Genetically Modified Organisms and the World Trade Organization

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I. INTRODUCTION

The onset of the new millennium has been marked by an increasing popular angst concerning the role of the World Trade Organization (WTO) and the constituencies that it is thought to serve. This concern has intersected with a vociferous debate about the use of certain types of biotechnology products in food and food production. In fact, the use and regulation of recombinant DNA techniques and their resulting genetically modified organisms in food is now a major socio-scientific issue. On one hand, biotechnology proponents laud its ability to deliver increased food security.[1] These changes are achieved not only through higher yielding crops and improved animal

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1. *See, e.g.*, Catherine L. Ives, Bruce M. Bedford & Karim M. Maredia, *The Agricultural Biotechnology for Sustainable Productivity Project: A New Model in Collaborative Development*, *in* AGRICULTURAL BIOTECHNOLOGY IN INTERNATIONAL DEVELOPMENT 1, 2 (Ives & Bedford eds., 1998); Nuffield Council on Bioethics, *Genetically Modified Crops: The Ethical and Social Issues* ch. 4, http://www.nuffield.org/bioethics/publication/modifiedcrops/index.html; Tim Roberts, *"Economically Superfluous, Physically Pernicious, Morally Atrocious & Politically Abominable": The Nuffield Report on GM Foods*, 2 BIO-SCIENCE L. REV. 35 (1999/2000).

husbandry techniques, but also through a catalogue of other improvements. These include the production of disease resistant organisms that lower consumer exposure to pesticides, the enhancement of micronutrient levels, the development of resistance to inhospitable conditions, and the removal of allergens.[2] On the other hand, opponents of biotechnology are skeptical about the role of biotechnology in increasing food security; they point to the threats which it poses to sustainable development, to agricultural and environmental biodiversity, and to public health; they counsel caution about the "not yet well known risks of gene technology."[3] Overlaying and incorporating all this is enormous consumer concern in some parts of the world about genetically modified organisms (GMOs), especially where they occur in food or are used in food production.[4] These consumer concerns range from issues dealing with health, environmental protection, and ethics. One response to these concerns is an ongoing campaign to label foods containing GMOs or produced through the use of GMOs. In response to this campaign, national and regional initiatives for the labeling of GMO foods are emerging.[5]

Regulatory structures are also emerging at the international level which are likely to have an effect, not only on the debate about labeling GMOs in food, but also on the shape of domestic and regional regulation of such labeling. The principle international regulatory structures are those established under the WTO, on the one hand, and those proposed under the Convention for Biological Diversity (CBD), on the other. Aside from the general obligations under GATT, the principal WTO Agreements that affect the area of

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2. *See* Nuffield Council on Bioethics, *supra* note 1, Overview.

3. Press Release from Non-Government and Farmers' Organisations, *Food for All—Farmers First in Research*, GLOBAL FORUM ON AGRICULTURAL RESEARCH, May 22, 2000 ("The root cause of hunger is not a lack of technology, but rather pervasive social economic and political inequalities and injustices, which prevent the poor to [sic.] having access to the abundance that surrounds us."); *see, e.g.*, Jack Kloppenberg, Jr. & Beth Burrows, *Biotechnology to the Rescue? Twelve Reasons Why Biotechnology Is Incompatible with Sustainable Agriculture*, 26(2) THE ECOLOGIST 61 (1996); *see also* Katherine Barrett & Gabriela Flora, *Genetic Engineering & the Precautionary Principle: Information for Extension* ch. 2 (Sci. & Envtl. Health Network, Mar. 2000). Interestingly, given the arguments of the pro-GM camp, one of the often-cited risks to public health is the possibility of the development of new allergens. *See* Press Release from Non-Government and Farmers' Organisations, *supra*.

4. This concern has been much greater in Europe, e.g., than it has been in the United States. For discussion of the differences in consumer perceptions on different sides of the Atlantic, see *Nuffield Council on Bioethics*, *supra* note 1, ch. 5.

5. For an overview of some of these initiatives, see Peter Drahos, *Genetically Modified Organisms and Biosafety: The Global Regulatory Issues*, 2 BIO-SCI. L. REV. 40, 47 (1999/2000); *see also* Pauline Dore, *Designer Genes: More than Just a Label?*, 1 BIO-SCI. L. REV. 8, 10-11 (1999).

biotechnology labeling regulation are the Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT Agreement). The particular initiative under the CBD that concerns itself with, amongst other things, the labeling of biotechnology or, in its terms, living modified organisms (LMOs), is the Cartagena Protocol on Biosafety. The Protocol is not yet in effect.[6] However, when it comes into force, an issue will arise with respect to its compatibility with the WTO regime.

II. AGREEMENT ON SANITARY AND PHYTOSANITARY MEASURES

A. Application of the SPS Agreement

Sanitary and phytosanitary measures are defined in Annex A of the SPS Agreement as follows:

> Any measure applied:
> (a) to protect animal or plant life or health within the territory of the Member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;
> (b) to protect human or animal life or health within the Territory of the Member from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs;
> (c) to protect human life or health within the territory of the Member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or
> (d) to prevent or limit other damage within the territory of the Member from the entry, establishment or spread of pests.
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> Sanitary or phytosanitary measures include . . . packaging and labeling requirements directly related to food safety.

As may be seen, the focus of this definition is on measures concerned with pests, diseases, additives, contaminants, and toxins. While it may be argued that GMOs are not always (or even typically) disease-carrying, disease-causing, or otherwise toxic, it is likely that any measure that has the purpose of restricting the use of GMOs in foodstuffs or as part of food-production would fall within the definition of an SPS measure. As far as general measures go, it seems that this would be true whether the motivation for the measure was human or animal health, or safety or protection of the environment.[7]

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6. For information on the content and current status of the Cartagena Protocol, see http://www.biodiv.org/biosafe/index.html. On the process of negotiation, see also Drahos, *supra* note 5, at 43-44.

7. *See* Fiona Macmillan & Michael Blakeney, *Regulating GMOs: Is the WTO Agreement on Sanitary and Phytosanitary Measures Hormonally Challenged? Part 1*, 6 INT'L TRADE L. & REGULATION 131, 133-34 (2000).

Packaging and labeling requirements are, however, included within the definition of SPS measures only where they are "directly related to food safety." This raises the issue of whether or not proposals for measures requiring the labeling of foods containing GMOs would fall within the scope of the SPS Agreement. The argument that, at least at present, such measures would be likely to fall outside the SPS Agreement is that they are really about consumer information and consumer choice rather than "directly related to food safety."

