

**Trade and the Environment:
Current Issues and New Challenges**

C. Ford Runge
Distinguished McKnight University Professor of Applied Economics and Law
Department of Applied Economics
University

May 28, 2003

29-30, 2003, Fargo, North Dakota.

Trade and the Environment: Current Issues and New Challenges*

C. Ford Runge**

The coevolution of environmental and trade policies since the end of the Uruguay Round, as well as their prominence in the Doha Development Round, have left governments and trade negotiators to deal with two central questions. The first question concerns the impacts of trade on the natural environment: When does trade impose such burdens on the natural environment that trade rules must be revised or offsetting interventions be made to protect environmental quality? The second question concerns the impacts of environmental measures on trade: When do the burdens of environmental measures on trade justify their removal or reform?

Both of these questions arise from the interaction of trade and environmental measures.¹ There is, of course, a large class of cases in which national environmental problems can be dealt with in ways that do not burden trade flows at all. Conversely, there are many issues of agricultural trade policy that are unrelated to environmental issues. An example of the former might be pollution in inland lakes and waterways requiring changes in agricultural practices in a

* This paper is dedicated to the memory of Professor Robert Hudec, colleague, friend and expert on trade and the environment. It is based in part on "Agricultural Trade and the Environment: Issues and Challenges," Chapter 1 in *Globalization and Agricultural Trade Policy* (H.J. Michelmann, et al., eds., 2001). An earlier version appeared in the *Journal of World Trade* (December 1999). Discussion of the EU's biotechnology moratorium is based in part on David Victor and Ford Runge, "A trade battle that will cost America dear," *Financial Times*, May 15, 2003.

** Distinguished McKnight University Professor of Applied Economics and Law, University of Minnesota.

watershed. An example of the latter might be the choice of a tariff versus a quota affecting imports of a commodity such as dairy products or sugar. But where trade and environmental measures *do* interact, resolving these issues requires explicit value to be given to environmental costs and benefits, which must then be weighed against the costs and benefits to the trading system. The effect of such explicit evaluation is to grant “standing” to environmental costs and benefits that have often been ignored or discounted in the past (see Runge, et. al., 1994, pp. 31-33; Arrow, et. al. 1996).

As part of this trend, Annex 2 of the Uruguay Round Agreement designated certain agro-environmental policies as “green box,” meaning that their impacts on trade were sufficiently small that they received a “green light” and would not be regarded as part of a country's Aggregate Measure of Support (AMS).² Green-box designations were extended not only to a variety of agro-environmental measures but also to policies affecting food security, crop insurance, and revenue support. In general, so long as a policy had little or no impact on production or prices, it was presumed to have little impact on trade and was thus in the green box. However, the presumption that neutrality respecting prices and production is the best indicator justifying exemption from trade disciplines is dubious. Here I shall be concerned with (1) whether a more general characterization can be given to environmental (or other) policies that are justified, *even if* they negatively affect trade; and (2) the converse question of under what conditions trade policies with negative environmental impacts must require discipline. These actions and decisions may occur through consultation, negotiation, or formal rule changes (see

Sampson, 1999).

I will set these issues in a decision-theoretic framework, and then develop a set of verifiable criteria that help to justify certain policy measures. Although the discussion is conceptual, I consider specific examples, including the result WTO case on GMO's brought by the U.S. and other countries against the European Union (EU). I conclude with some comments on the recent trend toward "sustainability assessments" of trade agreements.

A Decision Framework

How can nations respond to the environmental effects of trade measures? Conversely, how can environmental policies be justified even though they may pose burdens for the trading system? I will consider each question in turn, treating them in a decision-theoretic manner.

