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**CHALLENGING SCIENTIFIC LEGITIMACY:
CITIZEN PARTICIPATION AND TECHNOSCIENCE**

As the word ‘technocracy’ suggests, there has long been a tension between democracy and notions of expertise. If democracy is based on the principle that citizens collectively have the right to make the decisions that shape the conditions of their lives, the role of the expert in democratic decision-making is problematic. More particularly, the relegation to scientific ‘experts’ of decisions governing the use of technologies with potentially far-reaching impacts on citizens’ lives has come under challenge, as has the legitimacy of the resulting decisions.

This tension has been thrown into relief in recent years by developments in biotechnology and the controversies surrounding them. In New Zealand, the Royal Commission on Genetic Modification (RCGM) was a response to political challenges to the legitimacy of policy processes governing biotechnology. In this chapter we do not discuss the Royal Commission process or its outcome; rather, we take the Commission as a focus of contending discourses around the problem of democracy and expertise. We analyse the formal submissions of ‘interested persons’¹ for the ways in which public participation in decisions around genetic modification have been either discursively facilitated or foreclosed. This analysis can serve as a map of contending constructions of the appropriate relationship between citizenship and science in New Zealand today.

¹ [Those qualifying to present formal submissions were those who could persuade the Commission that they had ‘an interest in the inquiry apart from any interest in common with the public.’](#)

Developments in biotechnology have highlighted not only the tension between democracy and expertise; they have also highlighted the tension between democracy and capitalism, and they have focused attention on the increasingly intertwined relationship between science and commerce. Not surprisingly, then, discourses of scientific rationality and economic rationality are a dominating presence in RCGM submissions. Here we analyse the ways in which these discourses open up, foreclose, or define a role for citizens *qua* citizens in the process of regulating the development and use of technologies of genetic modification.²

Scientific rationality

This section of the chapter will examine a range of discourses that circulate around science in the submissions of ‘interested persons’ to the Royal Commission. Many submissions partake of a discourse of science as an unproblematically ‘expert’ enterprise engaged in discovering and revealing the (unproblematically singular) truth about an objective external reality (‘nature’). Others operate as forms of resistance to these dominant discourses, either through refigurings of the scientific project or through more radical redefinitions of what might comprise appropriate ‘knowledge’ and appropriate ‘knowers’ within the realm of scientific and technological decision-making.

² Due to space constraints, we will keep our quotations from the submissions to a minimum. As the submissions use various styles of organisation, we will adjust our notation to those styles: i.e., where paragraphs are consecutively numbered from the beginning to the end of the submission, we cite the paragraph number; where they are not, we cite the relevant section or subsection.

These discourses have significant implications for the role of public participation in decision-making about genetic modification in New Zealand. Within dominant scientific discourses, decision-making about scientific and technical matters, and particularly about matters that have the potential to generate controversy, is presented as a matter that should be left to the appropriate experts. While public involvement (often posed as a matter of informing or educating a ‘general public’ conceived of as ignorant and fearful) may be considered a political necessity, it is often viewed as a hindrance, a source of unnecessarily rigid regulation, or an infringement on the rights of scientists to conduct and (often) commercialise their research. On the other hand, more marginalised discourses that appear in the submissions propose variously that good scientific decision-making *requires*, rather than is inhibited by, in-depth and broad public participation. Within a number of submissions, expert knowledge based on narrow, reductionist and unreflexive approaches is argued to be inadequate as ‘knowledge’, and hence broad-based public participation is considered essential for formulating good policy on more epistemologically solid ground.

Self-contained science, excluded publics

Sandra Harding (1998) employs the term ‘internalist scientific epistemologies’ in a way that is consistent with what are referred to here as ‘dominant scientific discourses’, and her elaboration of this model provides an apt characterisation of many of the high profile interested persons’ submissions to the Royal Commission on Genetic Modification. Within this model, ‘the success of modern science is insured by its internal features’,

