

# Walking backwards into the future: Māori views on genetically modified organisms.

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## **Abstract**

This paper presents the results of research conducted among Māori people in New Zealand concerning their views on genetically modified organisms (GMO's). Participants invoked a number of traditional principles, values and beliefs that were used to assess and evaluate the risks and benefits posed by GMO's to Māori culture. Suggestions for a decision-making framework incorporating these principles and capable of being used by both Māori and scientists to assess intended GMO research applications are also included. If successful, this framework and process may help avoid, remedy or mitigate any adverse cultural effects and just as importantly, maximize any potential benefits of the research for Māori or other indigenous peoples.

## **Introduction**

Few recent issues better characterize the historical tension between science and society than do debates about genetic engineering. In New Zealand, this issue has engendered considerable public concerns about genetically modified organisms or GMO's (new organisms created in a laboratory by the transfer of genes between different species), particularly their presence in foods, in field trials, and their possible release into the environment.

Māori concerns (in addition to being pragmatic) were notably political and spiritual. The former focuses on rights conferred by the Treaty of Waitangi. Signed in 1840 this important document provides the basis for debate relating to guardianship and authority of Māori over natural resources and taonga (valued possessions) and the concept of partnership between the Crown (the New Zealand Government) and Iwi (Māori tribes). Spiritual concerns related to those values, beliefs and practices that constitute a Māori world view and which are perceived by many as being threatened by GMO technology.

Modern society however, is increasingly secular and reliant upon scientifically based decision making, involving quantifiable, tangible and objective evidence. Not surprisingly, a clash of cultures has emerged from the interaction of these disparate world views in terms of the assessment, evaluation and decision-making processes surrounding applications to genetically modify organisms.

Applications are administered by the Environmental Risk Management Authority (ERMA) under the Hazardous Substances and New Organisms Act 1996 (the Act). In addition to scientific assessment and evaluation of the risks and benefits of a GMO application to the ERMA, Section 6(d) of the Act requires applicants (i.e. scientists), the ERMA and the decision making group (the “Authority,” a group of eight independently appointed persons) to take into account Māori culture and traditions.

But when the Authority has attempted to do so, a number of difficulties have arisen. One example concerned an application to insert a copy of a human gene into cows in order to produce a human protein in their milk that might benefit sufferers from multiple sclerosis. Ngati Wairere, the sub tribe on whose traditional land the research was being conducted, strongly objected to this experiment on the basis of spiritual values and beliefs, in addition to more tangible concerns such as disposal of carcasses.

In its decision, the Authority queried what constitutes evidence, and what reliability might be placed upon spiritual or intangible concerns compared to physical, empirically-based evidence. In over-ruling Ngati Wairere’s concerns they commented—

“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...” (Māori Law Review, 2000, p.5).

The need for a broader approach to weighing and balancing the perceived risks and benefits associated with GMO’s was again voiced by Māori during hearings held by a Royal Commission (2001) established in response to public concerns about GMO technology. At the same time, several research projects were funded by the Foundation for Research, Science and Technology aimed at identifying the values and spiritual beliefs that might constitute elements of a culturally-based decision-making framework.

In this paper the results of two such projects involving the author are presented. Project 1 investigated the perceived effects of different GMO applications on Māori culture, values and beliefs, with the aim of developing a culturally grounded decision making framework for evaluating the risks and benefits to Māori posed by this technology.

Project 2 investigated perceptions of the risks and benefits to Māori of various forms of biotechnology including GMO’s, xenotransplantation, cloning, stem cell research and bioprospecting. This paper presents the fundamental principles or values identified by Māori in both projects as being of importance in the assessment and evaluation of GMO’s, along with suggestions on how they might be incorporated into a culturally-grounded decision making process.

## Project Methodology

Project 1, undertaken among Māori people in the North Island in 2001-02, involved three separate rounds of interviews and focus groups with a total of 90 participants. Examples of actual and theoretical applications, including their scientific risks and benefits were provided as a context for discussion. These included cows or sheep containing human copy genes, frost-resistant strawberries containing copy genes from flounder fish, and pine trees (introduced) containing copy kauri (native) tree genes.