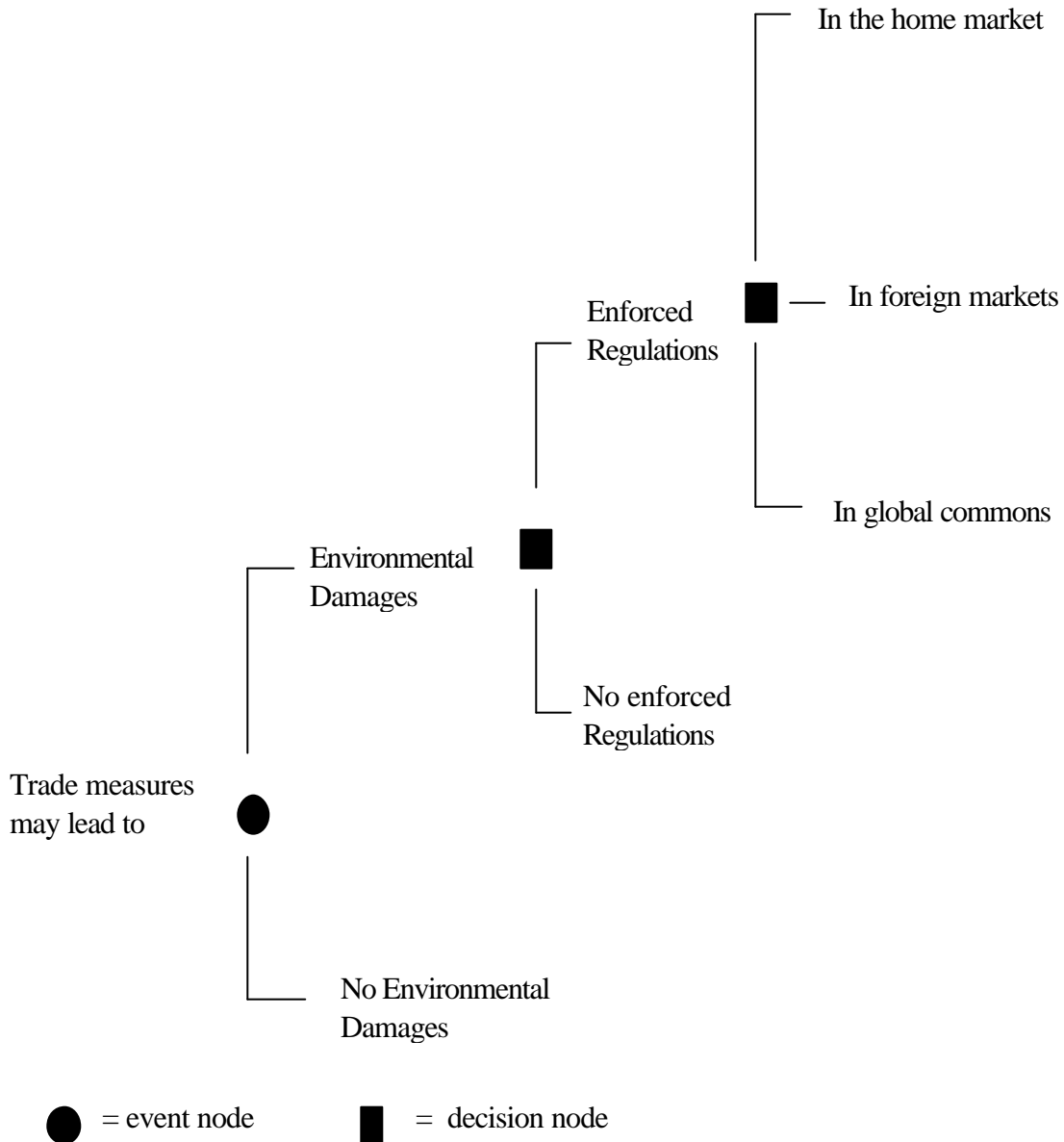
Trade Effects on the Environment

I begin with a description of the impacts of trade measures on the environment, (following Runge, et al., 1994). Figure 1 is a decision tree, in which the first branches result from an "event node," where one or another outcome may occur (see Raiffa, 1970). In decision analysis, it is customary to assign probabilities to the branches of an event node, reflecting information about the likelihood of alternative outcomes. Clearly, the greater the likelihood that a trade measure may lead to environmental damages, the more scrutiny the trade measure will require.³ If the trade measure itself is not abandoned or altered as a result of such a likelihood, then the environmental damages may lead to some type of regulatory decision (taxes, subsidies or other measures may clearly be part of this decision). For this reason, the next set of branches are marked as "decision nodes." The decision tree allows for the

possibility that a decision not to enforce regulations can be made. This outcome is especially relevant where the institutional and/or regulatory infrastructure is undeveloped, or where the political system is indifferent to the environmental damages involved, both of which are distinct possibilities in parts of the Organization for Economic Cooperation and Development (OECD) and in less developed countries (see Runge, 1998).