which include ‘maximising objectivity and rationality’ and the use of mathematics (Harding, 1998: 2). Furthermore, according to this view, ‘there is only one “nature”, one truth about it, and one science; and such a science can in principle reveal the complete, unitary, and harmoniously integrated truth about a reality that is ordered in such a way as to be available for such an accounting.’(Harding, 1998: 3). She argues that in the era of post-Kuhnian science studies such a model has become dated and even for some ‘a relic of modern western “folk belief”’(Harding, 1998: 2), nonetheless, it is still ‘the prevailing theory of scientific knowledge . . . invoked by scientists when speaking to funding sources, Congress [in the American context], or the general public’ (Harding, 1998: 2). Indeed. The submissions presented by New Zealand universities, Crown Research Institutes, corporations, and a number of government agencies to the Royal Commission are littered with references to an unproblematised notion of ‘a scientific viewpoint based on evidence’ (NZ Assoc of Scientists, 7.38), ‘sound contemporary scientific and medical knowledge’ (ANZFA, 27), and the need for GM technologies to be ‘assessed objectively’ (WB Dr Barry Palmer, Lincoln University, exec summ). In all of these cases, claims for scientific validity are made on the basis of appeals to processes internal to scientific practices, for instance on an unquestioned notion of solid ‘evidence’, knowledge that is consistent with what is accepted within the scientific community (presumed to be unitary and consensual) as ‘sound’ and ‘contemporary’, and experimentally verifiable ‘objectivity’. This internalist orientation also produces a tendency to reductionism; data considered ‘relevant’ within this model will necessarily be limited to the narrow confines of carefully defined research parameters, and scientific explanations will often be presented in mechanistic terms linked closely to ‘verifiable scientific results’.

This version of science has drawn criticism for a number of reasons. For instance, such a definitive drawing of boundaries between ‘science’ and the ‘non-scientific’ limits the scope of the science itself, making it difficult to formulate more holistic or ‘systems’ accounts of biological phenomena, and it also rules out consideration of a wide range of concerns related to scientific and technological issues that cannot be captured within a narrow conception of ‘science’. For instance, ‘spiritual concerns’ (which is often used as a code for ‘Maori concerns’) tend to be mentioned in the submissions as something that decision-making bodies like the Environmental Risk Management Authority (ERMA) should ‘take into account’ when ruling on applications to conduct research, but the status of this ‘accounting’ is highly ambiguous. As ERMA themselves explain, ‘The Authority will have to continue the difficult task of endeavouring to weigh adverse spiritual consequences against scientific or other benefits which may flow from genetic modification. *These are not comparable phenomena.*’ (emphasis added, ERMA A(2) 18). In relation to one particularly controversial case, they go on to explain that ‘The [HSNO] Act does not provide a sufficient framework within which to address the [spiritual] concerns elaborated by Ngati Wairere’ (18), and subsequently remove themselves from attempting to sort out these ‘incomparable phenomena’ by commenting that ‘it may be that the Government will need to decide whether and where the boundaries should be drawn.’(19). The issue here is not a matter of evaluating the good will or otherwise of ERMA authorities in relation to Maori; the narrow discursive framework within which they are operating simply cannot put these ‘incomparable

phenomena' in conversation with one another in order to arrive at a coherent resolution to these kinds of issues.

The drawing of such narrow boundaries around 'science' also precludes critical questioning of scientific practice. A critical stance from 'outside' science is deemed uninformed and hence based on some motivation other than valid knowledge: within expert representations of the public, 'expert knowledge is grounded in reality whereas lay knowledge and attitudes are politically real but intellectually unreal' (Wynne, 2001: 452) and can be considered 'cognitively empty emotion or values' (Wynne, 2001: 445). Thus attempts to raise public-interest related questions that could legitimately be discussed and adjudicated by the public -- such as questions around the social location of researchers (considered irrelevant if the researcher is conducting 'objective' research), for instance, or the economic motivations or constraints that either overdetermine or rule out particular research projects--are disqualified in advance and by definition as uninformed and mischievous interference with sound scientific practice.

The forward march of science, 'the public' as obstacle

These dominant discourses of science not only operate largely as self-contained and exclusionary; they also contain as the measure of successful science an unquestioned telos of scientific progress. Consistent with Harding's view that internalist science is engaged in a march to reveal a singular and comprehensive truth about 'reality', a number of submissions unproblematically promoted the view that it is in New Zealand's

