

---

---

# Are the Kiwis Taking a Leap? – Learning from the Biosecurity Policy of New Zealand

Mitsuhiko A. Takahashi\*

## I. INTRODUCTION

Of the many causes of biodiversity loss, pressures from exotic and invasive species are among the most difficult for the general public to fully comprehend even though they are among the most destructive. Due to the complexity and incremental nature of the biodiversity loss, scientists have played a leading roll in promoting public awareness and proposing countermeasures. Although the problem has become more apparent to policy makers within the last decade or so, many jurisdictions are still searching for effective ways to prevent and control exotic and invasive species.

In recent years, New Zealand has introduced a number of comprehensive countermeasures and innovations, and is now recognized as a world-leader in the field.<sup>1</sup> Part II of this paper gives some background information about the alien and invasive species issue and presents some United States regulations as examples of conventional legal countermeasures. Part III discusses problems that arise from using

---

\* Associate Professor of Law, Faculty of Human Development, University of Toyama, Japan. E-mail: mitsu@edu.u-toyama.ac.jp. The author would like to thank the Japan Fund for Global Environment for funding the research trip to New Zealand, and David Grinlinton (Faculty of Law at the University of Auckland) and Aaron Courtney for their invaluable comments. The responsibility for any errors resides with the author.

<sup>1</sup> GUARDING PACIFIC'S TRIPLE STAR – DRAFT BIOSECURITY STRATEGY FOR NEW ZEALAND 5 (Biosecurity Council Dec. 2002) [hereinafter BIOSECURITY DRAFT 2002].

conventional legal systems to manage alien species. Part IV provides an overview of New Zealand's biosecurity policy, and Part V discusses the policy's problems and scientific effectiveness. In conclusion, Part VI discusses the requirements to improve the means of implementing science in the legal control of exotic and alien species.

## II. BACKGROUND: THE ISSUE AND CONVENTIONAL REGULATIONS

### A. Problem of Alien Species

The global ecosystem has many natural barriers such as oceans, mountains and rivers. These natural barriers and differences in climate have contributed to the diversity of organisms, which scientists call "biodiversity." However, the Industrial Revolution and the era of Imperialism have dramatically increased the mobility of people and cargo between countries and regions, resulting in the movement of huge numbers of organisms intentionally and unintentionally. This trend has been greatly accelerated by globalization.

The so-called "biological invasions" of alien invasive species<sup>2</sup> has become one of the major reasons for the loss of biodiversity around the globe.<sup>3</sup> The adverse effects include a progressive biological homogenization or "biosimilarity" that could be explained as "evolution in reverse."<sup>4</sup> These effects are devastating in oceanic islands such as Hawaii,<sup>5</sup> and in island countries like Japan, which may not be classified as an oceanic island in strict bio-geographical terms. The effects are also evident in the "New World," such as North and South America. One of the challenging regions, however, will be Oceania, particularly New Zealand and Australia, which have been largely isolated with rich, unique biodiversity and are relatively new to human incursion.

Biological invasions are conspicuous, but the emergence of bioscience and the utilization of genetic modified organism (GMO) technology have led to another set of concerns. The scientific community has many divergent opinions towards GMO, and policy makers are struggling to find a resolution.

### B. Legal Measures in the United States

The biological disturbance of ecosystems has progressed now to the point where it is causing serious economic damage to both developed and developing nations. In

---

<sup>2</sup> In this paper, either the term "alien invasive species" or "invasive species" will be used to describe species which threaten ecosystems, habitats, or other species. The term "alien species" refers to species which, as a result of intentional or unintentional introduction by humans, occur outside of their normal distribution. See The United States Department of Agriculture, National Invasive Species Information Center (NISIC), <http://www.invasivespeciesinfo.gov> (last visited Feb. 9, 2006).

<sup>3</sup> See EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 253-54 (W.W. Norton & Co. 1999) (1993) (stating that from prehistory to the present time, the introduction of disease carrying animals, such as rats and goats, has contributed significantly to the "environmental apocalypse," resulting in habitat destruction and the extinction of many animal species).

<sup>4</sup> DAVID N. STAMOS, *THE SPECIES PROBLEM: BIOLOGICAL SPECIES, ONTOLOGY, AND THE METAPHYSICS OF BIOLOGY* (2003) (explaining the Biosimilarity Species Concept).

<sup>5</sup> See generally *ECOLOGY OF BIOLOGICAL INVASIONS OF NORTH AMERICA AND HAWAII* (Harold A. Mooney & James A. Drake eds., Springer-Verlag 1986) (examining the current knowledge of the ecology of biological invasion in North America and Hawaii).

the United States, scientists at Cornell University have estimated the total annual losses and control costs of such damage to be approximately \$137 billion a year.<sup>6</sup> While the problems of invasive species are now better understood, they are not new. Such problems first attracted the interest of agricultural science and domestic businesses. As a consequence, early legal countermeasures focused primarily on quarantine measures imposed on the transportation and importation of plants and livestock to protect agriculture from pests, weeds, and diseases. Systems of plant and animal quarantine have, in fact, been implemented since the late nineteenth century. In the United States, the Plant Quarantine Act,<sup>7</sup> the predecessor of the Plant Protection Act of 2000,<sup>8</sup> was enacted in 1912.

Concerning wildlife and natural resources, states, which have jurisdiction over wildlife, regulate the deliberate release and importation of certain animals within their jurisdiction. At the federal level, the Lacey Act,<sup>9</sup> which was passed in 1900 as the first federal law on wildlife protection, regulates interstate and international trade in wildlife and generally prohibits the importation or transportation of “injurious” species.<sup>10</sup> As globalization has expanded, however, these conventional legal measures have been criticized. The measures focus on agricultural, natural resources, or human health interests and are therefore unable to address the comprehensive risks and damages caused by alien invasive species.

In recent decades, economic damage caused by alien invasive species, especially by insects, aquatic organisms and exotic weeds, has led to further federal and state statutes.<sup>11</sup> For example, in reaction to the explosive propagation of Zebra Mussels in the Great Lakes, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990<sup>12</sup> and National Invasive Species Act of 1996<sup>13</sup> were enacted to regulate and prevent the introduction and spread of aquatic nuisance species in the Great Lakes through ballast water exchange.<sup>14</sup>

In February 1999, President Clinton issued Executive Order 13112,<sup>15</sup> addressing countermeasures against invasive species. The Executive Order requires federal agencies to refrain from actions likely to increase invasive species, creates an interagency Invasive Species Council, and calls for a National Invasive Species Management Plan to be completed by 2000.<sup>16</sup> The National Invasive Species Management Plan, *Meeting the Invasive Species Challenge*,<sup>17</sup> was released in

---

<sup>6</sup> David Pimentel et al., *Environmental and Economic Costs of Nonindigenous Species in the United States*, BIOSCIENCE 53, 53 (Jan. 2000).