For advocates of obligatory labeling for GMOs, it would be sensible to argue that GMOs fall outside the scope of the SPS Agreement, because such measures are likely to have a rough ride under this Agreement. Despite its first recital "*[r]eaffirming* that no member should be prevented from adopting or enforcing measures necessary to protect, human, animal or plant life or health,"[8] the SPS Agreement is essentially concerned with placing limitations on the introduction of such measures. Consistent with the approach of other WTO Agreements, these limitations flow from the Agreement's concern to ensure that the measures in question are, in the words of the first recital, "not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between Members . . . or a disguised restriction on international trade."[9] Further limitations arise from the requirements of article 2 that any SPS measures be "necessary," be "applied only to the extent necessary" to protect human, animal or plant life or health, and be based on scientific principles and evidence.[10] The extent to which all these factors coalesce into an anti-SPS model may be gauged from the decisions of the WTO panel and Appellate Body in the US/EU *Beef Hormones* case, which did not involve a protectionist measure.[11] Some of the main concerns arising from this case are canvassed below.

B. Role of International Organizations

An important role of the SPS Agreement is the harmonization of acceptable SPS measures across member states. Article 3.1 requires

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8. Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, RESULT OF URUGUAY ROUND (1994) [hereinafter SPS Agreement], *available at* http://www.wto.org (last visited Mar. 1, 2001).

9. *See id.* art. 2.3.

10. *See id.* arts. 2.1-2.2.

11. *EC—Measures Concerning Meat and Meat Products (Hormones)*, Panel Reports: Case WT/DS26/R/USA, Aug. 18, 1997, & Case WT/DS48/R/CAN, Aug. 18, 1997; Appellate Body Report: WT/DS26/AB/R & WT/DS48/AB/R, Jan. 16, 1998 [hereinafter Appellate Body Report].

members to base their SPS measures on any existing standards, guidelines or recommendations. The incentive to emulate, but not exceed, such standards, guidelines or recommendations is provided in article 3.2, which deems measures that conform to international standards necessary. Article 3.2 makes this position relatively clear by stating that measures conforming to international standards, guidelines, or recommendations will be presumed to be consistent with both the SPS Agreement and with GATT. Measures which result in a higher level of SPS protection than those based on international standards will not necessarily fall foul of the Agreement (or, presumably of GATT), but will not gain the benefit of the presumption that they are necessary and, hence, consistent with the SPS Agreement and GATT. According to the Appellate Body in the *Beef Hormones* decision, article 3 of the SPS Agreement distinguishes between three types of measures: first, measures "conforming" to international standards; secondly, measures "based on" international standards; and thirdly, measures which result in a higher level of protection than provided for in international standards.[12] The first and second class of measures are permitted, but only the first class of measures obtains the benefit of the presumption in article 3.2.[13] The third class of measures will be permitted only if they comply with the principles of risk assessment laid down in article 5, which are discussed below. Where there are no relevant international standards, it is unclear whether the measures in question will fall within the third class or whether article 3 is simply inapplicable. Either way, it appears that it will be necessary for the measure to comply with article 5.[14]

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12. World Wildlife Fund, *The WTO Beef Growth Hormone Ruling: An Analysis*, Dispute Settlement in the WTO: A Crisis for Sustainable Development (May 1998), paras. 160-172, http://www.panda.org/resources/publications/sustainability/wto-98/fourth-3.htm [hereinafter *Beef Hormone Ruling*].

13. This seems to be the implication from the identification of these classes. However, it is unclear whether the second class of measures (i.e., measures "based" on international standards), in particular, need to comply with article 5 as well. If they do, it is unclear what is achieved by distinguishing them from measures which offer a higher level of protection. On the other hand, the Appellate Body in *Beef Hormones* did not express an opinion on the point since it decided that the European Communities had established a higher level of protection under article 3.3. *Id.* para. 176.

14. It might be possible to construct an argument that there are no relevant international standards and compliance with article 5 is not mandated, but rather it is only necessary to show that the measure is "based on scientific principles and is not maintained without sufficient scientific evidence" under article 2.2. However this argument would be difficult to make in the light of the fact that the Appellate Body in *Beef Hormones* said that "Articles 2.2 & 5.1 should constantly be read together. Article 2.2 informs Article 5.1: the elements that define the basic obligation set out in Article 2.2 impart meaning to Article 5.1." *Id.* para. 180.

Some commentators see cause for optimism in this emphasis on international standard-setting and the benefits that such standards are capable of delivering to consumers worldwide.[15] For others, this deference to international standards is a cause for concern, especially in light of the ambiguities regarding the burden of proof in showing that a measure which exceeds international standards is nevertheless consistent with the SPS Agreement.[16] According to the World Wildlife Fund:

> International standards are traditionally adopted and approved in international forums lacking the public participation guarantees of their domestic regulatory counterparts. In addition, international standards such as the Codex Alimentarius standards discussed in the *Beef Hormone* case frequently, but do not always, provide a lower level of protection than domestic standards.[17]

In essence, the concern is that the SPS Agreement is imposing a form of "downward harmonization" on international standards.[18] As Drahos points out, however, there is nothing in the SPS Agreement which prevents upwards harmonization.[19] International bodies may adopt national standards. The same scientists who are influential at the national level may be influential at the international level. Militating against this optimism may be the culture of the WTO itself, which is essentially concerned with the reduction of measures, which impede trade. Nevertheless, a subversion of the SPS Agreement is a tantalizing idea.

The standards, guidelines, or recommendations envisaged in article 3 are to be set under the auspices of the relevant international organizations. Article 3(4) identifies the Codex Alimentarius Commission as being of particular relevance with respect to standards for food safety. However, there is also a catch-all provision included in the definition of "international standards, guidelines and recommendations" that applies in relation to matters not otherwise covered. This catch-all provision brings within the scope of the

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15. *See* Drahos, *supra* note 5, at 46.

16. *See Beef Hormone Ruling*, *supra* note 12, paras. 97-109; Vern R. Walker, *Keeping the WTO from Becoming the 'World Trans-Science Organization': Scientific Uncertainty, Science Policy, and Fact-finding in the Growth Hormones Dispute*, 31 CORNELL INT'L L.J. 251, 290-96 & 311-19 (1998); Fiona Macmillan & Michael Blakeney, *Regulating GMOs: Is the WTO Agreement on Sanitary and Phytosanitary Measures Hormonally Challenged? Part 2*, 6 INT'L TRADE L. & REGULATION 161, 164-165 (2000).