national interests to contribute to the international effort to ‘advance knowledge’ (e.g. University of Otago, 2.1), or to ‘contribute as well as take out of the pot of knowledge’ (WB Dr Glenn Buchan, University of Otago, B(d) 6). There were also repeated references to ‘the state of knowledge’ (e.g. ERMA, B(k) 21, 25, 26, 28), even if some acknowledgement of a possible ‘range of uncertainty and dispute’ (ERMA, B(k) 28). In this view, knowledge is a ‘thing’ to be increasingly revealed through the inevitable development of modern science: ‘That there will be massive global developments in the use of GM-technologies is beyond question.’ (Institute of Molecular BioSciences, Massey University [IMBS], B(h) summary), and New Zealand policy-makers must not ‘compromise the opportunity for society to keep pace with biotechnology developments worldwide’. (University of Canterbury, B(b) 5). To do so would be to ‘step back in time’ (Lincoln University, A(1) ii), thus ‘relegating New Zealand biological science to mid-twentieth century status.’ (University of Otago, B(c) ii 14). This narrative of inexorable progress also makes explicit appeals to New Zealand national pride in the effort to present a favourable picture of GM technologies: ‘It will not help our international reputation to come from a country where [GM] treatments accepted everywhere else are banned’ (National Testing Centre, B(l)). New Zealand can currently count itself as ‘a literate and technologically advanced nation’ (WB Alfred Richard Bellamy, University of Auckland, B(h) 7.15), but this status depends on maintaining the ‘skills [of a sophisticated research-informed society] for the enlightenment necessary for a modern, economically successful economy.’ (University of Canterbury, B(b) 1). These kinds of emotive rhetorical gestures pertain not only to New Zealand’s economic future (to be discussed in more detail elsewhere), but also to its status amongst the world’s

nations. Nothing less than New Zealand's status as 'modern', 'enlightened' and 'advanced' is at stake within these representations.

Yet blocking this path of scientific progress lies the public, an undifferentiated group that is probably 'confused over the real risks and the real benefits of genetic modification' (New Zealand National Commission for UNESCO, A(2)) and may act out of 'unreasonable fear of the unknown, emotion and anecdote' as opposed to 'a scientific viewpoint based on evidence' (NZ Assoc of Scientists, B(h) 7.38). Advocates of GM technologies attempt to deal with these 'unreasonable fears' primarily in two ways. The first is to posit an alleged desire on the part of the public for 'zero-risk' in the development of new technologies: 'the public would, no doubt, prefer guaranteed certainties or even zero-risk which is an unrealistic goal in biological systems.' (NZ National Commission for UNESCO, B(b) summ). The problem presented by this presumed public concern is then summarily solved by means of education: 'an educated society . . . is capable of engaging in debates on the constructive use of biotechnology' (University of Canterbury, B(c) 3). In other words, to know biotechnology is to love biotechnology; while it may indeed have 'constructive' uses, the discourse deployed here elides the need to argue the point. Biotechnology's usefulness is assumed rather than demonstrated, and it is also assumed that the public will come to understand that 'fact' as it gains greater awareness of the issues.

The second approach to managing the public's 'irrational' fears circulates around the notion of 'substantial equivalence' as a response to concerns about 'Frankenfoods', for

instance. Not only are claims made about the ‘fundamental naturalness of genetic engineering processes’ (WB unnamed, NZ Assoc of Scientists, A(1) 2), but many of the submissions also relied on this notion of ‘substantial equivalence’ in order to allay the public’s fears. According to this model, genetically modified organisms, and in particular genetically modified food products, are deemed to be ‘substantially equivalent’ to their conventional counterparts, and thus inherently no more risky than those products. The principle was established by the United States Food and Drug Administration in 1992, and has been widely adopted internationally in subsequent years and utilised as a key justification for the introduction of GM organisms into the environment and into the food supply. So once again, for consumers concerned about ‘Frankenfoods’, scientifically based education that makes this principle clear can allay their fears, and public concerns are once again tidily contained within a narrowly defined scientific discourse.

Issues of containment also concern ERMA, the primary institutional site of public contestation of science and technology. While highlighting the centrality of public participation with the HSNO Act (B(n) 17-21), they consider the processes as prescribed by the Act as ‘unnecessarily rigid’ in certain ways, and in particular call for ‘less prescription and more discretion’ as to ‘when an application should be publicly notified and open to public submissions’, noting that ‘it is difficult to constrain the extent of public participation once it occurs’ (B(n) 20-21). ERMA proposes to manage public participation that is difficult to ‘constrain’ by granting increased ‘discretion’ to presumed experts, and on a broader scale the goal is to quell ‘unreasonable fears’ by means of

education. In all of these cases, the discursive gesture is to contain, control and domesticate a public that poses a potential threat to the forward progress of the (sometimes patriotically inflected) scientific endeavour.