<sup>7</sup> 7 U.S.C. §§ 151-167 (repealed 2000).

<sup>8</sup> 7 U.S.C. §§ 7701-7772 (2000).

<sup>9</sup> 16 U.S.C. §§ 701, 3371- 3378 (2000); 18 U.S.C. § 42 (2000).

<sup>10</sup> 50 C.F.R. § 16 (1997).

<sup>11</sup> See Viki Nadol, *Aquatic Invasive Species in the Coastal West: An Analysis of State Regulation within a Federal Framework*, 29 ENVTL. L. 339 (1999) (discussing statutes against aquatic invasive species in the U.S.).

<sup>12</sup> 16 U.S.C. §§ 4701- 4751.

<sup>13</sup> *Id.*

<sup>14</sup> 16 U.S.C. § 4711(b)(2)(B)(i) (Supp. 1997).

<sup>15</sup> Exec. Order No.13112, 64 Fed. Reg. 6183 (Feb. 8, 1999).

<sup>16</sup> *Id.*

<sup>17</sup> NATL. INVASIVE SPECIES COUNCIL, MANAGING PLAN - MEETING THE INVASIVE SPECIES CHALLENGE (Jan. 18, 2001).

January 2001.

Even though they pose a similar threat to biodiversity, GMOs are treated differently from invasive species. Regulation of GMOs in the United States is fragmented and complex.<sup>18</sup> Regulatory activities are divided among at least three central agencies. The United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) are involved in the regulation of living modified organisms (LMOs). Under the authority of the Plant Protection Act of 2000, the USDA issues permits through the Animal Plant Health Inspection Service (APHIS) for the “import, interstate movement, and field testing of genetically altered plants, microorganisms, and invertebrates.”<sup>19</sup> The EPA is involved in regulating bio-engineered pesticides pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (FIFRA)<sup>20</sup> and other provisions. The United States has consistently maintained a pro-GMO position, but, as one commentator has suggested, the fragmented regulatory system “has failed to adequately determine the effects of GMOs on humans and the environment,”<sup>21</sup> and thus the problem “requires the special attention of an independent federal agency” to address the “extremely scientific and complex” area of GMOs.<sup>22</sup>

### III. PROBLEMS WITH CONVENTIONAL LEGAL MEASURES

Countermeasures must be scientifically sound to efficiently and effectively control invasive species; however, most of the legal instruments are more traditional and are often overridden by existing vested interests or fund shortages.

#### A. Lack of a Regulatory Regime

In the United States, the Lacey Act has been addressing “injurious species” since 1900 and quarantine laws have been around since the early twentieth century. In contrast, many categories of organisms were not addressed at all until quite recently. Many nations still lack any regulatory regime for the management and control of alien species. For example, Japan is one of the largest importers of agricultural products in the world. Yet the country does not regulate seeds, weeds, or trees in its plant quarantine laws. Japanese plant quarantine laws only regulate pests such as insects, fungi, and parasites. Perhaps due to the public’s low interest in nature conservation and outdoor recreation in Japan, wildlife laws and park management regulations lack sufficient provisions against the release of animals in the wild and the importation of wild animals.<sup>23</sup> Nevertheless, with the broader awareness and dissemination of information about the concept of biodiversity in recent years, the Ministry of Environment in Japan pushed to enact the Invasive Alien Species Act in

---

<sup>18</sup> See Heather N. Ellison, *Genetically Modified Organism: Does the Current Regulatory System Compromise Consumer Health?*, 10 PENN ST. ENVTL. L. REV. 345, 349 (2002).

<sup>19</sup> Judith E. Beach, *No “Killer Tomatoes”: Easing Federal Regulation of Genetically Engineered Plants*, 53 FOOD & DRUG L.J. 181, 182 (1998).

<sup>20</sup> 7 U.S.C. §§ 136-136(y) (1994).

<sup>21</sup> Ellison, *supra* note 18, at 362.

<sup>22</sup> *Id.* at 363.

<sup>23</sup> Mitsuhiro Takahashi, *Scientific Issues, Especially Wildlife Trade and Invasive Species, Left Over in Wildlife Protection and Hunting Law Amendment*, 52 SEIBUTSU KAGAKU 171, 176-79 (2000) (in Japanese).

2004 to protect biodiversity.<sup>24</sup> Many other nations are now starting to take legal measures against invasive species, a topic which has been addressed by an increasing number of international conventions, such as the Convention on Biodiversity.<sup>25</sup>

#### B. “Dirty List” Approach

The approach of existing legislation has often been reactive, addressing only those species known to be dangerous (“dirty list”), thus making the regulatory range very narrow.<sup>26</sup> The importance of a “precautionary approach” cannot be overstated in combating invasive species. It is a truism that alien species that are inconspicuous in their original habitat often cause major disruptions to the balance of local ecosystems when introduced to a new habitat. It is very difficult to predict the effects of such introduction. Therefore, a “clean list” approach is suggested by imposing a general ban on all introductions of alien species except those with rigorously assessed and controlled approvals.<sup>27</sup> Prior to any judgment on such introductions, an environmental risk analysis should be executed comparing the risks with the benefits of introduction. Regrettably, however, this precautionary approach has not been widely implemented.

#### C. Coordination between Regulatory Agencies

Statutes and measures for biosafety have, in the past, been ad hoc and uncoordinated between independent agencies and stakeholders.<sup>28</sup> Ecologically, the problems evolving from alien species are all interrelated within the ecosystem. Conversely, the current legal and administrative systems, inter-jurisdictionally and intra-jurisdictionally, are not designed to address ecological issues in an integrated, comprehensive way.<sup>29</sup> Nationally, a comprehensive regime involving integration among regulatory agencies and local government is indispensable.<sup>30</sup> Internationally,

---

<sup>24</sup> Tokutei gairai seibutsu niyoru seitaikeito ni kakawaru higai boushi ni kansuru horitsu [Invasive Alien Species Act], Law No. 78 of 2004, available at <http://www.env.go.jp/en/topic/as.html> (last visited Feb. 9, 2006).

<sup>25</sup> The Convention on Biodiversity, About the CBD, <http://www.biodiv.org/default.shtml> (last visited Feb. 9, 2006) (“At the 1992 Earth Summit in Rio de Janeiro, world leaders agreed on a comprehensive strategy for ‘sustainable development’. . . One of the key agreements adopted at Rio was the Convention on Biological Diversity. This pact among the vast majority of the world’s governments sets out commitments for maintaining the world’s ecological underpinnings as we go about the business of economic development. The Convention establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.”)