17. *Beef Hormone Ruling*, *supra* note 12, part 4.

18. *Cf.* Walker, *supra* note 16, at 273.

19. *See* Drahos, *supra* note 5, at 46; *see also* John J. Barceló III, *Product Standards to Protect the Local Environment—The GATT & the Uruguay Round Sanitary and Phytosanitary Agreement*, 27 CORNELL INT'L L.J. 755, 766-78 (1994).

definition "appropriate standards, guidelines and recommendations promulgated by other relevant international organizations open for membership to all Members, as identified by the Committee."[20] Codex Alimentarius has recently considered the issue of mandatory labeling of GM foods.[21] At its meeting in May 2000, the Codex Committee on Food Labeling agreed to continue the process towards the adoption of an amendment to the General Standard for the Labelling of Prepackaged Foods that would address the issue of labeling with respect to allergens in prepackaged food obtained through some forms of genetic modification.[22] However, the more general proposal contained in the Proposed Draft Recommendations for the Labeling of Foods Obtained through Biotechnology was returned for redrafting and further comment by members.[23] Its adoption, if it ever occurs, is currently a long way off. This raises the issue of whether or not any labeling regime, which may be developed under article 18 of the Biosafety Protocol, might become the relevant international standard. The catch-all provision mentioned above, would appear to encompass this possibility. However, pragmatism suggests that, even if such a labeling regime were developed, the SPS Committee would not "identify" such a regime for the purpose of the SPS Agreement while the Codex Committee on Food Labelling has the matter under consideration. This means that for the foreseeable future, if a labeling regime was regarded as falling within the ambit of the SPS Agreement, it would be denied the protection of the assumptions in article 3.2 and be required to demonstrate scientific justification in accordance with articles 3.3 and 5.

C. Risk Assessment and Management

SPS measures which are not conforming to or based upon international standards[24] must be based upon a risk assessment "as appropriate to the circumstances."[25] The principles of risk assessment laid down in the SPS Agreement require members to take into account risk assessment techniques developed by international organizations,

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20. SPS Agreement, *supra* note 8, annex A, para. 3. On the composition & role of the Committee, see *id.* art. 12.

21. *See* JOINT FAO/WHO FOOD STANDARDS PROGRAMME, REPORT OF THE TWENTIETH-EIGHTH SESSION OF THE CODEX COMMITTEE ON FOOD LABELING, OTTAWA, CANADA, May 5-9, 2000.

22. *See id.*, Draft Recommendations for the Labeling of Foods Obtained through Certain Techniques of Genetic Modification/Generic Engineering.

23. *See id.*

24. *See* SPS Agreement, *supra* note 8, art. 3.1-3.3.

25. *Id.* art. 5.1; *see also id.* arts. 2.1, 3.3.

as well as scientific and economic factors.[26] The scientific factors are stated in an open-ended list as follows: "available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; prevalence of specific diseases or pests; existence of pest- or disease-free areas; relevant ecological and environmental conditions; and quarantine or other treatment."[27] The relevant economic factors to be taken into account are stated in a definitive list as follows: "the potential damage in terms of loss of production or sales in the event of the entry, establishment or spread of a pest or disease the costs of control or eradication in the territory of the importing Member; and the relative cost-effectiveness of alternative approaches to limiting risks."[28] Having taken all these factors into account, members are required to exercise proportionality; that is, SPS measures must not be "more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility."[29] The relevant risks which are to be assessed using this multifarious criteria are risks to human, animal, or plant life or health.

The SPS Agreement recognizes that there may be cases where scientific evidence is not sufficient and permits provisional adoption of provisional SPS measures "on the basis of available pertinent information."[30] Two possible sources of such information are the international organizations and the SPS measures applied in the same area by other Members. Since many people seem to regard the jury as still being out on the question of the safety of some or all biotechnological products, SPS measures in relation to such products may well fall under this provision. This matter is further discussed below in relation to the precautionary principle.

It is evident from the comments submitted to the Codex Ad Hoc Intergovernmental Task Force on Foods Derived From Biotechnology that there is considerable international concern, and not necessarily a great amount of consensus, about the issue of risk assessment.[31] For

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26. *See id.* art. 5.1-5.3.
27. *Id.* art. 5.2.
28. *Id.* art. 5.3.
29. *Id.* art. 5.6. See also Barceló, *supra* note 19, at 771-72, who argues, based on the European approach in cases such as *Commission v. Denmark*, Case 302/86, [1988] ECR 4607, (1989) 1 CMLR 619, that the notion of proportionality is also contained in article 2.3.
30. *See* SPS Agreement, *supra* note 8, art. 5.7.
31. *See* Codex Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology, *Consideration of the Elaboration of Standards, Guidelines or Other Principles for Foods Derived from Biotechnology*, CX/FBT 00/4, Part I, Feb. 2000 [hereinafter Codex Task Force].

example, Hungary, Mexico, New Zealand, Singapore, and Switzerland all noted the need for clear principles of risk assessment in Codex Guidelines. In its comments, Consumers International noted:

> A . . . major subject of discussion of the Task Force should be to define what [is] a "core data set" or minimum amount of scientific information that should be reviewed in order to assess the safety of an engineered food. Perhaps the most difficult aspect of such a core data set will be the scientific studies that would be needed to screen for unexpected genetic, biochemical, immunological and toxicological consequences of genetic engineering. The crude compositional analysis of engineered foods, required as part of a "substantial equivalence" approach is not sufficient enough to look for such problems. The Task Force should investigate what alternative methods may be used to more accurately look for unintended consequences of genetic engineering.[32]

Consumers International also called for an examination of what "other legitimate factors" might be taken into account in risk analysis.[33] As possible candidates for "other legitimate factors," it suggested: environmental impacts; food security and agricultural sustainability; the precautionary principle; animal welfare considerations, consumer choice; and ethical and religious considerations.[34] The Council for Responsible Nutrition, on the other hand, argued that other legitimate factors should be limited to those influencing health risk. Such factors, it argued, include environmental and resource considerations.[35] There is a pressing need for clear principles of risk assessment, particularly in the biotechnology area. At the very least, such principles would involve consensus on the range of factors that should be taken into account as part of a risk assessment. There is, however, no warrant in the SPS Agreement for determining the policy approach in relation to such factors that should be taken by WTO Members for the purpose of conducting a risk assessment. It is arguable that the issue of fixing policies of the scientific, socio-economic and regulatory variety, is the core issue with respect to national sovereignty in this area.[36]