Who ‘knows’? Contesting public ignorance and exclusion

Despite these efforts to confine public participation within narrowly defined terms and to delegitimise alternative perspectives, a substantial proportion of the submissions demonstrate a wide range of resistance to these narrow and reductionist views. Some seek to stay within the confines of ‘science’ yet correct what they view as inaccuracies or ‘mistakes’ within dominant representations of biotechnology. Others seek to redefine science in significant ways by introducing ‘systems thinking’ instead of reductionism, or qualitative and vitalist approaches in the place of strictly quantitative and mechanistic methods. Not only was it remarked that ‘science cannot provide definitive answers about the safety of the new technologies’ (ECO, B(n) 85), there were also comments on ‘[t]he dangers of compartmentalised research’ (Parliamentary Commissioner for the Environment, closing submission) and the tendency for ‘[mechanistic] thought patterns’ to produce ‘inaccurate, sweeping statements’ (Friends of the Earth, WB Denys Trussell, preamble). These submissions reveal a public that, far from being irrational, anti-science, or hysterically worried about ‘the sky falling’ (NZ Assoc of Scientists, WB Dr David Heath, 3 exec summ), want more *evidence* on a range of issues, and less unquestioned acceptance of expert views.

Moving somewhat further beyond the boundaries of science, some submissions attempt to deconstruct the false dichotomy between all-knowing ‘experts’ and a public conceived of as ‘often ignorant of the facts’ and therefore not legitimate actors in decision-making processes. In some submissions this involves a shift from a purely scientific framework to an emphasis on spirituality, the kaitiaki role of Maori in relation to taonga, or ethics; in a somewhat different approach the Parliamentary Commissioner for the Environment argued that the (non-‘expert’) ‘community’ contains ‘much wisdom and knowledge . . . which can provide insights, problem identification and information that the “experts” are likely to miss’ (B(j) 83). Yet others pointed to the crucial role of indigenous communities within the Convention on Biological Diversity and to the requirement of Article 8(j) of the convention to ‘respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity’ (WAI 262 B(d) summ, 1). Thus, these submissions provide a solid basis on which one could argue that the category of legitimate ‘knower’ needs to be broadened in order to more comprehensively investigate the implications of complex technologies.

In other words, there is an enormous range of views in these submissions that pose serious challenges to the mainstream and expert-led positions reflected in current government policy. These discourses could be said to comprise multiple discourses of ‘counter-expertise’, and while space constraints do not allow such a discussion here, they warrant considerably more substantial engagement than has been evident since the completion of the Royal Commission enquiry. Most centrally for our purposes here,

what are significant about these discourses are their attempts to carve out a legitimate, and indeed necessary, role for wide public participation in decision-making about GM technologies.

Economic rationality

The second prevalent set of discourses within the submissions encompasses those circulating around notions of economic rationality. Over the same decades that witnessed the rapid development of modern biotechnologies, the political philosophy of neoliberalism or economic rationalism came to dominate much national and international political discourse and practice. This discourse has effectively reinterpreted democratic participation: the act of citizens (or their representatives) making binding decisions through collective participation is seen not as a laudable democratic achievement, but as a threat to individual choice and hence to (individual) ‘liberty’. Market structures, in the presence of clear and enforced property rights, are said to maximise choice, while public institutions are associated with inefficiency and oppression. Society is seen as an agglomeration of self-regarding individuals focused on the pursuit of their own self-interest—or at least, it is argued, political, economic, and social institutions must be structured around that assumption. Competition—between individuals, firms, economies—is said to produce the best overall outcome; economic growth is equated with well-being. Human life is seen as a series of trade-offs, which involve weighing, and quantifying through the medium of money, anticipated costs and benefits.

Policies justified by neoliberal principles have facilitated a particular kind of economic globalisation, in which the free flow of capital across national borders has placed competition to attract capital at the centre of national strategies for economic success. National economic success is only indirectly about material well-being; it is directly about ‘competitiveness’ or ‘competitive efficiency’ in relation to the rest of the world’s economies. In place of an international system characterised by gradations of economic success, we now have, in effect, a competitiveness (or efficiency) competition in which, it is assumed, there are simply winners and losers. As a result, 'anything...which might seem to have a bearing on economic life is assessed...in terms of [its] consequences for promoting or inhibiting the pursuit of national economic efficiency' (Hindess, 1998: 223).