<sup>26</sup> See, e.g., U.S. OFFICE OF TECHNOLOGY ASSESSMENT, 103D CONG., HARMFUL NON-INDIGENOUS SPECIES IN THE UNITED STATES 108-109 (1993) (discussing the “clean” and “dirty” list dichotomy in existing legislation) [hereinafter OTA REPORT]; George Laycock, *The Importation of Animals - The Unforeseen Consequences*, 63 *Sierra* 20 (1978); Steven A. Wade, *Stemming the Tide: A Plea for New Exotic Species Legislation*, 10 *J.LAND USE & ENVTL. L.* 343, 366 (1995) (noting use of the “dirty” list approach under the Lacey Act).

<sup>27</sup> OTA REPORT, *supra* note 26.

<sup>28</sup> *Id.* at 163.

<sup>29</sup> See Julianne Kurdila, *The Introduction of Exotic Species into the United States: There Goes the Neighborhood!*, 16 *B.C. ENVTL. AFF. L. REV.* 95, 108-111 (1988) (recognizing the need for uniform protective legislation among states to regulate the introduction of exotic species); John L. Dentler, *Noah’s Farce: The Regulation and Control of Exotic Fish and Wildlife*, 17 *U. PUGET SOUND L. REV.* 191, 226-234, 239-240 (1993) (advocating for national regulation of exotic species).

<sup>30</sup> Wade, *supra* note 26, at 364-65.

efforts are being made to construct clearinghouses for the sharing of information and coordination.<sup>31</sup>

Regulatory decisions on invasive species are often inconsistent with scientific priorities. In most cases, regulatory measures target species for which public awareness is high. Often, the legislators' decisions are not based on scientific reasoning, but rather according to political interests and expediency. These decisions can leave the ecologically crucial cases with few resources.

#### IV. NEW ZEALAND'S BIOSECURITY POLICY

New Zealand has named its policy against biological pollution by exotic and invasive species "biosecurity." With this policy the government is attempting to develop an integrated comprehensive strategy resting on sound scientific knowledge and research, and the application precautionary measures.

Despite relatively low involvement in some areas of pollution control,<sup>32</sup> observers have noted, "New Zealand has introduced one of the most integrated approaches to the management of natural resources in the world."<sup>33</sup> Some of the most important innovations have included: the Resource Management Act of 1991,<sup>34</sup> the establishment of the Environment Court,<sup>35</sup> the establishment of an Environmental Ombudsman,<sup>36</sup> and other bold policies. Consistent with its image as a "clean and green" country, New Zealand has been less affected by industrial pollution and overpopulation, thus enabling the country to learn from the experiences of other countries and to prevent future environmental problems.<sup>37</sup> New Zealand's unique natural environment and dependence on primary industry has resulted in the government's very strict approach to quarantine and biosafety issues.<sup>38</sup> The Biosecurity Council of the New Zealand government notes that "in many cases, our competitive edge stems from our relatively natural production systems and relative freedom from pests and diseases."<sup>39</sup>

---

<sup>31</sup> CLARE SHINE ET AL., A GUIDE TO DESIGNING LEGAL AND INSTITUTIONAL FRAMEWORKS ON ALIEN INVASIVE SPECIES 30 (IUCN 2000).

<sup>32</sup> TON BUHRS & ROBERT V. BARTLETT, ENVIRONMENTAL POLICY IN NEW ZEALAND – THE POLICY OF CLEAN & GREEN 158-160 (Oxford Univ. Press 1993).

<sup>33</sup> *Id.* at 156.

<sup>34</sup> Resource Management Act of 1991 (Pub. Act 1991 No. 69).

<sup>35</sup> New Zealand Environment Court, <http://www.justice.govt.nz/environment> (last visited Feb. 9, 2006) (The Environment Court was established by the Resource Management Amendment Act 1996, as a court of record consisting of Environment Judges and Environment Commissioners.)

<sup>36</sup> New Zealand Parliamentary Commissioner for the Environment, Future Directions: Strategic Focus of the Parliamentary Commissioner for the Environment, Aug. 1997, [http://www.pce.govt.nz/reports/allreports/future\\_directions.shtml](http://www.pce.govt.nz/reports/allreports/future_directions.shtml) (last visited Feb. 9, 2006) (One of the Commissioner's core roles is as an "environmental ombudsman" where the PCE could address citizens' concerns and information on environmental management. Such concerns are "a unique source of information on environmental management issues that is often not readily available to government agencies.").

<sup>37</sup> Buhrs & Barlett, *supra* note 32, at 5-6.

<sup>38</sup> BIOSECURITY COUNCIL, PROTECT NEW ZEALAND: THE BIOSECURITY STRATEGY FOR NEW ZEALAND 5 (2003), available at <http://www.biosecurity.govt.nz/bio-strategy/biostrategy.htm> [hereinafter BIOSECURITY STRATEGY].

<sup>39</sup> *Id.*

## A. Structure of the Biosecurity Policies

The Biosecurity Act of 1993,<sup>40</sup> along with the Hazardous Substances and New Organism Act of 1996 (HSNO Act),<sup>41</sup> defines New Zealand's current biosecurity framework. Under the Biosecurity Act, one of the Ministers of the Crown in Cabinet is appointed as the Minister for Biosecurity.<sup>42</sup> The Minister for Biosecurity takes responsibility for coordinating the implementation of the Act, recording and coordinating reports of suspected new organisms, and managing appropriate responses to such reports.<sup>43</sup> However, the Minister of Biosecurity does not maintain an independent Ministry to carry out his duties, but instead relies on other central government agencies and regional councils, which hold statutory operational responsibilities.<sup>44</sup>

The central government agencies with operational responsibilities under the Biosecurity Act include the Ministry of Agriculture and Forestry (MAF), the Department of Conservation (DOC), the Ministry of Fisheries, and the Ministry of Health.<sup>45</sup> Each of the four agencies bears respective responsibilities, reports to the Minister of Biosecurity and has agreed to work with the other agencies on biosecurity matters.<sup>46</sup> The MAF is the lead agency and is responsible for border control (through the MAF Quarantine Service) and biosecurity issues affecting preliminary industry – agriculture, horticulture, and forestry.<sup>47</sup> DOC is responsible for biosecurity issues that impact conservation and environmental values.<sup>48</sup> MOF is responsible for marine biosecurity issues including threats to both conservation and the commercial values of marine resources.<sup>49</sup> The MOH is responsible for biosecurity issues that impact human health.<sup>50</sup> Furthermore, the four central agencies and regional councils that have statutory obligations under the Biosecurity Act are responsible for developing national pest management strategies,<sup>51</sup> proposing regional pest management strategies,<sup>52</sup> and taking action in response to biosecurity emergencies.<sup>53</sup>

---

<sup>40</sup> Biosecurity Act 1993 (Pub. Act 1993 No. 95) [hereinafter Biosecurity Act].