The matter of risk assessment was at the heart of the *Beef Hormones* decision. Both the panel and the Appellate Body ruled that the European Communities' measure was not based on appropriate

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32. *Id.* at 17.
33. *See id.* at 18-19.
34. See also the Comments of the International Association of Consumer Food Organizations. *See id.* at 25-26.
35. *See id.* at 27.
36. *See also* Macmillan & Blakeney, *supra* note 7, at 139-40.

risk assessment. In the case of the panel this ruling was partly based on the fact that the relevant European Communities directives had not mentioned the scientific evidence in their preamble.[37] However, while the Appellate Body overturned this aspect of the panel's ruling, it nevertheless concluded that the risk assessment upon which the European Communities relied had not been sufficient to support the measures in question.[38]

The Appellate Body in *Beef Hormones* took a relatively wide approach to the issue of risk assessment under the SPS Agreement. While its rejection of a distinction under the SPS Agreement between risk assessment and risk management is open to criticism, the consequence of this position was to widen the notion of risk assessment—at least in comparison to that espoused by the panel.[39] As a consequence, the Appellate Body concluded that:

> It is essential to bear in mind that the risk that is to be evaluated in a risk assessment under Article 5.1 is not only risk ascertainable in a science laboratory operating under strictly controlled conditions, but also risk in human societies as they actually exist, in other words, the actual potential for adverse effects on human health in the real world where people live and work and die.[40]

This meant that, contrary to the panel, the Appellate Body took the view that nonscience factors should be included in any risk assessment. In the context of the *Beef Hormones* case that meant, in particular, that the risks of potential abuse in the administration of drugs was an appropriate factor to include in the risk assessment. (Although, as it turned out, the Appellate Body decided that the European Communities did not include any proper assessment of these matters.)[41]

On the crucial question of the relationship between the risk assessment and the measure in question, the Appellate Body held that the requirement in article 5.1 "that an SPS measure be 'based on' a risk assessment is a substantive requirement that there be a rational relationship between the measure and the risk assessment."[42] According the Appellate Body, this does not mean that the SPS measure must follow a mainstream scientific view:

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37. Panel ruling in Case WT/DS26/R/USA, *supra* note 11, para. 8.122.

38. *See* Appellate Body Report, *supra* note 11, para. 208.

39. See Walker, *supra* note 16, at 255-72, 303-04, who points out the clear distinction between the processes of risk assessment and risk management. *See also* Biosafety Protocol arts. 15-16.

40. *Beef Hormone Ruling*, *supra* note 12, para. 187.

41. *See id.* para. 206.

42. *Id.* para. 193.

> We do not believe that a risk assessment has to come to a monolithic conclusion that coincides with the scientific conclusion or view implicit in the SPS measure. The risk assessment could set out both the prevailing view representing the "mainstream" of scientific opinion, as well as the opinions of scientists taking a divergent view. Article 5.1 does not require that the risk assessment must necessarily embody only the view of a majority of the relevant scientific community. In some cases, the very existence of divergent views presented by qualified scientists who have investigated the particular issue at hand may indicate a state of scientific uncertainty. Sometimes the divergence may indicate a roughly equal balance of scientific opinion, which may itself be a form of scientific uncertainty. In most cases, responsible and representative governments may act in good faith on the basis of what, at a given time, may be a divergent opinion coming from qualified and respected sources. By itself, this does not necessarily signal the absence of a reasonable relationship between the SPS measure and the risk assessment, especially where the risk involved is life-threatening in character and is perceived to constitute a clear and imminent threat to public health and safety. Determination of the presence or absence of that relationship can only be done on a case-to-case basis, after account is taken of all considerations rationally bearing upon the issue of potential adverse health effects.[43]

Despite this comparatively liberal approach, the Appellate Body came to the conclusion that there was not a rational relationship between the European Communities' measure and the risk assessment. In a nutshell, this was because the studies relied upon as forming the risk assessment were not sufficiently specific: they dealt with the carcinogenic effects of the hormones in question in general. "They do not focus on and do not address the particular kind of risk here at stake—the carcinogenic or genotoxic potential of the residues of those hormones found in meat derived from the cattle to which the hormones had been administered for growth promotion purposes."[44] This level of specificity was said to be required by the definition of risk assessment in Annex A to the SPS Agreement. This paragraph, in relevant part, defines a risk assessment as follows: "the evaluation of the potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs." The specificity requirement here is not blindingly obvious.[45] David Wirth argued that the SPS Agreement does not "speak to whether empirical data must correlate with regulated exposures, to whether uses from which data

43. *Id.* para. 194.
44. *Id.* para. 200.
45. *See also* Walker, *supra* note 16, at 299-300.

are obtained must be identified with a high degree of particularity, or to the specificity with which uses or exposures might be regulated based on particular effects."[46] He must have been surprised by the outcome of the *Beef Hormones* case.

In the context of a regime for the labeling of GM foods, the specificity requirement adopted in the *Beef Hormones* decision looks more or less fatal. The generality of a labeling scheme for all GM foods would make it difficult to show the sort of rational relationship between a risk assessment and the labeling requirement which was required by the Appellate Body. There are three ways around this problem. One would be to do sufficiently specific risk assessments for all GM foods. This appears to be somewhat impractical, especially given the fact that there is little scientific evidence to date about the dangers to human health of most GM foods. In any case, even if such risk assessments were conducted, there would seem to be a substantial danger that a labeling regime would breach article 5.5. This provision directs WTO members to avoid "arbitrary or unjustifiable distinctions" in levels of protection "if such distinctions result in discrimination or a disguised restriction on international trade." The scientific evidence that GM foods were significantly different from other foodstuffs in terms of their effect on human health would have to be strong in order to avoid the application of this provision.[47] The second way around the problems posed by the risk assessment rules as interpreted in the *Beef Hormones* case, is to press for a strong application of the precautionary principle in the context of the SPS Agreement. This argument is considered in the next Part of this Article. The third, and most successful solution to the problem is to argue, as suggested above, that a general labeling scheme for GM foods falls outside the SPS Agreement.