Figure 1. Environmental and Regulatory Implications of Trade Measures

Source: Adapted from Runge, et al., 1994, p. 12.



Once a decision to respond to environmental damages has been reached, there are further decisions that must be made over the appropriate venue and jurisdictional boundaries within which to proceed (see Hauer, 1997). For example, even if trade is linked to environmental damages, the damages may occur outside the home market, beyond the reach of domestic laws. Such was the case in the “tuna-dolphin” dispute, when the United States imposed trade embargoes to enforce laws designed to prevent dolphin kills in fishing nets used to catch tuna in foreign waters.⁴ In such cases, regulation takes on international legal significance, and questions of jurisdiction and sovereignty arise. Whether the trade measure has its primary environmental impact at home, abroad, or in the so-called global commons (such as the atmospheric ozone layer), will thus affect the type of action taken in response (see Bhagwati and Srinivasan, 1997).

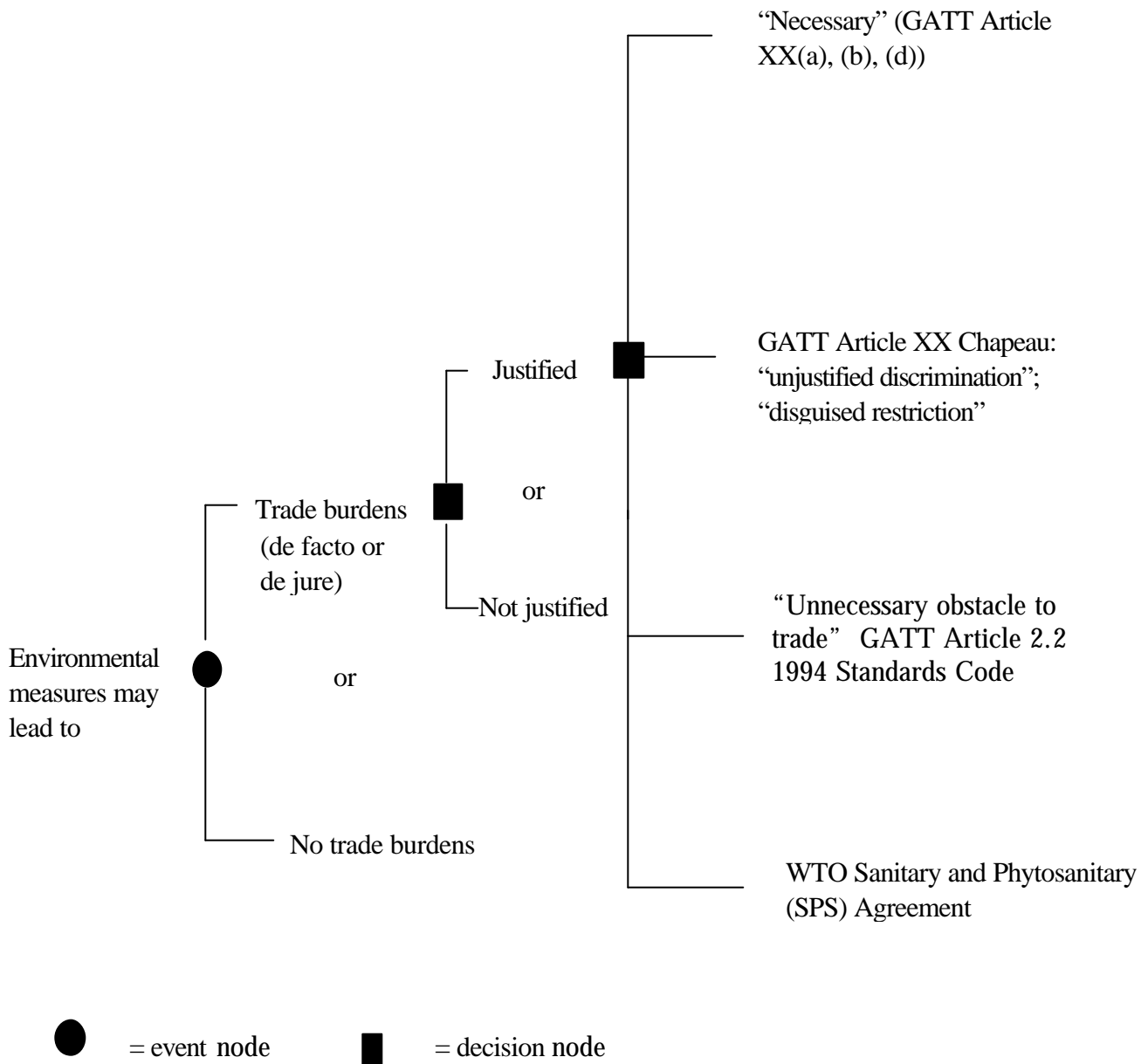
In summary, Figure 1 shows the basic elements of events and decisions where trade affects the environment. A trade measure (for instance, an export ban or market integration process such as the North American Free Trade Agreement, or NAFTA) may or may not lead to environmental damages. If the likelihood of damages is high, offsetting them requires either that the trade measure itself be changed, or it requires a decision in favor of some type of enforced regulatory response. The venue for this implementation and enforcement may be the home market, foreign markets, or even the global commons. The wider the scope of intervention, the more complex issues of jurisdiction and sovereignty become, necessitating greater consultation, negotiations, or rule changes.