<sup>41</sup> Hazardous Substances and New Organism Act 1996 (Pub. Law 1993 No. 30) [hereinafter HSNO Act].

<sup>42</sup> Biosecurity Strategy for New Zealand: Governance and Structural Arrangements, <http://www.biosecurity.govt.nz/bio-strategy/cabinet-papers/governance.htm> [hereinafter Biosecurity Governance and Structural Arrangements].

<sup>43</sup> Biosecurity Act, *supra* note 40, at § 8.

<sup>44</sup> Biosecurity Governance and Structural Arrangements, *supra* note 42.

<sup>45</sup> OFFICE OF THE PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT, NEW ZEALAND UNDER SIEGE - A REVIEW OF THE MANAGEMENT OF BIOSECURITY RISKS TO THE ENVIRONMENT 27 (2000) [hereinafter NEW ZEALAND UNDER SIEGE].

<sup>46</sup> See Memorandum of Understanding on Biosecurity Activities between Ministry of Agriculture and Forestry and Department of Conservation, Ministry of Fisheries, and Ministry of Health (June 28, 2005), available at <http://www.biosecurity.govt.nz/bio-strategy/papers/biosecurity-mou.htm#1> (describing the current inter-agency agreement).

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> BIOSECURITY DRAFT 2002, *supra* note 1, at 28. These responsibilities overlap to some extent such as in the role of MAF Quarantine Service and MOH in management of Salt Marsh Mosquito.

<sup>51</sup> Biosecurity Act, *supra* note 40, at §§ 10, 68, 69.

<sup>52</sup> *Id.* at §§ 13, 71, 73.

<sup>53</sup> *Id.* at § 11.

To promote comprehensive integration among the various agencies and stakeholders, the Minister of Biosecurity has established the Biosecurity Council,<sup>54</sup> which was replaced by the Biosecurity Ministerial Advisory Committee, as an inter-agency forum to discuss biosecurity policy issues.<sup>55</sup> The Biosecurity Council was a non-statutory advisory group comprised of an independent chair, the chief executives of the four central agencies and the Ministry for the Environment, the Ministry of Research Science and Technology, the Environment Risk Management Authority (ERMA), and representatives of the various regional councils.<sup>56</sup> Its major task in recent times has been designing the Biosecurity Strategy, which was published in August 2003 and has been fully endorsed by the government.<sup>57</sup> The Biosecurity New Zealand website describes the strategy as “propos[ing] a new direction for New Zealand’s biosecurity, to deal with the mounting pressures on the biosecurity system.”<sup>58</sup>

This strategic framework seems like a general mobilization order. With ongoing governmental campaigns—such as “Protect New Zealand – Keep Pests & Diseases Out!”—the government’s strategy may be true in principle. However, the resources and business of biosecurity are overwhelmingly concentrated in the hands of the MAF. Along with the Quarantine Service, MAF has organized the Biosecurity Authority as an executive branch within the Ministry.<sup>59</sup> The MAF Biosecurity Authority has become the operational headquarters of biosecurity, and has handled the administration of the Biosecurity Council.<sup>60</sup> In 2000, the relative proportions of the government funding administered by the four Ministries were: MAF 93%, DOC 3%, MFish 2.4%, and MoH 1.7%.<sup>61</sup>

The concentration of resources and funding with MAF could be explained by the importance of pre-border measures, which MAF administers. Within the funding for MAF, forty-eight percent was allocated for border inspection.<sup>62</sup> Some critics argue that this concentration reflects the political priorities of government and MAF’s

---

<sup>54</sup> New Zealand Ministry of Agriculture and Forestry, Biosecurity Council, <http://www.maf.govt.nz/mafnet/publications/2002-post-election-brief/strategic-context-emerging-issues/biosecurity/biosecurity02.htm> (last visited Feb. 9, 2006) (Biosecurity Council established as a forum to provide Minister for Biosecurity with “coordinated and consistent advice on biosecurity policy and implementation across agencies with an interest in biosecurity.”)

<sup>55</sup> Ministry of Agriculture and Forestry (MAF), Biosecurity Forums, <http://www.maf.govt.nz/biosecurity-strategic-unit/biosecurity-forums/index.htm> (last visited Feb. 9, 2006).

<sup>56</sup> New Zealand Ministry of Agriculture and Forestry, *supra* note 54.

<sup>57</sup> BIOSECURITY STRATEGY, *supra* note 38; New Zealand Ministry of Agriculture and Forestry, *supra* note 54 (Biosecurity Council established as a forum to provide Minister for Biosecurity with “coordinated and consistent advice on biosecurity policy and implementation across agencies with an interest in biosecurity.”).

<sup>58</sup> Biosecurity New Zealand, <http://www.biosecurity.govt.nz/bio-strategy/> (last visited Feb. 9, 2006).

<sup>59</sup> Ministry of Agriculture and Forestry (MAF), Advancing Agriculture, Horticulture and Forestry for the Benefit of All New Zealanders, <http://www.maf.govt.nz/mafnet/profile/maf-profile-2002.htm#Biosecurity> (last visited Feb. 9, 2006) (The Biosecurity Authority identifies high-risk imports and set standards with which they must comply to enter New Zealand.).

<sup>60</sup> *Id.*

<sup>61</sup> MINISTRY OF AGRICULTURE AND FORESTRY (MAF), ISSUES WITH NEW ZEALAND’S CURRENT BIOSECURITY PROGRAMME 3 (2001).

<sup>62</sup> *Id.* at 7.

institutional bias toward agricultural risks,<sup>63</sup> but the Biosecurity Council recommended that MAF should be “clearly accountable for [the] overall management of the whole biosecurity system.”<sup>64</sup>

#### B. Biosecurity Act

The Biosecurity Act is the primary source of biosecurity and covers related projects and regulatory programs.<sup>65</sup> These include quarantine of flora and fauna, quarantine of humans where necessary, and pest control of organisms that have already entered or become established in New Zealand. In most jurisdictions, the legal framework is fragmented between the various subject matter of regulation, such as plants or animals, or between the sector interests in the subject matter, such as agriculture or conservation. In comparison, the Biosecurity Act is a comprehensive, integrated, model statute for the management of biological pollution.