D. The Precautionary Principle

One of the questions raised in the *Beef Hormones* case was the role of the precautionary principle, if it exists, in the interpretation of the SPS Agreement. The European Communities argued that articles 5.1 and 5.2 should be read in light of the precautionary principle with the result that it should be entitled to take a cautious approach to risk assessment and management. In particular, it argued "that it is not

46. David A. Wirth, *The Role of Science in the Uruguay Round & NAFTA Trade Disciplines*, 27 CORNELL INT'L L.J. 817, 857 (1994).

47. This is especially true given the uncertainties concerning burden of proof under the SPS Agreement. *See* Macmillan & Blakeney, *supra* note 16, 164-165.

necessary for *all* scientists around the world to agree on the 'possibility and magnitude' of the risk, nor for *all* or most of the WTO Members to perceive and evaluate the risk in the same way."[48] Like the panel, the Appellate Body refused to be drawn definitively on the status of the precautionary principle in international law. It noted that there was considerable debate on this topic "among academics, law practitioners, regulators and judges."[49] The opportunity to consider the argument that the precautionary principle may have been incorporated into the international trade regime as a consequence of the Preamble to the Agreement Establishing the World Trade Organization was not taken.[50]

Nevertheless, the Appellate Body stated four principles governing the relationship between the SPS Agreement and precautionary principle—just in case it exists.[51] First, the precautionary principle does not justify measures otherwise inconsistent with the SPS Agreement. Secondly, while the precautionary principle is reflected in article 5.7, this does not mean that article 5.7 exhausts the application of the precautionary principle to the SPS Agreement.[52] This must be the case since article 3.3 allows members to establish their own level of sanitary protection. Thirdly, a panel that is considering whether or not there is "sufficient scientific evidence" for a measure (within the meaning of article 2.2) should "bear in mind that responsible, representative governments commonly act from perspectives of prudence and precaution where risks of irreversible, e.g. life-threatening, damage to human health are concerned."[53] Finally, the precautionary principle does not displace ordinary principles of treaty interpretation. On the basis of these principles, the precautionary principle, even if it exists, was held not

48. Appellate Body Report, *supra* note 11, para. 121.

49. *See Beef Hormone Ruling*, *supra* note 12, para. 123 & n.69.

50. This argument depends on the reference in the Preamble to the "optimal use of the world's resources in accordance with the objective of sustainable development" and the fact that the Rio Declaration on Environment and Development embraced the precautionary principle as essential to sustainable development, Rio Declaration on Environment and Development, (1992) 31 ILM 876, Principle 15. *See also* Wirth, *supra* note 46, at 837-40.

51. *See Beef Hormone Ruling*, *supra* note 12, para. 124.

52. Article 5.7 refers to provisional measures only. It reads:

> In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time.

53. *See Beef Hormone Ruling*, *supra* note 12, para. 124.

to exculpate the European Communities from their failure to comply with articles 5.1. and 5.2.

The express application of the precautionary principle in relation to provisional measures under article 5.7 might be useful in relation to labeling measures imposed with respect to GM foods. In particular, it allows provisional measures based upon "available pertinent information," which would appear to include information gathered, for example, as part of the Biosafety Clearing House envisaged under the Protocol on Biosafety.[54] On the other hand, the exception under article 5.7 lasts only until the state imposing the measure has the opportunity to undertake "a more objective assessment of risk." Given the widespread concern about GM foods, the question about whether or not there is, or should be, a more general precautionary principle has particular resonance in the context of biotechnology issues.

As already noted, the Appellate Body in the *Beef Hormones* decision was agnostic on the question of whether or not there is a general precautionary principle. Furthermore, in the context of labeling measures related to GM foods, it is not entirely clear how the four principles laid down by the Appellate Body governing the relationship between the SPS Agreement and the precautionary principle might work. Since no standards or clear risk assessment techniques for such products have been established by the international organizations, perhaps such a measure would fare better under article 5 than did the *Beef Hormones* measure. On the other hand, it appears that there would need to be some scientific evidence supporting the measure in relation to the particular GM product in question, even if this did not reflect the dominant scientific view.[55] One thing the *Beef Hormones* decision does seem to make clear is that a zero tolerance policy to GMOs will not, in the absence of some scientific support, find favor under the SPS Agreement. Whether or not a labeling regime would be regarded as a zero tolerance policy is unclear. However, given the ability of such a regime to act as restriction on trade, the signs are not good.

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54. A Biosafety Clearing House, which is to function as an information sharing mechanism with respect to "scientific, technical, environmental and legal information on, and experience with, living modified organisms" (Biosafety Protocol article 20.1(a)) will be established under the Biosafety Protocol article 20. "Living Modified Organism" (LMO) is defined in Biosafety Protocol, article 3(g) as "any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology." See also the accompanying definitions of "living organism" (art. 3(h) & "modern biotechnology" (art. 3(i)).

55. *See supra* text accompanying note 48.

The fact that substantial periods of time may be needed in order to make any proper study of the health or environmental effects (not to mention the socio-economic and ethical consequences) of GMOs, militates in favor of giving the precautionary principle weight and significance.[56] On the other hand, it has been argued that the precautionary principle is not "knowledge-promoting."[57] This argument is based on the proposition that its use can absolve regulatory authorities from the obligation to conduct a proper risk assessment. Where the precautionary principle is used with abandon, it is arguable that some conception of consumer protection is being given precedence over, not only the commercial interests of multinational enterprises, but also over an increase in scientific knowledge.[58] Overall, the argument is that, no one's interests are served by evading proper scientific investigation. However, this argument may well ignore the distinction between risk assessment and risk management. The use of the precautionary principle in place of a proper risk assessment opens the door to the accusation that it is not knowledge-promoting. However, where the precautionary principle is used in the process of risk management, this problem evaporates.[59] We need further development of scientific knowledge concerning GMOs, but in the meantime, a regulatory response is needed. The precautionary principle is capable of delivering this much needed response. This makes the case for its recognition within the framework of the SPS Agreement, especially as it applies to GMOs, a strong one. It is arguable, moreover, that a strong precautionary principle recognized as part of the risk management process would have been capable of addressing the issue of whether the EU beef hormone measure should have been regarded as being *based on* the relevant risk assessments. This may well have delivered a rather different result in the *Beef Hormones* decision.

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56. *See* Kloppenberg & Burrows, *supra* note 3, at 64-65; Katherine Barrett, *The Case of Genetically Modified Organisms and the Precautionary Principle* 4(1) (1999), *The Networker*, *at* http://www.sehn.org/Volume_4-1A.html.

57. *See* Drahos, *supra* note 5, at 48.