Effects of Environmental Measures on Trade

In contrast to the impacts of trade measures on the environment, measures designed to protect the environment may also affect trade. This sequence of events and choices is shown in Figure 2, a decision tree with different features. The first branches describe an event node: environmental measures may lead to burdens by diverting or stopping trade flows, or they may not. Such burdens result from discrimination against foreign goods that is either explicit and rule-based (*de jure*) or (although neutral *prima facie*) imposes a differential burden (*de facto*). If the likelihood of such trade discrimination (whether *de facto* or *de jure*) is high, particular scrutiny of the environmental measure is required. If a demonstrable burden is imposed on agents seeking to export or import goods or services, the next question involves a decision. This balancing decision is whether the environmental measure is a form of justifiable environmental protection, or is instead mainly a disguised restriction to trade in which harmful trade effects offset and may outweigh beneficial environmental effects. This decision requires explicit weighing of the costs (to social welfare due to trade distortion) that should be borne in order to achieve environmental benefits. Such questions typically break down into two parts (Hudec and Farber, 1992). First, does the environmental measure create a burden on the trading system? Second, is the burden nonetheless justified by the welfare benefits of internalization of negative environmental externalities?

Figure 2. Trade Implications of Environmental Measures

Source: Adapted and updated from Runge, et al., 1994, p. 16.



From a legal perspective the burden imposed on trade is a gateway concept. If no burden is found, then the trade effects of the environmental measure are not at issue. The finding of a burden (either de jure or de facto) opens the way to further decisions as to a measure's justification, in which its benefits for the environment are weighed against its harm to trade. This justification depends on specific legal tests applied by the General Agreement on Tariffs and Trade/World Trade Organization (GATT/WTO) in dispute settlement procedures and interpretations of various GATT/WTO codes.