The expectation of commercial gain has been a dominant driver of the development of modern biotechnology. At least since the explicit embrace of the notion of the ‘knowledge economy’ it has also come to be seen as essential to the achievement of national economic competitiveness. Below we discuss some of the prevailing elements of the discourse of economic rationality found in the submissions and the ways in which they, for the most part, work to minimise and even de-legitimate citizen participation in decision-making on issues of genetic modification. We then discuss various alternatives to and contestations of this discourse that reconfigure the relationship between citizens and (GM) technoscience.

Economic competitiveness and the cost of democracy

A pervasive argument *equates the public interest with the economic returns* expected from the pursuit of GM. The equation is at times made directly: ‘The overwhelming public interest (either perceived or still unknown) is and will be driven by the economic benefits to be derived from the application of genetic modification to agriculture’ (New Zealand Life Sciences Network [B(j)iii]). Very often, it is implicit: lack of 'competitiveness' is equated with a disastrous erosion in well-being, and the utilisation of GM technology is argued to be essential to economic competitiveness. This competitiveness is often equated with achieving a 'knowledge economy': the utilisation of GM technology in agriculture is said to support New Zealand's 'strategic aim' to be a 'globally competitive knowledge economy' (Crop & Food A(1)), while the failure to utilise GM will lead instead to ‘a third world economy’ (WB Ross Clark, Auckland Uniservices, para.7.32).

A kind of immanent critique of this position is offered by those who argue that New Zealand’s best economic opportunities are to be found in the pursuit of a GM-free path. Here, the importance of economic returns is accepted; only the path to achieve them is disputed. Maintaining GM-free status is either seen as protection against the potential economic harms that growing consumer rejection of GM food would bring (WB Tony Marks, ZESPRI, B(j)iii) or as a boon that would tap not only the markets for GE food but the demand among tourists for 'outdoor recreation in an unspoiled environment' (Green Party: A(1)).

If the public interest is equated with the economic returns to be had from pursuing (or avoiding) the use of GM, there is no need for the public interest to be determined collectively by citizens *qua* citizens. Rather, the determination of the course that would best serve the public interest becomes a technical question resolvable by those with biotechnological and economic expertise, as well as by ‘the market’ as arbiter of what is likely to be profitable. This is reinforced by the familiar neoliberal argument that the play of economic interests should be as unconstrained as possible: in this case, to be constrained only by regulation based on proof of harm derived through ‘sound science’, and even then through self-regulation and self-monitoring by economic actors wherever possible. Economically rational actors, it is argued, do not want a product failure or a public relations disaster on their hands, so are well-motivated to avoid harmful applications; after all, ‘[a] significant failure of a particular new organism will have major financial and other consequences for the owner or user of the GM derived product’ (Life Sciences Network, B (n)).

A corollary to this position is the implicit notion that public participation—or democracy—is not a good in itself. Its value is at best instrumental in the pursuit of some other good—often (unstated, but implied as) economic competitiveness. If public participation is *costly* to potential developers, thereby discouraging them and making NZ uncompetitive, it should be curtailed. As Monsanto argues, ‘where the implementation of that consultation becomes onerous and unwieldy, it is counter-productive and possibly even detrimental to the interests of the public the process is supposed to serve...Public consultation may act as a barrier to investment’ (Monsanto: para.13). Similarly, if

participation introduces more *uncertainty* than investors want to bear, it should be curtailed. As the New Zealand Dairy Board warns, the ‘uncertainties involved in [ERMA’s] public hearing process are in themselves a significant disincentive’ to carrying out research in New Zealand. [para. 64.12] For others, mere public *expression* of concern or dissatisfaction with the technology is categorised as producing unaffordable obstacles to New Zealand’s economic competitiveness:

Crop & Food Research has serious concerns over the influence of public questioning of ethics, values and utility of gene technology on the career aspirations of researchers in gene technology. These skills are in great demand internationally and the debate in New Zealand may have already discouraged talented researchers sufficiently for them to look outside New Zealand for their future careers (Crop & Food Research: para.80).

Maximising (consumer) choice

The typical treatment of ethical and cultural issues suggests that the utilitarian cost/benefit calculation is universally applicable; it also is one instance of the more general tendency to posit ‘consumer’ as the only legitimate identity for the ‘lay’ public in the GM debate.. In a line of reasoning parallel to the notion that the public’s fears about biotechnology can be overcome through *education*, it is also argued that ethical and cultural objections can be overcome by more *information to consumers about benefits*. New Zealanders’ ‘improved understanding of the basis of gene technology’ ... could lead

many undecided people and others who base their value judgements on ethical, cultural and environmental issues to become more accepting of the technology due to the positive outcomes and benefits of genetic modification' (NZ Biotechnology Association, B(j)iv).