Each example outlined key aspects of GMO research considered to be influential in decision making e.g. the *purpose* of the research (for medical, food, environmental, conservation, economic or pure research purposes); its *location* (in a laboratory, a field trial, or released into the environment); the *species* involved as donor and recipient and whether they were native/non native, human/nonhuman; and the proposed *benefits* (for Māori, for New Zealanders, for international companies).

Scientific risks were discussed before inviting participants to share their views on the perceived cultural effects (positive or negative) of each example. A report on these interviews (Satterfield et al., 2005) is available from the second author.

Project 2 was conducted among South Island Māori, primarily of the Ngai Tahu tribe. This iwi is alone in having a tribal policy concerning GMOs, and their tribal authority gave support for this project as part of a review of this GMO policy. A total of 16 interviews and 7 focus groups involving 47 participants were held in 2003, following a similar procedure to that above. A published report of this research (Roberts & Fairweather, 2004) is available from the first author.

## Results of the Projects

### 1. Key principles or values

Prominent among the key values are spiritual concepts thought to be threatened by the genetic modification of organisms e.g. *whakapapa*, *mauri* and/or *wairua*, *tapu* and *mana*. Decisions about whether the research was *tika* (right) or wrong included consideration of the *kaupapa* or purpose of the research; of *kaitiakitanga* (the obligations and responsibilities placed on Māori to care for the environment), and of Treaty of Waitangi guarantees and principles e.g. *tinio rangatiratanga* (the rights of Māori to self determination and control over their own resources) including partnership with the Crown. Further explanations of some of these values are provided below.

### Whakapapa

When applied to humans, this word refers to genealogies or family trees, with the implication of shared genetic relationships and descent from a common ancestor among all persons named in that *whakapapa*. But when applied to non-human things (e.g. plants, animals, rocks and stars), it is clear that other factors such as habitat and morphology (shape, appearance) provide an important rationale for each grouping (Roberts et al., 2004). For these reasons the term *tātai taiiao* will be used to describe non-human whakapapa.

For example, one participant referred to a *whakapapa* of the flax plant that included the *tuna* (eel) fish. In her view, because they lived together in the same habitat they were “related” and this

might therefore make it acceptable to transfer a gene from one to the other. She further suggested that many Māori who learnt biology at school had their thinking “colonised” by scientific classifications, and this “affected their views on *whakapapa*.” Another person, noting that each tribal grouping has their own tribal variations of plant/animal *whakapapa*, asked “so whose *whakapapa* is right?” (Roberts & Fairweather, 2004, p.64).

In general, a majority of participants believed it is wrong to move genes between species that in nature did not interbreed, and the wider the perceived ‘gap’ between the species e.g. between toads (Animal Kingdom) and potatoes (Plant Kingdom) the more unacceptable the GMO. This widespread perception among Māori of a ‘species barrier’ reinforces the suggestion above of the influence of scientific classification including concepts such as “kingdoms” and “species” which appear to have replaced more traditional teachings on *tātai taiao*. Interestingly this influence was often overlooked when applied to the insertion of a human gene into bacterial cells to create a GMO for the manufacture of human insulin. In this case it seems that factors such as the purpose (aimed at saving human lives) was more influential in decision making.

Another aspect involved opposing views on the exclusive or inclusive nature of *tātai taiao*. Advocates of the former exclude things unknown to pre-European Māori and hence unrecorded in traditional *tātai taiao*, which are perceived as fixed in time, “closed” constructs. Hence applications to transfer genes from introduced species such as pigs, sheep or cows are considered a ‘contamination’ or violation of existing *tātai taiao*. An alternative view holds that *tātai taiao* are open, dynamic and capable of incorporating introduced species into appropriate traditional groupings. Hence all things visible and invisible are actual or potential members of a particular *tātai taiao*, because all things ultimately descend from the same spiritual ancestors Ranginui (sky father) and Papatuanuku (earth mother) all things are related. Understandably, supporters of this view were in general more open to organ transplants and cross species transfers.