These tests all amount to decisions implicitly balancing the environmental benefits of the measure against the harm it does to trade. The first and simplest is the “necessary” test provided for in GATT/WTO Articles XX(a), (b), and (d) and related as well to XX(g). These general exceptions allow measures to be undertaken for domestic reasons even if they impose burdens on trade. Under article XX(b), for example, measures must be “necessary to protect human, animal or plant life or health.” Article XX(g), while not using the word “necessary,” refers to measures “relating to the conservation of exhaustible natural resources, if such measures are made effective in conjunction with restrictions on domestic production or consumption.” *Necessity*, in this context, means that the environmental goal cannot be realistically accomplished by means that are less burdensome to trade. As Robert Hudec argues, whether a burdensome regulation is necessary to achieve a domestic environmental objective “is really an interlocking decision about whether, as compared with the next least restrictive alternative, the extra burden is worth the extra gain.”⁵

The second version of justification for environmental measures appears in the chapeau, or

headnote, to Article XX, relating to “unjustifiable discrimination” or a “disguised restriction” on international trade. These justifications have been developed in light of recent cases before the Appellate Body of the WTO, notably the reformulated gasoline case,⁶ in which a U.S. claim that a discriminatory regulation had been enacted for a bona fide regulatory purpose was rejected because the United States had alternative measures available that could have accomplished the regulatory objective without employing discrimination. When the discriminatory element of a regulation is found not necessary to the policy objective it is meant to serve, that measure can be classified as “unjustified discrimination” or a “disguised restriction” to international trade (Hudec, 1998, p. 638). The issue also arose in the shrimp-turtle case (see note 4 above).

A third basis for justifying environmental measures derives from Article 2.2 of the 1994 Standards Code, which discusses “unnecessary obstacles” to trade. Although the WTO dispute settlement system has not rendered any decisions applying the article, it appears to be especially useful in relation to measures that are neutral on their face (or “origin neutral”) but in which de facto discrimination is alleged, in contrast to de jure discrimination, which could be more readily handled under Article XX (Hudec, 1998, p. 644).

A final basis for justifying environmental measures related to food quality and health risks in the food system, of especial relevance to new issues of biotechnology and Genetically Modified Organisms (GMOs), is the Sanitary and Phytosanitary (SPS) agreements made during the Uruguay Round. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) is itself an explication of Article XX(b). Controversy currently surrounds the application of the SPS Agreement

to the risks that may be posed by GMOs and whether measures designed to ban imports of GMOs can be justified by demonstrating that they might promote plant or insect pests, antibiotic resistance, or other threats to human, animal or plant life and health.

In summary, if an environmental measure imposes a burden on trade, then the determination whether the burden is justified can be assessed using several criteria. All appeal to the idea that if feasible alternatives exist that are less trade-distorting, but still protect the environment, then they should be considered in lieu of existing measures.⁷ In order to establish these desiderata, however, certain types of evidence will be needed. We turn now to three key verifiable criteria required when trade may affect the environment or when environmental measures affect trade.

Verifiable Criteria

In this section, a set of general criteria is proposed to help organize the evidence in both of the decision processes outlined above. Its purpose is to offer some tools of interpretation in answering the two questions identified at the outset of this chapter: respecting trade impacts on the environment, and the impacts of environmental regulation on trade. The discussion is largely substantive and is not intended to offer a procedural basis for these decisions, or to specify how the burden of proving certain effects should be distributed among disputants. Notwithstanding these caveats, in either of the two decision processes thus far considered, three types of verifiable criteria can be applied (see Figure 3). The first of these is a factual requirement: a finding of damage or burden. In the case of trade-liberalizing measures with damaging effects on the environment, careful documentation, including the use

of well-defined environmental indicators, is needed to show how trade expansion is likely to lead to environmental damages. This documentation is valuable not only in establishing the linkage but also in designing appropriate policies to offset or mitigate the damages. In the case of environmental measures that may pose burdens for the trading system, the same level of rigor is necessary. If it is alleged that an environmental policy imposes trade burdens, careful documentation will be needed not only in establishing a case but also in designing alternative measures that are less trade distorting.

The second verifiable criterion concerns the opportunity set of alternatives available to policymakers, which requires that a specific set of feasible alternatives be identified.⁸ In the case of trade impacts on the environment, these would include either adjustments in trade policies designed to reduce environmental damages or environmental safeguards introduced to mitigate or offset them. In the case of environmental measures with trade effects, it would include alternative environmental measures that might be less burdensome to trade. What is important is that these alternatives be *feasible in practice and not wholly hypothetical*. First preference would go to alternatives that are already in practice, obviating a demonstration of feasibility and eliminating hypothetical judgments.⁹ *Feasibility* implies that these alternatives, even if not identical in costs, be within the budget set and be capable of implementation and execution. Where such policies do not exist, evidence must be adduced showing that they are affordable and can be implemented in principle.