If this is the case, then ethical/cultural concerns do not constitute a kind of expertise that justifies citizen participation; once again they are seen as a kind of ignorance or irrationality, here a product of imperfect consumer information. The appropriate response would then be, not to allow such concerns to limit economic activity, but to increase information about benefits so the concerns will dissipate. Those ethical and cultural difficulties that remain are not to be publicly adjudicated or collectively resolved; rather, they must be left to private individuals to decide. Any other treatment is seen as a serious transgression of the (core neoliberal) principle of *individual freedom of choice*. Ethical or cultural objections should be acted on by the individual *qua* consumer, not *qua* citizen.

[C]ultural and spiritual issues should be dealt with by education and consumer choice. Cultural and spiritual issues should not be used to impinge the rights of those who wish to use, research or produce substances or organisms resulting from GM.... (New Zealand Biotechnology Association, exec. summ.)

This discourse assumes its own stance to be outside the realm of cultural and ethical 'preferences'; it does not acknowledge its own stance of privileging individual freedom of

choice (or instrumental rationality) as in itself an imposition of a particular cultural or ethical prescription on society as a whole.

Yet while '[r]esponsible regulation of GM should provide choice', this commitment to choice must not result in 'controls which are damaging to New Zealand's economic interests' (New Zealand Dairy Board: para.58.5). In particular, labelling of GM products should not be required if this could damage the economic prospects of industry actors. While '[m]andated labelling statements can be important for protecting human health and safety', 'the motivation and rationale for choice are too complex for a single regulatory response.' Moreover, '[m]andatory labelling of GM products imposes high costs' (New Zealand Dairy Board: paras.65.13-65.16).

There are two ways in which this position is contested *within* the paradigm of individual choice. In line with its 'wait and see' position on the use of agricultural GMOs, ZESPRI's conclusion regarding the need for and effects of comprehensive labeling differs greatly from that of the Dairy Board. They argue that, by giving consumers 'choice and personal control' through 'full and honest disclosure at point of sale', comprehensive labelling is 'an essential step in the process of consumer acceptance of this technology' (B(h)4).

More common is the argument that the principle of individual consumer freedom of choice is violated by inadequate labelling laws—in particular, by those that require provision of information only about GM product ingredients, and not about GM

production processes. Requiring production information 'would ensure that consumers have the right to avoid GM food if they wish to, for cultural, religious or ethical reasons, and to avoid products produced using new and controversial technology. (Green Party, B(j)i.) The same argument is also applied to the release of GMOs into the wider environment. The posited impossibility of protecting non-GM crops from GM contamination removes the possibility of individual choice of GM-free produce (e.g., Canterbury Commercial Organics Group, B(c) ii.), or of the 'freedom to choose a life free of GMOs' (WB Tremane Barr, Canterbury Commercial Organics Group, B(k)). Focusing on this aspect of individual choice leads to the conclusion that a *collective* decision to prohibit GMO release is required to protect the *individual* consumer and producer choice of GM-free products, reversing the dominant argument that a collective decision to permit GMO release (though it is often presented instead as the rejection of a collective decision to prohibit) is required to protect individual consumer and producer choice of GM products (e.g., Federated Farmers [B(k)]).

Privileging property rights in a commodified world

The role and status of property rights within the economically rational approach to genetic modification also places severe constraints on the possibilities for citizen participation. The commodification of human beings (labour) and nature (land), noted by Polanyi (1957) as a crucially revolutionary aspect of the development of liberal capitalism in the 19th Century, has--with the commercial development of modern biological techniques--been extended to the genomes of living beings. The treatment of

intellectual property (IP) issues as questions of determining where maximum economic benefit lies, rather than as moral questions, not only reflects the degree to which the GM debate partakes of the neoliberal paradigm; it also, within that paradigm, removes such issues from collective public jurisdiction—including, according to some, from RCGM jurisdiction.

IP protection for GM technologies should always operate to encourage beneficial downstream development but not be applicable where benefits are maximised by information free flow....If there is to be a change, a shift of the boundaries, then this is not primarily a GM issue but an issue relating to maximising the benefits (Association of Crown Research Institutes, B (f)).

The division of the world into private property, given markets, makes it unnecessary, indeed illegitimate, for use of that property to be determined collectively.