58. *Cf.* Nancy Myers, *Debating the Precautionary Principle*, Sci. & Envtl. Health Network, *at* http://www.sehn.org/ppdebate.htm (last visited Mar. 1, 2001).

59. On the distinction between risk management & risk assessment, see Walker, *supra* note 16, at 255-72, 303-04. On the role of the precautionary principle in risk management, see Olivier Godard, *Integrating Scientific Expertise into Regulatory Decision-Making Under Conditions of Scientific Controversy: Expertise & the Precautionary Principle* (EUI Working Paper RSC No. 96/6, 1996). For further discussion of the application of the precautionary principle in the context of the SPS Agreement, see Macmillan & Blakeney, *supra* note 16, 161-164.

E. Relationship with GATT and the TBT Agreement

Article 2(4) of the SPS Agreement creates what appears to be a "safe harbor" with respect to compliance with GATT. According to this provision, sanitary or phytosanitary measures that comply with the SPS Agreement will be presumed to be in accordance with GATT and, in particular, within the exception in GATT article XX(b). It seems, however, that this safe harbor also has an inverse effect. In the *Beef Hormones* panel decision it was held that where a measure violates the SPS Agreement it will not be open to the relevant member to argue that the measure comes within the exception in article XX(b). There is nothing explicit in the SPS Agreement which would appear to compel this conclusion.[60] However, the panel's decision on this issue was based on the fact that the validity of SPS measure must first be considered under the SPS Agreement. If the measure is found wanting under the SPS Agreement it will necessarily fall foul of article XX(b).[61] However, it is not clear, given the restrictive interpretation of the GATT article, that much, in practice, is lost by this. What is not clear from the *Beef Hormones* case is whether or not it is possible to argue that a measure, which violates the SPS Agreement, may be still be protected under the environmental exception in article XX(g).[62] There is some WTO-type logic in the decision to the effect that a measure that violates the SPS Agreement cannot be "necessary to protect human, animal or plant life or health."[63] However, the same logic would not compel the conclusion

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60. Although it would appear to be the consequence of the General Interpretative Note to Annex 1A of the Agreement Establishing the World Trade Organization, which provides:

> In the event of conflict between a provision of the General Agreement on Tariffs and Trade 1994 and a provision of another agreement in Annex 1A to the Agreement Establishing the World Trade Organization [of which the SPS Agreement is one] . . ., the provision of the other agreement shall prevail to the extent of the conflict.

See also Mike Meier, *GATT, WTO, & The Environment: To What Extent Do GATT/WTO Rules Permit Member Nations to Protect the Environment When Doing So Adversely Affects Trade?*, 8 COLO. J. INT'L ENVTL. L. & POL'Y 241, 273 (1997).

61. *See Beef Hormone Ruling*, *supra* note 12, paras. 8.42, 8.273.

62. GATT article XX(g) provides as follows:

> Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:
>
> . . . .
>
> (g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.

63. *See id.*

that such a measure could not be one "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption."[64] It is not beyond the bounds of possibility that a measure in relation to GMOs that violates the SPS Agreement may nevertheless be one in which an argument under article XX(g) might be sought to be made.

So far as the relationship between the SPS Agreement and the TBT Agreement is concerned, to the extent that a measure is a SPS measure within the definition laid down in Annex A of the SPS Agreement, then the SPS Agreement has exclusive application to that measure.[65] The TBT Agreement covers everything else that might be regarded as a technical barrier to trade.[66] If, therefore, a general labeling regime for GM foods is outside the SPS Agreement because it cannot be characterized as being "directly related to food safety," then it will fall within the TBT Agreement.

III. WTO TECHNICAL BARRIERS TO TRADE AGREEMENT

To a considerable extent the TBT Agreement reflects the provisions and obligations found in the SPS Agreement. Accordingly, the general obligations under the Agreement are to ensure that technical barriers (which are comprised of technical regulations, standards, and conformity assessment procedures) are subject to national treatment and MFN obligations.[67] It also ensures that they do not create "unnecessary obstacles to international trade."[68] It also contains provisions on harmonization.[69] There are, however, some important differences. One of these is obviously the scope of the Agreement. Another very important difference is the latitude that the Agreement gives for members to justify measures apparently outside the obligations contained in the Agreement.

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64. *Id.*

65. *See* SPS Agreement, *supra* note 8, art. 1.4; Agreement on Technical Barriers to Trade, Apr. 15, 1994, RESULT OF URUGUAY ROUND (1994) [hereinafter TBT Agreement], *available at* www.wto.org (last visited Mar. 12, 2001).

66. *See* SPS Agreement, *supra* note 8, art. 1.4.

67. *See* TBT Agreement, *supra* note 65, art. 2.1 (technical regulations); *id.* art. 4 & Annex 3, para. D (standards); *id.* arts. 5.1.1, 7-9 (conformity assessment procedures). The respective meanings of technical regulations, standards & conformity assessment procedures are discussed below.

68. *See id.* art. 2.2 (technical regulations); *id.* art. 4 & Annex 3, para. E (standards); *id.* arts. 5.1.2, 7-9 (conformity assessment procedures).

69. *See id.* art. 2.6 (technical regulations); *id.* art. 4 & Annex 3, para. G (standards); *id.* arts. 5.5, 7-9 (conformity assessment procedures).

A. Scope of the TBT Agreement

The TBT Agreement applies to three types of measures: technical regulations, standards and conformity assessment procedures. Each of these types of measures is defined in Annex 1.[70] A "technical regulation" is defined in paragraph 1 a: "document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process or production method."

A "standard" is defined in paragraph 2 a:

> document approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process or production method.

Finally, a "conformity assessment procedure" is defined in paragraph 3 a: "Any procedure used, directly or indirectly, to determine that relevant requirements in technical regulations or standards are fulfilled."

Labeling requirements explicitly fall within the definitions of technical regulation and standard, the main difference between the two being that the former are mandatory requirements whereas the latter are not. Whether mandatory or recommended, the issue of labeling, especially eco-labeling, has been a hotly contested one within the WTO. Traditionally, the issue of eco-labeling has been a bone of contention between developed and developing countries.[71] More recently, emerging differences between Europe and the United

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70. *See id.* art. 1.2.