The purpose of this criterion is to show rigorously that alternatives exist which may offer the same degree of trade liberalization with fewer environmental damages or the same level of environmental protection with fewer burdens to trade. This demonstration is logically needed prior to judgments about

whether an environmental measure is necessarily the least trade restrictive, or whether a trade measure is least damaging to the environment, since use of *least* implies that feasible alternatives exist. The test also relates to questions of necessity more generally. A measure is necessary to protect the environment, for example, if and only if no other measure can feasibly accomplish the same goals, thus requiring the examination of actual or hypothetical alternatives.

The third verifiable criterion concerns the distribution of costs and benefits of a given measure.¹⁰ This arises from the fact that different trade measures may impose different patterns of environmental burdens (costs) in relation to commercial trade advantages (benefits). Conversely, different environmental measures may impose different patterns of trade burdens (costs) in relation to their environmental advantages (benefits). Choices among feasible alternatives are likely to be affected by this distribution of costs and benefits. For example, if an environmental measure restricts trade but imposes more burdens on foreign competitors than domestic producers, and if alternatives exist in which the burden would be more equally shared, one may argue in favor of replacing the measure with this alternative.¹¹ In the case of trade policies that pose hazards for the environment, those that offer economy-wide benefits in relation to narrowly drawn environmental costs (e.g., to a particular geographic area or ecosystem) may be more easily dealt with through a targeted environmental intervention than those in which commercial benefits flow to a narrow set of interests while imposing widespread ecological damages. Similarly, when environmental policies offer widespread benefits, and their costs are borne narrowly by affected parties (such as a sector or firm), it is easier to target this group for direct compensation while retaining the widespread advantages of environmental protection.¹²

Taken together, the verifiable criteria summarized in Figure 3 are designed as a tool of interpretation to narrow the search for trade policies that, even if damaging to the environment, may have feasible alternatives that are less damaging or, failing that, in which opportunities exist for narrowly targeted environmental interventions to mitigate or offset these damages. In cases in which environmental policies impose burdens on the free flow of trade, the three criteria are designed to encourage alternatives that have fewer trade effects, and well as those in which benefits are widespread while costs are borne narrowly, accommodating compensation to those burdened. In either case, the purpose is to inform the decision framework where trade and environment intersect so that where this intersection poses either environmental damages or trade burdens these are minimized in relation to trade and/or environmental benefits. In the real world of dispute settlement, it would be useful if GATT/WTO panels charged with evaluating trade-environment interactions would specifically evaluate alternatives by reference to these decision tools.

FIGURE 3. VERIFIABLE CRITERIA

Verifiable Criteria	Trade → Environment (see Figure 1)	Environment → Trade (see Figure 2)
Factual finding of damage or burden	Evidence that links trade measure to damages to environment, based on clear environmental indicators	Evidence that links environmental measure to trade burdens, based on clear indicators of trade distortion
Opportunity set of alternatives	Evidence that feasible trade policy alternatives (or environmental safeguards) exist	Evidence that feasible environmental policy alternatives exist
Distribution of burden (costs) and advantages (benefits)	Evidence that trade policies offer widespread benefits and narrow (more easily targeted) environmental costs	Evidence that environmental policies offer widespread benefits and narrow (more easily targeted) costs to the trading system

Source: The author.

Some Examples

Let us consider some cases of each decision process, together with the verifiable criteria noted. First, consider the impact of NAFTA on a particular sector, such as the North American beef-feeding industry. This was the subject of an issue study prepared for the NAFTA Effects Project for the North American Commission on Environmental Cooperation (Runge and Fox, 1999). First, empirical evidence was developed showing that trade expansion under NAFTA would contribute to a process of consolidation of beef feeding already underway in the central United States and in the prairie provinces of Canada. Second, the environmental impacts were identified as occurring primarily in the feed-grains sector, and indicators such as atrazine applications and nitrate levels in ground and surface waters were suggested as a basis for monitoring these effects. Since NAFTA's trade benefits are large and widespread in both the cattle and feed-grains sectors, environmental interventions were discussed that focused primarily at the more narrow base of farm practices and feedlots, where specific environmental targets could be most easily met. These environmental safeguards were discussed as appropriate adjuncts to expanded North American trade in agriculture.