These two elements—commodification and the privileging of economic returns—combine in a widely prevalent argument for the necessity of denying public access to information relevant to the approval process, even if that information is crucial to effective participation in that process, e.g.: 'Information related to the application for approval to ERMA, which if made public, would be detrimental to the opportunity to capture national benefits from GMOs, should be kept confidential' (Association of Crown Research Institutes, A(2)) or, in Monsanto's somewhat more direct style:

If intellectual property rights cannot be given adequate protection companies such as Monsanto are unlikely to proceed with applications for field trials in New Zealand. ...In an open economy, especially one seeking to become a 'knowledge economy', legislation, which coerces commercial organisations to release sensitive intellectual property into the public domain, is not good legislation.

(Monsanto: paras. 17 and 137)

Again, democracy must be sacrificed to the goal of the 'competitive knowledge economy'.

The final nail in the coffin of collective public agency is provided by the argument that *there is no alternative* to the global economic competitiveness stakes. As the New Zealand Life Sciences Network proclaims: 'it is futile for New Zealand . . .to seek to change the tide of globalisation' (B(b)). If the context of unrelenting global competition in which capital chases the most favourable conditions is unalterable, then the only rational decision is to ensure that conditions are in harmony with the most welcoming or regulatorily lenient of like countries: 'the imposition of controls which are more restrictive than those of other comparable countries, will hinder New Zealand's competitiveness and seriously damage the New Zealand economy' (New Zealand Dairy Board, para.58.2).

Nothing the public would decide can change this. Decisions reflecting public views that are out of line with major international economic actors would, it is repeatedly warned,

put New Zealand afoul of the World Trade Organization. Again, there can be no meaningful role for public participation in shaping New Zealand's GM policies. In fact, public concerns about corporate control and the distribution of power derived from wealth are dismissed as irrelevant or illegitimate; the regulatory process must be protected from this kind of politicisation' (Monsanto, paras.151-156). Thus a debate on how power should be distributed in society, an area in which all (or no) citizens could be seen as experts, is foreclosed, removing another justification for citizen participation.

Who decides? Re-legitimizing democratic agency

As with scientific rationality, in relation to economic rationality there are also discourses of rejection, redefinition, and revaluation; these discursive stances have various implications for the citizenship/expertise relationship. While those operating from the perspective of economic rationalism assume that perspective rather than justify it, the marginalisation of the contending discourses is reflected in their felt need to explicitly reject or refute the dominant assumptions. Thus they can be most readily organised according to what they refuse.

Present in the submissions are *rejections of the equation of public interest with economic returns*. This sometimes takes the form of an explicit rejection of 'the prevailing utilitarian worldview' as 'not a sustainable worldview' (Sustainable Futures Trust, B.(b)) and as a 'limited moral vision [that does not] allow us to make sense of the world' (Green

Party, B(j)iv). The rejection is sometimes focused explicitly on the regulatory process, where, it is argued, 'commercial motivations need to be clearly differentiated and isolated' (Sustainable Futures Trust, A(1)) from other aims and distinguished from the public interest (Nelson GE Free Awareness Group, para. 120).

Rejecting the equation of the public interest with economic returns opens the possibility for democratic participation to be treated as a good in itself. Arguing against calls to restrict public participation in the regulatory process, the Green Party argue it 'would be arrogant and undemocratic to attempt to exclude New Zealanders from any part of the approval process' (B(a)). Citizen participation is a right that cannot be trumped by economic considerations: 'It is the peoples [sic] democratic right to say no to this technology.' (Nelson GE Free Awareness Group: para.128.)

Going beyond a critique of the anti-democratic influence of economic interests on the regulatory process, the Safe Food Campaign equates GM technology itself with the anti-democratic power of the wealthy:

It is a technology that acts as a form of order embodying a specific form of power and authority...The values embodied by GM, are those of the dominant industrialised world. It embodies the expanded domination of the industrialised world over the majority world (B (j)iv).

Presenting the technology itself as a form of authority—one that is potentially in conflict with democratic authority—legitimizes extensive citizen involvement in scrutiny of and decision-making around that technology.