71. *See* Richard H. Steinberg, *Trade-Environment Negotiations in the EU, NAFTA & WTO: Regional Trajectories of Rule Development*, 91 AM. J. INT'L L. 231, 243-44 (1997). Under TBT Agreement article 2.4, "where technical regulations are required" members are required to use international standards, where these exist, as the basis of their technical regulations. In relation to the promulgation of technical standards, the most significant international body is the International Standards Organization (ISO). Of importance in the context of eco-labeling generally, is the ISO 14000 series of standards. ISO standards are voluntary and this, of course, considerably reduces both their impact and the impact of the TBT Agreement on environmental issues.

States on the issue of the labeling of GM foods promises to give this issue renewed life within the WTO system.[72]

B. Justification of TBT Measures

While justification of SPS measures is based on scientific evidence and principles of risk assessment, the TBT Agreement relies upon a mixture of exemptions that appear to owe something to those in article XX of GATT and SPS Agreement-type principles of risk assessment. According to article 2.4:

> technical regulations shall not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create. Such legitimate objectives are, *inter alia*: national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment. In assessing such risks, relevant elements of consideration are, *inter alia*: available scientific and technical information, related processing technology or intended end uses of products.

Just how much scope is in the inter alias here is anyone's guess.[73] The exemption is bolstered by a presumption in article 2.5: Whenever a technical regulation is prepared, adopted or applied for one of the legitimate objectives explicitly mentioned in paragraph 2, and is accordance with relevant international standards, it shall be rebuttably presumed not to create an unnecessary obstacle to international trade.

Labeling of GM foods would not benefit from the presumption in article 2.5 since there are no international standards currently in force that concern themselves with the labeling of genetically modified foods generally.[74] Nevertheless, it might reasonably be argued that such labeling requirements are imposed for "the prevention of deceptive practices" or the "protection of human health or safety, animal or plant life or health, or the environment" within the meaning of article 2.[75] Presumably, the expression "not be more trade

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72. *See, e.g.*, David Hencke & Robert Evans, *How U.S. Put Pressure on Blair Over GM Food*, THE GUARDIAN, Feb. 28, 2000, http://www.guardian.co.uk/Archive/Article/0,4273, 3968321,00.html (last visited Mar. 3, 2001).

73. It has been argued, e.g., that labeling of genetically modified products, even where they have not been shown to have harmful effects, is justified on the basis of consumer information. *See* Codex Task Force, *supra* note 31, at 4-5.

74. *See supra* text accompanying notes 24-27.

75. This might particularly be the case where the name under which the goods are being marketed might suggest, misleadingly, that the goods contain no genetically modified products, e.g., "pure and natural," "whole goods" etc. On the other hand, it has been argued that labeling of foods enhanced through biotechnology would cause greater confusion for consumers, as well as

restrictive than necessary" will be interpreted, consistently with article XX of GATT, to require the least-trade restrictive of a possible range of measures. What the qualifying expression "taking account of the risks non-fulfillment would create" might add (or take away) is unclear. It might tentatively be concluded that overall the provisions appear to give a wider scope for justification of measures than do the exemptions in article XX of GATT. Of particular interest is the fact that rather than being listed as exemptions from the TBT rules, the various "legitimate objectives" seem to be part and parcel of the overall TBT Agreement approach. Even more notable is the fact that unlike GATT article XX, article 2.2 of the TBT Agreement actually mentions protection of the environment. This would seem to be a much broader concept than that of "the conservation of exhaustible natural resources" in article XX(g), the so-called environmental exception in GATT. Certainly, protection of the environment would seem to give much greater scope for arguments based upon possible environmental hazard of GMOs in line with the Biosafety Protocol. Nevertheless, much seems to depend on the relationship between the TBT Agreement and GATT.

C. Relationship with GATT

The waters surrounding the relationship between the TBT Agreement and GATT seem to be particularly muddy. According to general principles of interpretation under the WTO Agreement, in the event of a conflict the TBT Agreement would take precedence over the GATT Agreement.[76] This might lead one to the conclusion that if a national measure complied with the TBT Agreement it would be valid despite its failure to qualify for an exemption under GATT article XX. Strangely, however, unlike the SPS Agreement,[77] the TBT Agreement contains no safe harbor from noncompliance with the GATT. The puzzlement that this creates about how the TBT Agreement fits into the overall scheme of things is not alleviated by proceedings that have taken place under the Dispute Settlement

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increased costs. *See* Codex Task Force, *supra* note 31 (Comments submitted by the Council for Responsible Nutrition).

76. *See* Agreement Establishing the World Trade Organization, General Interpretative Note to Annex 1A, which provides:

> In the event of conflict between a provision of the General Agreement on Tariffs and Trade 1994 and a provision of another agreement in Annex 1A to the Agreement Establishing the World Trade Organization [of which the TBT Agreement is one] . . ., the provision of the other agreement shall prevail to the extent of the conflict.

77. *See* SPS Agreement, *supra* note 8, art. 2.4.

Understanding (DSU). In this context the most notable (and perplexing) is the *Reformulated Gasoline* case.[78] This case concerned the imposition by the United States of differential measures on domestic and imported gasoline. It sought to bring these measures within the scope of the environmental exception in article XX(g) of GATT, arguing that clean air was an exhaustible natural resource, on the basis that it was impossible to check production data with respect to gasoline refined outside the United States. The measures in *Reformulated Gasoline*, as they applied to the refining of gasoline, seem to fall squarely within the definition of technical regulation in the TBT Agreement. Nevertheless, the TBT Agreement was not an issue in *Reformulated Gasoline*. Once it had been decided that the exemption in article XX(g) of GATT did not apply this seemed to be the end of the matter, despite the apparently more generous justifications and exceptions under the TBT Agreement and the fact that the TBT Agreement ostensibly supersedes GATT in the event of a conflict. This is rather disquieting:

> By failing to consider the TBT Agreement, however, the Appellate Body implied either that the TBT Agreement does not supersede Article 20 in cases of conflict or that the Agreement has a scope as narrow or narrower than Article 20. Arguably, the *Gasoline Case* indicates that the TBT Agreement actually imposes additional requirements on top of the general GATT rules, the interpretative provision notwithstanding, and that it may defeat an Article 20 defense.[79]

If this is so, then the apparent latitude of the TBT Agreement is illusory and it would be hard to know how to assess the labeling of GM products. It is suggested, however, that if the TBT Agreement does not apply to labeling then it does not apply to anything, given the explicit mention of labeling and associated concepts in the definitions of "technical regulation" and "standard." If it applies to labeling then, according to general principles, it must take precedence in this area over GATT.[80]

IV. CONCLUSION

From the foregoing it can be seen that between GATT and the TBT Agreement, the issue of labeling of GM foods falls more properly within the ambit of the TBT Agreement. It also can be

78. *United States—Standards for Reformulated and Conventional Gasoline*, APPELLATE BODY REP., Apr. 29, 1996, WT/DS2/AB/R.