In the case of environmental measures with trade effects, the U.S.-Canada dispute over landing of salmon and herring catch is instructive. In this case Canada demanded that U.S. salmon and herring boats land and have their catch fully counted in Canada before proceeding to canneries and further processing. The United States argued that this policy was not necessary to conserve exhaustible natural resources under Article XX(g), as claimed by Canada, and was an unjustified burden on the commercial conduct of the U.S. fisheries industry. After a series of dispute settlement panels heard the case (under

both the U.S.-Canada Free Trade Agreement and the GATT/WTO process), the U.S. position was upheld. This case illustrated a clear line of reasoning from a finding of trade burden to a lack of justification for the burden in terms of environmental protection. It did so by developing an empirical assessment of the need for 100 percent versus partial sampling, a feasible (and non-hypothetical) alternative. Finally, it showed that the landing requirements imposed on the United States would probably not have been undertaken by Canada if the distribution of the burden had been such as to fall wholly on its own (Canadian) nationals.

In other words, how genuine the conservation purpose of a measure is, must be determined by whether the government would have been prepared to adopt that measure if its own nationals had to bear the actual costs of the measure.... The issue must be posed in terms of whether Canada would have adopted the landing requirement if that measure had required an equivalent number of Canadian buyers to land and unload elsewhere than at their intended destination.¹³

The Case of GMOs

Among the most hotly contested issues in trade and environment today is the May 13, 2003 WTO action taken against the EU by the U.S. and other countries, objecting to the EU moratorium on Genetically Modified Organisms (GMOs). Since 1998, the EU has refused to approve any new GMO products, responding to pressure from Greens and consumers worried over both the food safety and environmental risks alleged to accompany GMO consumption and production. While WTO rules allow countries to restrict imports of crops based on “sufficient scientific evidence,” there must not be “undue delay” in producing this evidence. The U.S., joined by Canada, Argentina, and Egypt, argued that the

EU moratorium violates this language, both because scientific evidence of food safety and environmental harm from GMO crops has not been produced, and because undue delay has characterized the moratorium; the ban on imports is thus “illegal and unjustified” (*Economist*, 2003). Although we are critical of the timing of the U.S. decision (see Victor and Runge, 2002, 2003), the U.S. administration is clearly responding both to pressure from farm state interests, led by Senator Charles Granley (R, Iowa), and to European actions to force the U.S. to comply with an earlier WTO ruling against U.S. foreign-sales corporation taxes by January 1, 2004 or face retaliatory tariffs.

Setting these political considerations aside, what does the analytical framework developed above suggest about the moratorium’s justification? This justification clearly relates to the WTO Sanitary and Phytosanitary agreement, where the language on scientific evidence and undue delay appears. First, the U.S. will have little trouble establishing a factual basis for the moratorium’s trade burdens, which since 1998 has blocked U.S. and other countries’ sales of GMO corn, soybeans and cotton to Europe. U.S. growers contend that the impact on corn sales alone has amounted to \$300 million dollars (King, 2003). Second, the EU justifies the moratorium in part as a holding action pending the passage of new rules on GMO labeling and traceability. It is thus clear that the EU itself views these new rules (which may pose the same or greater burdens to GMO importers) as feasible environmental policy alternatives. Third, and at the heart of the U.S. claims, there is very little evidence addressed thus far that the human health or environmental benefits of the moratorium (or its successor labeling and traceability requirements) are or will be substantial or widespread in relation to the damage they have imposed (or will) on the trading system. The scientific consensus in support of GMO crops is reflected

in a declaration released concomitantly with the U.S. announcement by 20 Nobel Laureates and 3,200 scientists (U.S. Trade Representative, Press Release, 2003). It is buttressed by studies conducted by the French Academy of Sciences and seven other national academies of science.