In one sense, the rejection of utilitarian approaches undercuts a justification for citizen participation in such decisions: after all, utilitarian arguments (costs and benefits are what matter, and each individual is best placed to judge the costs and benefits relative to him/herself) have historically been used to undermine the legitimacy of traditional authoritarian regimes. However, this line of argument also leads to the prescription to provide maximum scope for individual choice through market mechanisms. As we have seen, an immanent critique of economical rationality charges the dominant view with obstructing individual choice by withholding necessary consumer information. Others *contest the adequacy of individual choice* even to achieve the best aggregate economic outcomes: 'The reason that the decision has to be taken for New Zealand as a whole, and not by individual biotech companies or farmers, is that that is the only way that all the costs to the country [including damage to the 'clean green brand'] can be weighed against all the benefits (Green Party, B(h)).

The adequacy of individual choice in the ethical realm is also challenged by placing 'individual choice' in a social context. The Sustainable Futures Trust, for example, calls attention to the lack of a 'fair choice' facing the less well-off in a world of cheaper GM products (B.j.iii) and also question the freedom, and the justice of the outcomes, of 'socially mediated' individual choice such as that facing a woman who learns that the

foetus she is carrying has a genetic disorder (B(c)2.1.2). Casting doubt on the ethical adequacy of individual choice potentially creates more space for legitimate collective choice.

Neoliberalism's boundless *commodification* and its grounding in individual property rights are also contested. Ngai Tahu criticise the current intellectual property regime for applying the term 'property', embedded in notions of individual rights of ownership, to 'traditional resources of indigenous communities' (Te Runanga O Ngai Tahu B(f)5).

Often the critique of neoliberal commodification and its extension to genetic information is based on moral repugnance ('The patenting of life calls into question the most basic values because it places a monetary value on life' [Green Party, B(f)], but it can also open up space for democratic control: 'The state of the earth's genetic material affects all life forms and should therefore be "owned" and "controlled" by the public through open processes' (Green Party: B(j)iv).

Finally, we find within the submissions an explicit critique of the impact of the neoliberal international economic order on the possibility of *national sovereignty and democratic agency*. New Zealanders are called upon to strive to 'retain our integrity, dignity and security' in the face of 'the globalising free market' (Sustainable Futures Trust: B(j)iii).

The World Trade Organization is portrayed as likely to 'impact on the public and environment in extremely negative ways' (Nelson GE Free Awareness Group: para. 340) and as an embodiment of 'corporate hegemony' that will try to enforce corporate will upon New Zealand. Building on the assumption that 'freedom' and 'democracy' still carry

persuasive power, Joe Rifici (Witness Brief, Nelson GE Free Awareness Group: exec. summ.) declaims: 'Any nation which would compromise health, welfare, justice and liberty for such reasons [i.e., fear of 'retaliation from the corporate hegemony'] is neither free nor a democracy'. Portraying the technology as essentially intertwined with a particular political-economic order in this way places a reaffirmed democratic agency at the spoken centre of the GM problematic.

Conclusion

In their constriction of democratic agency, scientific and economic rationalities are mutually reinforcing. The enterprise of science, particularly publicly funded science, legitimates itself publicly as a producer of economic goods. Likewise, economic rationality draws on a figuration of economics itself as 'science'—i.e., as objective, abstracted from culture or social location, and grounded in laws of nature (in this case, human nature)—in other words, as uncontestable in any terms other than its own. As an authoritative and interwoven blend of dominant discourses, economic and scientific rationalities both presume and confer unquestioned legitimacy, and thus have an inordinate influence on policy outcomes in the context of settings such as the RCGM in New Zealand. Within the seemingly impermeable bounds of their shared instrumental rationality, reductionism, and materialism, these discourses both remove grounds for citizen contestation as equals and inspire resignation to the inevitable. When only those voices located within these discourses are considered legitimate, then 'other' voices are marginalized or even ruled out in advance. It is this constraint on (legitimate) speech, and

subsequently the possibility for political agency, that can account for much of the frustration of submitters to the RCGM who felt that they simply had not been heard.

Those who are marginalized by virtue of speaking the ‘wrong’ language are rarely silent, however, and while the RCGM submissions clearly demonstrated the ascendancy of economic and scientific rationalities, they also provided ample evidence of voluminous and persuasive contestations to the unquestioned stature of these discourses. If robust and comprehensive examinations of these submissions were to be taken into account in formulating policy around genetic modification in New Zealand, our collective notions of ‘expertise’ and ‘legitimacy’ would necessarily be expanded, thus also necessitating broad-based participation in scientific and technological decision-making. To leave these decisions to the ‘experts’ undermines democracy; these submissions provide a means for policy-makers to understand and respond to the demands of genuine scientific and technological citizenship, should they choose to do so.

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