Regardless of the above views, most participants saw humans as deserving of special rights and were generally opposed to their involvement in gene transfers as either donor or recipient. Finally, because *tātai taiao* provide the origin, history and relationships of a thing, this construct was considered an essential ‘tool’ for deciding the appropriateness or not of GMO research.

“If you know these things, the history, the *whakapapa*, it grounds you. Knowing the *whakapapa* provides the framework for making decisions about the rights and wrongs of a thing. It can tell you whether it is natural or unnatural, appropriate or inappropriate” (Roberts & Fairweather, 2004, p.15).

### **Mauri**

This concept is one of the most commonly invoked principles in discussions by Māori about GMO’s. Definitions include life-essence, life force or vital principle originally possessed by Io, the Primary Life Force or Supreme Being. *Mauri* is intimately related to other metaphysical qualities such as *tapu*, *mana* and *wairua*, each of which endow a thing with its special character. In the words of one participant—

“Our belief is that there’s *wairua* and *tinana*...*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*” (Satterfield et al., 2005, p.28).

One participant defined *mauri* as the spiritual aspect of *whakapapa*, which protects and reflects the *tapu* and *mana* of the organism.

“*Mauri* warns us to be careful when we attempt to interfere with a *whakapapa*; to be respectful, to know when we have done right or wrong. In its role as a “spiritual gatekeeper” it can be interpreted as a form of indigenous ‘risk management’ to be applied by those skilled in these things” (Roberts & Fairweather, 2004, p.20).

It was generally believed that transgenics (the movement of genes between different species) resulting in the “mixing” of *mauri* is detrimental. For example, “... this sort of technology... flouts all the rules of nature. That’s why there are spiritual effects. Spiritual effects result from the fact that the genome has been “broken” in order to insert the foreign gene construct. This break disrupts the *mauri* of the intact genome which is what gives the organism its own unique spiritual identity. Putting in a foreign gene destroys that unique identity and creates something else, which has flow on effects on the whole organism and the environment. Scientists just see the result as a new protein in the milk or something, they don’t see the spiritual effects. They don’t know where and how to look. So the field trials just look for adverse physical effects but there is no monitoring of any psychological or spiritual effects on the animals, the earth (Papatuanuku) or on humans” (Roberts & Fairweather, 2004, pp.32-33).

Participants also debated whether a part of an organism, e.g. a gene, has a *mauri*, or whether *mauri* is the property of the whole organism. And if genes do have a *mauri*, is it the same or different from that of the parent organism? Where would the *mauri* come from if the new organism was created artificially in a laboratory? One response was that “we are the only people in the world who can put the *mauri* into something. For example, we put the *mauri* into this house (mentions the name of his ancestral house). So we are able to transfer the *mauri* of one thing to another and in so doing combine the spiritual with the physical. We have that power. But it depends on the purpose. The purpose has to be good” (Roberts & Fairweather, 2004, p.11).

#### **He tangata, he tangata.**

This expression, meaning “it is people, it is people”, comes from tribal leader Meringaroto in response to her own question “what is the greatest good in the world?”. It expresses a belief in the intrinsic value of human beings, individually and collectively. Conceptually, it’s one of a cluster of principles which includes *whānaungatanga*, an ethic of belonging (usually in a kinship group) and *manaakitanga* which demonstrates caring and support, as in displays of hospitality.

In the GMO context, *he tangata* emerges as a dominant theme. Firstly, because it expresses an imperative to help those who are sick (especially family). Secondly, it helps explain the place of humans in the world, especially in relation to non human organisms. Rather than emphasising the relatedness between human and non humans, some interpret this principle as emphasising the distinction between them, including, in many situations, the primacy of humans (Satterfield et al., 2005, p.37). This has important implications for decision-making concerning GMO’s and other biotechnologies.