The major objective of the Biosecurity Act is the management of “unwanted organisms” through quarantine and pest management strategies. “Unwanted organisms” are determined by the Chief Technical Officer of the related Ministries having responsibilities under the Biosecurity Act in their respective areas of responsibility.<sup>66</sup> Once an animal, plant, or any other organism is determined as an unwanted organism, it may not be released in the field, and any cargo containing such material is defined as “risk goods” and may not be imported.<sup>67</sup> For unwanted organisms that have already come into the country, pest control plans are promulgated and implemented according to their urgency and necessity by responsible Ministries or Regional Councils. The MAF’s Biosecurity website provides extensive information about unwanted organisms and is easily accessible to the public.<sup>68</sup>

For species that have not yet entered or become established in New Zealand the government enacted a new statute, the Hazardous Substances and New Organisms Act (HSNO Act), in 1996.<sup>69</sup> With the promulgation of the HSNO Act, the Biosecurity Act was amended to concentrate on organisms already introduced or established in New Zealand.

#### C. Hazardous Substances and New Organisms Act (HSNO Act)

The HSNO Act created a comprehensive regulatory regime for “new organisms” under a single agency, the Environmental Risk Management Authority (ERMA).<sup>70</sup>

---

<sup>63</sup> BIOSECURITY DRAFT 2002, *supra* note 1, at 29.

<sup>64</sup> BIOSECURITY STRATEGY, *supra* note 38, at 33.

<sup>65</sup> Biosecurity Act, *supra* note 40.

<sup>66</sup> *Id.* at § 2(1).

<sup>67</sup> NEW ZEALAND UNDER SIEGE, *supra* note 45, at 25-29.

<sup>68</sup> Biosecurity New Zealand, <http://www.biosecurity.govt.nz/> (last visited Feb. 10, 2006).

<sup>69</sup> Ministry for the Environment, About the Hazardous Substances and New Organisms Act 1996, <http://www.mfe.govt.nz/laws/hsno.html> (last visited Feb. 9, 2006) (The passing of the HSNO Act represented “one of the most significant reforms of environmental legislation since the Resource Management Act.”).

<sup>70</sup> *Id.* (“The Act established the Environmental Risk Management Authority (ERMA) to assess and decide on applications to introduce hazardous substances or new organisms into New Zealand. This includes genetic modification of plants, animals and other living things in New Zealand.”); Environmental Risk Management Authority (ERMA New Zealand) Homepage,

The HSNO Act bans any “new organism” not approved by ERMA from being imported, field tested, or released into the field.<sup>71</sup> The HSNO Act defines a “new organism” as, *inter alia*, a species of any organism not present in New Zealand on the date of commencement of the HSNO Act (July 1998); an organism which is in containment; an organism that has been conditionally released under the Act; a genetically modified organism which has not previously been approved for importation or release; or an organism that belongs to a species, subspecies, or variety that has been eradicated from New Zealand.<sup>72</sup> Any new organism may only be imported or released in the field after approval.<sup>73</sup> The approval of a new organism is issued by ERMA; however, before making its decision on importation or release, ERMA must carry out a risk assessment at the applicant’s expense.<sup>74</sup> The HSNO Act requires that the public be notified about most applications.<sup>75</sup> “Any person” may submit a written submission to the application.<sup>76</sup> Also, ERMA may hold a public hearing when the Authority deems one necessary.<sup>77</sup> ERMA’s decision is discretionary, and applicants have no general right of appeal against ERMA’s decision on an application, except regarding questions of law which may be appealed to the High Court (not to the District Court or the Environment Court).<sup>78</sup>

#### D. Environmental Risk Management Authority (ERMA)

Although ERMA does not have any operational responsibilities in the Biosecurity Act, the Authority plays an important role in New Zealand’s biosecurity by assessing all potential invasive species, including GMOs, and deciding to ban or approve their introduction.<sup>79</sup> ERMA simultaneously administers approvals of hazardous substances as provided by the HSNO Act.

ERMA is a quasi-independent multimember agency consisting of Authority Members appointed by the Minister of Environment,<sup>80</sup> and assisted by staff headed by a Chief Executive and senior executives. Also, to provide a forum for Māori input, an advisory committee (Nga Kaihatu Tikanga Taiao) is established in the ERMA by section nine of the HSNO Act.<sup>81</sup>

The backgrounds of the Authority Members vary, but six out of eight current

---

<http://www.ermanz.govt.nz/> (last visited Feb. 9, 2006).

<sup>71</sup> HSNO Act, *supra* note 41.

<sup>72</sup> HSNO Act § 2 (1) (defining new organism and organism).

<sup>73</sup> *Id.* § 34.

<sup>74</sup> *Id.* § 21.

<sup>75</sup> *Id.* § 53.

<sup>76</sup> *Id.* § 54.

<sup>77</sup> HSNO Act § 60.

<sup>78</sup> Justine Sefton, *The Hazardous Substances and New Organism Act 1996*, 2 N.Z. ENVTL. L.J. 263, 265 (1998).

<sup>79</sup> Environmental Risk Management Authority (ERMA), Roles and Responsibilities, <http://www.ermanz.govt.nz/about/roles-responsibilities.asp> (last visited Feb. 9, 2006) (Under the HSNO Act, different groups have certain roles and responsibilities. ERMA, or any Committee which the Authority may appoint under clause 43 of the First Schedule to the Act, shall apply the Order-in-council and other elements of methodology through a transparent process; make evaluations based on risk assessments from applicants and others; monitor its own decisions and the effectiveness of the methodology, in order to improve its effectiveness in meeting the purpose of the Act.).

<sup>80</sup> HSNO Act §§ 15, 16.

<sup>81</sup> About ERMA New Zealand, <http://www.ermanz.govt.nz/about/index.asp> (last visited Feb. 9, 2006).

Members have scientific backgrounds, one has a legal background, and the other has a professional background in hazardous substances.<sup>82</sup> The science backgrounds of the six Members include biotechnology, chemistry (with a particular focus on crystallography of DNA), obstetrics and gynecology, biological control, and resource management.<sup>83</sup> Many staff members are highly qualified scientists, ensuring ERMA has the scientific and technical capabilities to meet its statutory responsibilities.<sup>84</sup>

## V. SCIENTIFIC EFFECTIVENESS

For the biosecurity measures to be effective, they must be scientifically valid and justifiable. The biosecurity policy, which is in itself an experiment, has drawn some comments and criticism relating to the integration of sound science with policy. The following section explains some of the biosecurity measures' defects and issues relating to ERMA, analyzed from scientific perspectives.

