” of creating GM trees without flowers: their creation in a lab means they aren't “born” into the whānau, how can one be kaitiaki of something that is born in a lab and not born of Io?

(6) Tūhourangi speaker cultural advisor to Rotorua District Council. We have just come from a hui with DoC and the main thrust of that is to remind us of our role as kaitiaki; we are here to protect our land for our children and future generations. Our traditions also emphasise the sacredness of all things; the need to restrict human tampering, the need to maintain sacred places. Why? To protect the life force; the uniqueness of things; and because they are medicines their sacredness must be protected. The teachings of my tūpuna have no tradition of inserting genes into a tree. We have not had enough time to debate, analyse and discuss these issues. Our people are uncomfortable at being placed before a public panel of enquiry unprepared. We need more time.

NKTT report: (a) Consultation adequate. (b) Issues in relation to cultural outcomes: transgenics said by mana whenua to be in conflict with traditional values beliefs & customs; will impact on the mauri of land water air. (c) Issues in relation to environmental outcomes: negligible impact on mahinga kai, other natural resources, or natural habitats & biodiversity while in field trials. However, future use of herbicide on release of GM pines & spruce use could have major impact on understory biodiversity, on mahinga kai & other natural resources. (d) Issues in relation to Treaty outcomes: could have an economic impact and affect future Treaty claims. (e) Issues in relation to human health outcomes: some Māori fear adverse impact on taha tinana, taha wairua, taha hinengaro, taha whanaunga. No recommendation to approve or decline.

Appendix B. Issues Raised by Māori During the Royal Commission on GM

1. Analysis of Main Points Made by Māori organizations given “Interested persons” status. (Report of the Royal Commission Appendix 2; 204)

1. Role of the Treaty of Waitangi
2. The Crown’s duties under the Treaty of Waitangi
3. Tikanga principles *
4. Participation in economic benefits

*Tikanga principles (Appendix 2; 208)

whakapapa
kaitiakitanga
mauri
mana
atua
ira tangata

2. Analysis of main points made by Māori in oral & written submissions at regional hui (Appendix 3; 153).

1. Tikanga
2. Treaty of Waitangi
3. Controls and benefits
4. Information & time

In general GM was considered to be contrary to traditional tikanga. Aspects of genetic modification that were identified as incompatible with tikanga included the mixing of genes between species (transgenics); mixing of human genes with other species; environmental contamination and hence spiritual interference. Concerns were also expressed about Intellectual Property Rights (IPR), subjugation and loss of traditional knowledge and the implications for the Wai 262 claim over rangatiratanga of native flora and fauna (Appendix 3: 89,90).

Appendix C: Phase II of this Project

Moving from Phase 1 to Phase 2

Qualitative methods were used in Phase 1 to identify the dimensions of decisions about GMO applications that are of key importance to Māori people, particularly with respect to the effects of GMOs on tangata whenua, their culture, traditions, and the surrounding environment. Phase 1 used a semi-structured interview approach to minimize reactivity to the process of eliciting values. By avoiding a structured survey approach initially, we avoided the risk of inadvertently communicating experts’ knowledge and providing cues in cases where respondents are unsure of the answer. Unless respondents have very defined beliefs about the precise question being asked, they may engage in complex

inferences about what a question really means, what they think about it, what the researcher expects them to say, what other people are saying, and how to translate their (potentially complex) beliefs into the available response options (Fischhoff, 1991; Schwarz & Clore, 1996).

Once relevant values and their relations to GMO decisions have been elicited, however, a more structured, confirmatory approach can be adopted. Quantitative survey methods are useful in capturing opinions from large numbers of people and providing estimates of the reliability and validity of those opinions. Thus, a questionnaire was designed for use in Phase 2, based on the information gathered in Phase 1. The questionnaire presented multiple tasks designed to assess attitudes, beliefs, and values about GMO applications, general worldviews and cultural values, qualities of decision processes, and respondents' demographics. Specific items and response categories in the questionnaire were developed based on the responses to Phase 1 interviews.

Objectives of Phase 2

The main objectives of Phase 2 were:

- To identify the relative importance of the key dimensions of GMO decisions.
- To confirm the socio-cultural values associated with the decisions.
- The main result of Phase 2 will be information that can be used to develop a framework for policy makers to guide responses to GMO applications in a way that reflects Māori judgments about the relative values of GMOs and their effects.

Principles of Survey Design

The questionnaire is comprised of several different tasks. The main task uses the method of paired comparison (PC) to elicit judgments by various stakeholders to indicate the relative acceptability of alternative GMO scenarios described on tangible and intangible dimensions. The PC method is used primarily when the objects to be compared can be judged only subjectively. Objects (GMO scenarios) are presented in pairs to a sample of respondents. The respondents express a preference ordering among the objects in the whole set by choosing one member of each pair as being more acceptable than the other.

The advantage of the PC approach is that the relative acceptability of GMO applications can be determined without assessing the magnitude of losses or gains in each case. What it requires is respondents' judgments of the impacts of different applications on tangible and intangible values and the ability to judge their expected severity. The PC method permits the development of an acceptability scale that reflects judgments that implicitly incorporate peoples' assessments of both the likelihood of various impacts of the GMO applications and the importance (acceptability) of those impacts. The PC method permits tests of inconsistency in respondents' expressed preferences and homogeneity or variance within and across groups of respondents.

In essence, the PC method presents individuals with pairs of GMO application scenarios which reflect the current and potential future uses of GMOs likely to cover a wide range of acceptability and unacceptability. The scenarios present multidimensional descriptions of various GMO applications. The dimensions describing GMO applications in this survey include: the origin of the gene (human or non-human), the purpose of the application (economic, medical, or environmental), who benefits (mostly Māori or mostly non-Māori), whether mauri or whakapapa interference is likely or unlikely, what type of product will result (food or non-food), whether the species modified is native or non-native, where the research will take place (laboratory or forest field trial), and who controls the patent (Crown or local Rūnanga and Crown).

Respondents are asked to indicate which item in each pair they prefer (and whether or not they would accept it). By repeating this judgment for each of several pairs (constructed by factorially crossing the levels of the dimensions), respondents indicate the relative importance of each dimension used to describe the GMO applications. This method avoids the limitations commonly accompanying self-reported opinions (due to demand characteristics, lack of insight into personal judgment processes and policies, etc.) and provides policy makers with more than casual judgments and speculations. The method allows an empirical evaluation of the extent of agreement or disagreement among respondents in the acceptability (or non-acceptability) of various GMO applications and the importance of their dimensions. Ultimately, the results can be used to help decision makers guide policy responses to GMO applications in accord with community values and objectives.

In addition to the PC method, the questionnaire comprises items that use Likert scales to assess attitudes toward specific types of GMO applications, perceptions of qualitative aspects of risk, resonance with specific worldviews and cultural values, feelings of vulnerability and potential for stigma, and attitudes toward GMO decision processes and individual decision styles. Using an iterative approach to the questionnaire's development, we refined the questions and response options to optimize the reliability and validity of responses obtained. Analyses will provide an understanding of how individuals' and groups' attitudes, values, belief systems, and histories, condition their perceptions of GMO applications. Iterative discussions will be held with members of the expert komiti and focus group informants to appropriately contextualize interpretations of the results.

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