#### **Tika / tikanga /kaitiakitanga**

*Tika* refers to the nature and ethos of things, whereas *tikanga* is acting according to what is considered ethically right, correct and socially appropriate. Many participants considered *tikanga* an essential part of wise decision making because it maintains cultural integrity.

“In all things there are *tikanga*, principles, process and guidelines [for] preventing and managing that which is desired or good... Violation [can] come about when [this] does not happen — because stages are rushed [or] the truth is not revealed...” (Satterfield et al., 2005, p. 70).

*Tikanga* is inherent in the related concept of *kaitiakitanga*, a philosophy and practice which expresses the spiritual and physical rights and obligations of Māori to care for, protect and guard their environment (Roberts et al., 1995).

## **2. Other issues**

In addition to the values identified above by Māori participants (for the full list consult the original reports), a number of other important issues were raised.

Anti-science/scientists views were strongly expressed by a majority of participants, who perceived science and scientists as inherently unprincipled and unmindful of societal and especially cultural concerns.

GMO cows and sheep containing copy human genes raised concerns about “scientists playing God” and “tampering with nature” (Roberts & Fairweather, 2004, p.14). Another participant thought modern science has “ceased to be respectful because it has no spiritually grounded values, instead is proud of being value free.” In their view, GM technology is short-sighted and intellectually bankrupt, motivated by quick financial returns to the parent companies. Furthermore,—

“It imposes on nature, instead of working with nature. In this regard it is a form of intellectual and technological colonization by scientists. It’s not empowering – it’s overpowering” (Roberts & Fairweather, 2004, p.20).

Another participant observed that there were too few Māori scientists to “walk the talk, that if more were employed in the research institutions and could influence the sort of science being done, have more control over it, and also get out around the flax roots and communicate with their people, maybe Māori wouldn’t be so distrustful.” (Roberts & Fairweather, 2004, p.38).

## **3. A values- based framework for cultural risk assessment of novel biotechnologies**

In both projects the need was expressed for a risk assessment, evaluation and decision making framework based on Māori principles, values and beliefs. What follows is one such framework grounded in the principles and values identified by participants, along with a procedure for applying these in the context of GMO research.

### **Evaluation of the proposed research using cultural principles/key values.**

This involves assessing the potential risks to culturally grounded principles/values, then evaluating (weighing and balancing) these in the light of the proposed benefits to people, environment and economy. *Whakapapa*, *kaitiakitanga* and *tinu rangatiratanga* form the basis of

the Ngai Tahu policy on GMO's (Te Runanga o Ngai Tahu, 2000), *Tapu, mana and mauri* (the 'spiritual gatekeeper' of *whakapapa*) were also of importance. *Tino rangatiratanga* and *kaitiakitanga* are particularly important for tribal groups directly engaged with GMO research in on their land in their tribal area.

Each of these principles constitutes a benchmark against which cultural risks and benefits can be evaluated by tribes and scientists within the context of the *kaupapa* (purpose) of the research including who or what benefits. In turn, the *kaupapa* invokes values such as "*he tangata*", *maanakitanga* and *whanaungatanga*.

For Māori, scientists had to have the "right reason in their hearts as well as their minds" for any of these technologies to succeed (Roberts & Fairweather, 2004, p.63). One participant group felt GMO's might be acceptable if the purpose was good, and if there were appropriate processes and principles attached (Roberts & Fairweather, 2004, p.11). Together, these principles and values form the 'skeleton' against which potential risks can be assessed, and upon which is placed the 'flesh' that comes from discussion and evaluation of the risks and benefits to Māori.

One outcome of this process might be a decision to decline support for an application because the benefits appear minimal and the risks to cultural values so serious and unable to be mitigated. Another decision might be to give conditional support to an application in which there appear to be considerable benefits, and any risks are able to be mitigated. In the latter situation, provided that the scientific risks are also considered to be minimal, the application might receive conditional support from tribal groups subject to certain conditions being agreed to by the applicant. Conditions might be both scientific as well as cultural (i.e. based on tikanga).