### A. Standard Setting – Precautionary Approach and Uncertainty

Essentially, biosecurity aims to apply the precautionary approach to biohazards. The HSNO Act section seven, which may represent the first use of the term “precautionary approach” in New Zealand domestic legislation,<sup>85</sup> states: Precautionary approach – All persons exercising functions, powers, and duties under this Act . . . shall take into account the need for caution in managing adverse affects where there is scientific and technical uncertainty about those effects.<sup>86</sup>

To some, the “precautionary approach” concept sounds like a mythical, aspirational, but unobtainable, idea; therefore, the term's meaning and implication must be examined carefully. The tools designated to carry out the precautionary approach are numerous, and the approach's potential ambit varies widely from weak to strong, depending upon the context. In some forms, the approach could be weak and indistinguishable from conventional approaches, or it could be an absolute ban or phase-out.

The application of the precautionary principle in New Zealand law is not yet well established, and there are few cases on point. The Planning Tribunal (which is the predecessor of the Environment Court) in an early Resource Management Act (RMA) case held that the lack of knowledge does not automatically lead to a phase-out: “It is not to reject the precautionary approach, but there needs to be some plausible basis, not mere suspicion or innuendo for adopting that approach.”<sup>87</sup> Also, in *McIntyre v. Christchurch City Council*, another RMA case concerning alleged harmful health effects from a mobile phone transmitter, the Planning Tribunal struck

---

<sup>82</sup> ERMA New Zealand, Authority Members, <http://www.ermanz.govt.nz/about/authority-members.asp>.

<sup>83</sup> ENVIRONMENTAL RISK MANAGEMENT AUTHORITY, ANNUAL REPORT 2002 16-18 [hereinafter ERMA 2002]; ERMA New Zealand, Authority Members, <http://www.ermanz.govt.nz/about/authority-members.asp>.

<sup>84</sup> Chief Executive and managers of the Agency of ERMA New Zealand, <http://www.ermanz.govt.nz/about/agency-management.asp>.

<sup>85</sup> Mark Christensen & Martin Williams, *Legislation Notes – The Hazardous and New Organism Act 1996*, 1 N.Z. J. ENVTL. L. 301, 304 (1997).

<sup>86</sup> HSNO Act § 7.

<sup>87</sup> *Trans Power New Zealand v. Rodney Dist.* (Decision A 85/94), 4 NZPTD 35.

down the case after studying the U.S. Supreme Court's decision in *Daubert v. Merrill Dow Pharmaceuticals, Inc.*,<sup>88</sup> and other cases from England, Canada, and New South Wales, largely on the question of the reliability of the contested scientific evidence.<sup>89</sup> Some commentators suggest that the Environment Court should follow *McIntyre* in this type of situation and rest its decision on the "balance of probabilities."<sup>90</sup> If "reliable evidence" in support of the allegation is presented, "[t]he onus will then be on the other party to prove to the balance of probabilities that the alleged effect would not occur."<sup>91</sup>

The HSNO Act is silent on the definition of the "precautionary approach" and the Act is unclear on whether ERMA should take this approach in considering an application for approval. However, commentators suggest it should follow the approach of the Environment Court.<sup>92</sup> This approach seems reasonable since ERMA's decision cannot be challenged in court except on questions of law at the High Court level; still, ERMA's procedure is neither judicial nor trial-like and the judicial precedence may not be strictly binding.<sup>93</sup>

ERMA's review is based primarily upon the materials presented by the applicant and ERMA may, in its discretion, decline the application "if insufficient information is available to enable the Authority to assess the adverse effects of the organism."<sup>94</sup> Often, the information provided by the applicant is produced in foreign countries, and accordingly, ERMA's approval is based on whether it is approved in other foreign jurisdictions, such as the United States. On the basis of global business, harmonization of standards is desirable, but the establishment of multi-national bio-industries has provoked concern from environmentalists.<sup>95</sup>

Governmental agencies, when making decisions about new organisms or other biosecurity issues, are expected to evaluate New Zealand's ecological, economic, and social values. However, legislators have shown an intention to decide on cost (risk)/benefit analysis, combined with existing international obligations, and it is unclear how much the legislature intended to defer to scientific knowledge and preferences in the decision-making process.<sup>96</sup>

---

<sup>88</sup> *Daubert v. Merrill Dow Pharm. Inc.*, 509 U.S. 579 (1993).

<sup>89</sup> *McIntyre v. Christchurch City Council* (Decision A 15/96), 1996 NZRMA 289.

<sup>90</sup> Christensen & Williams, *supra* note 85, at 313. See also Joan Forett, *Scientific Evidence and Environmental Litigation in New Zealand*, 2 N.Z. J. ENVTL L. 39, 55-59 (1998).

<sup>91</sup> Christensen & Williams, *supra* note 85, at 313. See also Forett, *supra* note 90, at 55-59.

<sup>92</sup> Christensen & Williams, *supra* note 85, at 314.

<sup>93</sup> Authority of ERMA New Zealand, How the Authority makes Decisions, <http://www.ermanz.govt.nz/about/authority-decisions.asp> (The Authority of ERMA New Zealand makes decisions on applications under Part V of the HSNO Act "by evaluating risks, costs and benefits, placing conditions on approvals, and making decisions on transitional licenses and other approvals." Generally, the Authority's decisions are guided by a decision-making framework.)

<sup>94</sup> HSNO Act § 38 (1).

<sup>95</sup> Press Release, GE-Free New Zealand, Promises sought from NZ Government over threat to sacrifice GM food regulation for Free Trade (Nov. 18, 2002), <http://www.gefree.org.nz/press/18112002.htm> (last visited Feb. 9, 2006).

<sup>96</sup> Compare HSNO Act § 38(1) (providing the following: "approve the application if . . . the positive effects of the organism outweigh the adverse effects of the organism . . . decline the application if . . . the adverse effects of the organism outweighs [sic] the positive effects.").