79. Meier, *supra* note 60, at 279.

80. *See* Nuffield Council on Bioethics, *supra* note 1, paras. 5.10-5.23.

argued that between the SPS Agreement and the TBT Agreement, it is the TBT Agreement that is the most appropriate WTO regulatory instrument with respect to regimes for the labeling of GM foods. As suggested earlier in this Article, it would certainly be in the interests of any government wishing to introduce such a measure to make it clear, perhaps in the measure itself, that its purpose was not "directly relating to food safety," but rather based more widely on the consumer's right to information and choice. The conclusion that the issue of labeling of GM foods falls most properly within the sphere of the TBT Agreement is a heartening one from a number of standpoints. First, while reliance on the TBT Agreement does not solve all the problems in reconciling the Biosafety Protocol with the WTO rules, it makes the task of reconciliation considerably easier. This is as much a consequence of dovetailing the labeling rules under the two regimes, as it is of the fact that the TBT Agreement provides for a wider range of justifications for trade restrictive measures than either GATT or the SPS Agreement.

The other reason why it is important that the TBT Agreement governs the issue of labeling GM foods is that such labeling regimes have a much better chance of survival under this WTO Agreement. The conclusion that the labeling of foods containing GMOs, or produced through processes involving GMOs was not WTO-friendly would be unfortunate for a number of reasons. At a time when the WTO is facing unprecedented, and increasingly well-organized opposition, the revelation that the WTO was antagonistic to the labeling of GMOs in food would be a publicity nightmare. Without a doubt, it would increase the (not necessarily unjustified) perception that the WTO is a cipher for the views and interests of multinational business enterprises.[81] As the OECD discovered in relation to the negotiation of its Multinational Agreement on Investment, well-mobilized grass roots opposition can have debilitating effects. Nor are the interests of the multinational "life sciences" corporations served by flagrant disregard of consumer interests. There is already some evidence to suggest that farmers in North America have reduced their purchases of genetically modified seed because of consumer resistance to the resulting crops.[82] In the United Kingdom and Europe, empirical studies have shown that a substantial body of

81. *See* Fiona Macmillan, *Legitimating Global Corporate Power*, *in* 1 INTERNATIONAL CORPORATE LAW ANNUAL 155 (Macmillan ed., 2000).

82. *See* Julian Borger, *U.S. Farmers Desert GM Crops*, THE GUARDIAN, Feb. 17, 2000, http://www.guardian.co.uk/Archive/Article/0,4273,3964302,00.html; Barrett & Flora, *supra* note 3, ch. 2; *see also* Drahos, *supra* note 5, at 49 (referring to a similar European experience).

consumers polled are suspicious or unhappy about the proliferation of GM foods.[83] It is, of course, a truism that there is an uncertain link between consumer opinions and consumer behavior.[84] Nevertheless, recent reports that the demand for organic products is rising in the United Kingdom by forty percent per year, despite the higher prices of such products, may be instructive.[85] Further, the leading British supermarket chain has announced that it will be offering a full range of organic fruit and vegetables.[86]

It is also the case that important societal interests and values are affected by unsatisfied consumer concern about the content or nature of foodstuffs. The resistance of some commercial interests and some regulatory authorities to the labeling of GM foods creates a climate of suspicion on the part of consumers. Not only, does this affect sales, it also creates a lack of confidence in regulatory procedures in relation to food. This is particularly so in the United Kingdom and Europe where food scares, such as the bovine spongiform encephalitis (BSE) scare, have undermined public confidence in food regulation.[87]

> [B]road public concerns, however "irrational" they may appear to some, must be taken into account in food safety regulations if they are to maintain their credibility. Industry complains that the public has lost trust in its scientific experts, but it will only make matters worse by declaring its own loss of trust in the judgement of the consumer. If labeling all foods produced by GM techniques, as many argue, turns out to be a necessary step in regaining trust on both sides, it could be a small price to pay.[88]

It is also the case that labeling of products is socially advantageous because it reduces consumer search costs and leads to better allocation of society's resources.[89]

Finally, there are compelling arguments in principle to the effect that consumers are entitled to be supplied with information about bio-

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83. *See* Nuffield Council on Bioethics, *supra* note 1, paras. 5.10-5.23.

84. *See id.* para. 5.15.

85. *See* Deborah Collcutt & Jon Ungoed-Thomas, *Organic Food: The Facts They Don't Want You to Know*, SUNDAY TIMES, June 18, 2000.

86. *See id.* This is interesting since the supermarket chain in question, *Iceland*, was the sponsor of a national Gallup poll that is relied upon in Nuffield Council on Bioethics. *See* Nuffield Council on Bioethics, *supra* note 1, paras. 1.35-1.37, 5.10.

87. *See* Nuffield Council on Bioethics, *supra* note 1, para. 5.4. The Nuffield Council on Bioethics speculates that the comparative lack of debate and concern in the United States may have something to do with public confidence in the U.S. Food and Drug Agency. *See id.* para. 5.3.

88. 398 *Nature* 639 (1999), *quoted in* Nuffield Council on Bioethics, *supra* note 1, para. 5.50.

89. *See* Drahos, *supra* note 5, at 48. On the role of product information in reducing purchasing errors, see Douglas F. Greer, *The Economic Benefits & Costs of Trademarks: Lessons for the Developing Countries*, 7 WORLD DEVELOPMENT 683 (1979).

technology products. The consumption of food has a wide significance in our society which goes beyond the mere need for physical sustenance.[90] One corollary of this is that, as the Nuffield Council on Bioethics comments, "nobody should be obliged to eat what they do not wish to."[91] Consumer concerns about GM food products are widely based, ranging from health concerns to environmental and ethical objections.[92] In these circumstances, it is not easy to see why consumers should be denied the informed choice which would result from labeling regulations.[93]

90. *See* Nuffield Council on Bioethics, *supra* note 1, at 5.1.

91. *See id.* para. 7.53.

92. For a list of some of the specific concerns raised by respondents as part of the public consultation under by the Nuffield Council on Bioethics, see *id.* at 5.19.

93. *See* Drahos, *supra* note 5, at 49.