### **Incorporating tikanga**

Conditional support could include a range of values and practices designed firstly to avoid, remedy or mitigate any potential adverse effects. Foremost among these were *karakia* (invocations or prayer) advocated by traditional knowledge experts and Māori theologians as a means by which spiritual balance, safety and well being and a successful outcome could be achieved. In the context of GMO research this includes clearing the way for a new object or organism by bringing into existence its physical and metaphysical properties, and setting them in order in terms of their relationships with each other and surrounding things, thereby enabling them to function correctly in the world. As one participant explained—

"*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* [Gods].... If you go back to our cosmology or our creation stories, almost everything is created through *karakia*" (Satterfield et al., 2005, p.73).

Others suggested this step was also necessary to ensure the spiritual safety of the scientists engaged in the research.

Secondly, in addition to cultural measures aimed at minimising adverse effects, it was suggested that conditional support might also include measures designed to maximise benefits to Māori. Involvement of tribal groups in the actual research, as guardians in monitoring and ensuring

compliance, in maintaining the *mauri* of the organisms and land, and as recipients of some of the commercial and other benefits that might arise from the research was also considered.

A major function of the above process was considered to be in pre-application (to the ERMA) dialogue between scientists and Māori. One advantage of this for scientists is that by considering Māori values prior to embarking on the research, it may be possible to accommodate cultural concerns by changing the suggested design and/or by incorporating *tikanga* practices and potential benefits to Māori into the programme and thereby adding value to the project outcomes.

Pre-application dialogue benefits Māori by providing the opportunity to engage in a more constructive way with scientific institutions. *Kanohi ki te kanohi* (face to face) discussion of cultural values likely to be most at risk, ways in which they might be ameliorated, along with identifying possible benefits to Māori not considered by the applicant enables tribal groups to participate more equitably in the research and to make more informed decisions concerning the acceptability or not of the research.

## Conclusion

It is often said that Māori are a people who “walk backwards into the future,” an aphorism which highlights the importance of seeking to understand the present and make informed decisions about the future through reference to the past. Traditional stories were often invoked during this research, particularly those concerning the demi-god Maui. One cautionary tale relates how Maui, emboldened by his success in accomplishing many daring feats, tried once too often to tempt fate, and through his own death brought mortality into this world (Grey, 1969, pp. 43-44).

Among the lessons learnt from these traditions is that risk-taking is an inherent part of the search for new knowledge and benefits; and efforts aimed at risk avoidance or mitigation may involve unpalatable tradeoffs. It is therefore not surprising to find that support by Māori for a new technology like GMO's was seldom unconditional, and necessitated consideration of the moral principles and values exemplified by the deeds of ancestors.

Mead (2000) and Durie (2003) are two Māori scholars who have suggested *tikanga*-based frameworks for the assessment of cultural risks and benefits posed by GMO's. Mead (2000) outlines four cultural risk assessment and evaluation “tests” which include values identified by the participants of the research described in this paper.

Durie (2003) also identifies many of the same values but his framework shifts the focus from risk identification and aversion to describing how these values and concepts can provide a basis for assessing the relevance and potential benefits of the research to Māori. His framework is based around three domains; environment, people and process, each of which contain a series of desired outcomes or benefits. Rather than the imposition of cultural controls on the research, he suggests the setting of performance targets or indicators against which the desired outcomes can be measured.

The principles and processes outlined above by participants in our research support those espoused in the frameworks developed by Mead (2000) and Durie (2003). Taken together, all

three demonstrate that the values and beliefs of the ancestors are very much in the minds of their descendents. But in embracing and affirming the importance of traditional values, living generations of Māori also need to accept the challenge of applying them to present and future issues raised by new technologies such as GMO's so that they continue to be of relevance and utility to their people. This challenge is not unique to Māori; it applies equally to all indigenous peoples.

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