## B. Scientists, Decision Makers, and their Decisions

The performance and implementation of sound science in policy requires appropriate data resources and the availability of unbiased scientists. The MAF Biosecurity Authority Chief Director and the executives are scientists.<sup>97</sup> ERMA's Members and executive staff, including the Chief Executive, are also scientists.<sup>98</sup> Under the Biosecurity Act, Chief Technical Officers of the responsible agencies, who are also scientists, are given the power to determine unwanted organisms for control. The Act frames these as technical decisions, but the decisions actually involve value judgments and may lead to "unresolved disagreement between agencies."<sup>99</sup>

Often, scientists are obligated to make difficult decisions. Decisions on Import Health Standards, required by the Biosecurity Act for importation of risk goods, are delegated by statute to technical officers. Even though the original aim was to avoid political interference in the decision-making process, the *Biosecurity Draft 2002* criticizes the decisions as narrow and technical: Where "societal, environmental or other (non-technical) concerns are under consideration [...]. . . technical officers . . . may not be the appropriate final decision makers."<sup>100</sup> The *Biosecurity Draft 2002* recommended that a decision be escalated in the following cases: where conflicting interests exist; where uncertainty in risk is observed; or where society's desired level of protection is unclear.<sup>101</sup> The recommendations of the *Biosecurity Draft 2002* may fit well with the idea of separating technical (scientific) findings and policy decisions.<sup>102</sup> Dividing the functions of science and policy decisions is legitimate in a theoretical context; however, such a division can risk eviscerating legislative intent when implementing specific policy, such as biosecurity legislation. Ultimately, New Zealand intends to base decisions on cost (risk)/ benefit analysis.<sup>103</sup> Combined with the country's international obligations, the extent of the legislators' intent to defer to scientific decisions remains unclear.

The neutrality and independence of the scientists is another issue. Scientific decisions made by agencies responsible for biosecurity, such as ERMA, are generally made by in-house scientists and not subject to peer review. Nor are the decisions made with cross-examinations of scientists. As aforementioned, ERMA's scientific decisions are judicially unchallengeable. According to the fields of expertise and disciplines of staff scientists in the agencies, such as biotechnology in ERMA and agro science in MAF, an unintentional bias could influence the scientists' decisions and judgments. Dr. Walker, Chief Executive of ERMA, and his senior scientist both expressed confidence in the biotechnology science, and

---

<sup>97</sup> ERMA 2002, *supra* note 83; ERMA New Zealand, Authority Members, <http://www.ermanz.govt.nz/about/authority-members.asp>.

<sup>98</sup> Chief Executive and managers of the Agency of ERMA New Zealand, <http://www.ermanz.govt.nz/about/agency-management.asp> (scientists, including veterinarians).

<sup>99</sup> BIOSECURITY DRAFT 2002, *supra* note 1, at 40.

<sup>100</sup> *Id.*

<sup>101</sup> *Id.*

<sup>102</sup> See James Huffman, *Round Table Discussion: Science, Environment, and the Law*, 21 *ECOLOGY L.Q.* 351, 354-55 (1994) (providing ideas for separating science and policy, and removing scientists from political decision-making).

<sup>103</sup> HSNO Act § 38(1).

expressed a sense of mission in promoting a responsible and sustainable bio industry in New Zealand.<sup>104</sup> Their views are legitimate and contained no intentional bias; often, however, scientists have a zealous attachment to their practice and work, and promote them at the expense of other values.

In New Zealand, the relatively small size of the scientific community and the high turnover in the career market may minimize biased scientific decisions. Since 1984, when the Fourth Labour Government came into power on a platform of New Right economic principles, New Zealand has been experiencing drastic institutional reform and privatization, even in environmental policies.<sup>105</sup> This reform has stimulated career mobility and many private consultants or former NGO staff persons are hired by the government to deal with environmental or biosecurity affairs. Still, these employment shifts from the private to public sectors does not vindicate the concerns of government technocrats' monopolizing scientific decisions. Also, ex-government employees from corporations or privatized government agencies "re-invent" themselves as private consultants, and are "re-hired" by the government for particular projects or consultation requirements.

C. Public Input – Do the Māori<sup>106</sup> have too much influence?

Although decisions about biosecurity tend to be technical, policy decisions should be made with public input. The HSNO Act provides wide opportunity for public participation because it contains provisions requiring public notification of the applications.<sup>107</sup> Furthermore, any person may make a submission in writing to a notified application.<sup>108</sup> When the submitter requests a hearing, ERMA is obligated to conduct the hearing at the expense of the applicant seeking approval. Significantly, the fundamentals of this process are currently in dispute.

Drafting of the Biosecurity Strategy involved the participation of conservation groups, such as the Royal Forest and Bird Protection Society of New Zealand, and the public. Most opinions relating to alien invasive species are not all that controversial, as the public is keen on preserving New Zealand's unique biodiversity, though issues surrounding genetic engineering (commonly called "GE" in New Zealand) and genetically-modified organisms generate very heated debates in the public arena. New Zealand's leading newspaper, The New Zealand Herald, has been carrying pro-GE campaign articles, and has condemned ERMA procedures to be "tipped heavily against the scientific community," claiming that "[s]o much is the process weighted towards public participation that it can easily be hijacked by anti-GM groups."<sup>109</sup> This imbalance, the editorial alleges, risks the loss of New

---

<sup>104</sup> Interview with Dr. Bas Walker, Chief Executive, Environmental Risk Management Authority, in New Zealand (Sept. 4, 2001) (on file with author).

<sup>105</sup> Buhrs & Bartlett, *supra* note 32.

<sup>106</sup> See generally DAVID BATEMAN, HISTORICAL BRANCH, DEPT. OF INTERNAL AFFAIRS, NEW ZEALAND HISTORICAL ATLAS (1997) (providing background information about the Māori, the indigenous people of New Zealand); see also The Māori, New Zealand in History, <http://history-nz.org/maori.html> (last visited Feb. 6, 2006).

<sup>107</sup> HSNO Act §§ 52, 53.

<sup>108</sup> *Id.* § 54.

<sup>109</sup> *It's Time to End This GM Nonsense*, NEW ZEALAND HERALD, Dec. 28, 2002.

Zealand's competitive power in bio-industry and may also result in the loss of scientists who will leave the country for better positions overseas.<sup>110</sup>

Certainly, ERMA's approval process has constantly delayed statutory deadlines. In the year ending June 30, 2001, when GMO applications were not under a moratorium, the average time period for processing was 203 working days for GMO applications and 135 working days for conventional new organisms.<sup>111</sup> Although the record exceeded the statutory timeline, it is not unreasonable. Also, only three hearings were held in the business year 2001, of which one was a GMO application with a three-day hearing, and another was a day-long hearing for a non-GMO application.<sup>112</sup> Thus, the image of activists clogging the Agency with hearings and cross-examinations is inaccurate.

Despite assurances of participation in the procedures, public anxiety toward genetic engineering and concern about its effects upon biodiversity was overwhelming, leading to a big political debate. In October of 2001, after a year of protracted discussions, the Labour government announced its decision to instill a moratorium of two years, prohibiting the release of genetically modified organisms in the environment, while allowing time for further research.<sup>113</sup> For this controversial issue, the government formed the Royal Commission on Genetic Modification as a forum for debate and investigation into GE and GM.<sup>114</sup> The Commission received over 10,000 written submissions and conducted thirteen weeks of hearings. The GE ban was lifted only by the expiration of the moratorium on October 2003, which still provoked many protests.<sup>115</sup>

Māori groups, along with environmentalists including the Green Party, are strongly opposed to GE, while the mainstream Labour Party (currently the leading party of the coalition government) disfavors the moratorium. The political and legal rights vested in Māori by the Treaty of Waitangi gives them a position as important stakeholders in issues relating to natural resources and heritage, which the government cannot ignore. The Māori community has shown deep interest in preserving the indigenous biodiversity and has considerable antipathy toward the introduction of exotic species and genetic engineering. This unique position of Māori is often described as a "guardianship" role for the environment, but is seen by detractors as a roadblock to the biotech industry and scientists.<sup>116</sup> Some have criticized Ngai Tahu, the Māori advisory committee for ERMA, characterizing it as "largely close mind[ed]" and suggesting that ERMA places too much weight on the spiritual values of Māori, rather than scientific facts.<sup>117</sup> In contrast, Ngai Tahu

---

<sup>110</sup> *Id.*

<sup>111</sup> Environmental Risk Management Authority (ERMA), Annual Report 2001, 65 [hereinafter ERMA 2001].

<sup>112</sup> *Id.* at 66.

<sup>113</sup> *Prime Minister on GE*, NEW ZEALAND HERALD, Oct. 30, 2001.

<sup>114</sup> Ministry for the Environment, Royal Commission on Genetic Modification, <http://www.mfe.govt.nz/issues/organisms/law-changes/commission/> (established by the Government on May 8, 2000 to look into and report on the issues surrounding genetic modification in New Zealand).

<sup>115</sup> *Government Opens Door to GE Despite Protests, Polls and Threats*, NEW ZEALAND HERALD, Oct. 29, 2003.

<sup>116</sup> *Claims Māori Have Too Much Say On GE Research Are 'Absurd'*, NEW ZEALAND HERALD, Jan. 4, 2003; *Māori Get More Say in GE Research*, NEW ZEALAND HERALD, Dec. 27, 2002.

<sup>117</sup> *It's Time to End This GM Nonsense*, *supra* note 109.

member Whiti Reia has been reported as saying “consultation with Māori was required because ‘the public does not trust scientists [or] treaty relations.’”<sup>118</sup>

One of the reasons for the conspicuous role of the Māori can be traced to the emptiness of the arguments behind the GE scientific debate. The environmentalists, whose views are generally represented by the Green Party, allege that the risks of GE come from scientific uncertainty. Winning the risk debate on scientific grounds is risky for the environmentalists because the argument fundamentally arises from differences in values. Therefore, the frontal attack by Māori based on indigenous values, rather than science, makes a significant difference when the biosecurity policy’s aim involves defending indigenous biodiversity.

#### D. Cost of Science and Public Input

Scientific research is expensive, and financial demands for better science are potentially infinite. The Biosecurity Strategy notes, “[a]vailable sources are not well marshaled, most New Zealand sources of data are hard to access and many are poorly maintained.”<sup>119</sup> To pay the costs associated with scientific advancement, the government of New Zealand follows the New Right’s “user pays” principle. Under ERMA’s approval procedure, the cost is borne by the applicants, including the cost of public notification and hearings. The imposition of costs is disputable when considering the uncertainty of the potential advantages an applicant may or may not gain from the approval of the new organism, given that such approval is generally nonexclusive.

Though he acknowledges the financial realities, Dr. Walker, Chief Executive of ERMA, has noted the difficulty in coordinating with an applicant to fund an in-depth investigation and supplemental procedures that the Agency deems necessary.<sup>120</sup> Dr. Walker believes that government funding is reasonable only when an applicant is pursuing an objective that will have a public benefit.<sup>121</sup> Forced internalization of costs is expected to discourage the introduction of exotic, unwanted and dangerous species into the environment, and the pursuit of other irresponsible projects.

## VI. CONCLUSION

New Zealand’s biosecurity policies can be acknowledged as some of the boldest experiments in bringing science and the precautionary approach into policy, regulation, and operational decision-making at the domestic level. New Zealand has a comprehensive structure and the responsible agencies are relatively well staffed by scientists and professionals. The decisions are made after risk assessments and public input. The legislature has indicated its intention to give appropriate weight to scientific and technical data and analysis to arrive at decisions that are neutral and unaffected by political and other influences. New Zealand’s comprehensive structure and the internalization of the precautionary approach, among other things, provide a model from which other countries could learn. In times when public funds are scarce, the Labour government’s promotion of science, along with the pursuit of

<sup>118</sup> *Claims Māori Have Too Much Say On GE Research Are ‘Absurd’*, *supra* note 116.

<sup>119</sup> BIOSECURITY DRAFT 2002, *supra* note 1, at 46.

<sup>120</sup> Interview with Dr. Walker, *supra* note 104.

<sup>121</sup> *Id.*

minimal but effective government regulation and intervention, is impressive.

In reality, however, decisions made by scientific technocrats have not always been pleasing to the public, or even to the government. Furthermore, New Zealanders have taken the reverse path in engaging in a nationwide debate on GE after the HSNO Act and ERMA were put in place. Other countries should observe New Zealand's notion that the public's values and opinions should be sought, and government policy determined, on the basis of a consultation before legislative implementation and delegation of decision-making to the scientific community. Eventually, the initial scientifically-based policy approach was displaced, at least temporarily, by the spiritual values of the indigenous people. In the United States, or other countries, the voice of the indigenous people may not be as strong, but, taking into account the diverse views and ideals among its citizens, decisions-making by technical agencies and scientists before the value argument is settled would be unwise.

All things considered, the New Zealand Biosecurity Act and HSNO Act do not provide the ultimate solution, nor is the precautionary approach the panacea it is often made out to be. Still, the attitude of New Zealand in boldly internalizing science in legislation should provide a model in the post-modern state. Implementation of science in New Zealand's biosecurity decision-making is inspiring. Yet, the backlash from value judgements of various sector and interest-groups in controversial scientific issues must be expected, as more and more sophisticated scientific issues will emerge. In current biosecurity affairs, both sides of the extremes, the scientific community and the Māori, seem to hold significant influence. Before engaging in technical decisions, the government should have clearly established policies, especially concerning the approach towards the unknown in the GM debate. Although the original orientation must rely on science, in a democracy, the policy preferences and values of the general public must be incorporated in the system in a balanced and representative way.