Even so, the timing of the U.S. action may itself pose risks to the trading system greater than any trade advantage that could come from winning the GMO case. The target of U.S. action should probably have been the forthcoming EU labeling and traceability rules, not the moratorium. Now is a particularly bad time to embark on a dispute that will inflame anti-Americanism in Europe. In the broader, already deteriorating relationship with continental Europe, the U.S. has much more important issues at stake, notably reviving the Doha Round on trade and mending diplomatic relationships strained by the Iraq war. Moreover, a close look at the options reveals that each of the plausible outcomes from a dispute would leave the U.S. worse off than before.

First, the U.S. could pay the political costs of launching an inflammatory dispute and then lose. Most press accounts compare this case with one of the first disputes ever handled by the WTO: the EU's ban on beef that had been produced using hormones. The EU lost because its ban had no basis in science and in "comparable" areas of food policy it had adopted much less strict rules – a telltale sign that the ban was a protectionist gambit. On the surface, the cases appear similar. Although the science on the health risks of GM food is contested, essentially all the credible evidence shows that these foods are safe, which would seem to indict the EU ban. But in critical ways the cases differ. Across the board, the EU is tightening food safety regulations in ways that seem irrational by standard cost/benefit

tests but, crucially, are broadly nondiscriminatory and consistent – the key tests for whether a trade ban is legitimate. Moreover, the GM ban is a temporary measure – unlike the permanent ban on beef hormones – and trade rules allow more flexibility for countries that implement temporary measures when they can claim the science is uncertain.

Second, the EU could change its rules in the middle of the dispute. For several years, EU bureaucrats have been designing a new set of standards that would “reopen” Europe’s markets to GM foods if traders complied with onerous tracing and labeling requirements. This shift would make it harder for the U.S. to win because trade laws are tolerant of labels that allow consumers to make the final choice. While the U.S. might respond by dropping the suit, it would be more likely to redirect the dispute against the tracing and labeling rules. In the past, hotly contested trade disputes have usually taken on a myopic list of their own. Each side digs in and the political damage spreads.

Third is the most likely (and worst) outcome: the U.S. could win. The victory would be Pyrrhic because the issues are fundamentally ones of morality and technology – they must be settled in the courts of consumer opinion. On this score, the beef hormones case is instructive. Even today, hormone-treated beef is no more able to find European consumers than it was before the U.S. won its case; and the years of legal wrangling have led to counter-sanctions that have harmed a wide variety of unrelated products and industries. The antagonism over GM foods appears to be unfolding in much the same way.

A better strategy would have been to stay the course that U.S. policy has followed ever since

the controversy over GM crops broke out in the late 1990s. Time is on America's side because the technology is already proving itself in the marketplace and European opponents will find themselves increasingly isolated.

“Sustainability Assessment” of Trade Agreements

As trade-environmental linkages have come to occupy both environmentalists and trade officials, a new mechanism has evolved known as “sustainability assessments” of trade agreements. In principle, such assessments could be useful as a means of clarifying issues and developing analysis and evidence supporting the verifiable criteria in Figure 3. In practice, however, these assessments have often become ends in themselves, tying up valuable resources that might otherwise be dedicated both to environmental improvement and trade liberalization.¹⁴

A leading case of such an assessment is the EU-commissioned study, undertaken by the University of Manchester, “Sustainability Impact Assessment (SIA) of the WTO's Millennium (now Doha) Round” in 1999. An elaborate “screening and scoping” exercise was followed by the development of a methodology to assess the potential impacts (positive and negative) of the new trade round on the natural environment. The resulting framework covered 15 separate issues associated with WTO liberalization. These impacts were scaled from 1-5 (plus or minus) and presented in matrix form. In addition, an illustrative list of mitigation or enhancement measures was presented.

Unfortunately, the proposed methodology suffers from a variety of shortcomings (Richardson, 2002). First, it does not make clear how the impact scale was developed. In principle, such impacts should be clearly linked to a set of environmental indicators (see Runge and Fox, 1999). Second, there

is the serious issue of what baseline to use for such indicators, and how improvements from such a baseline can be measured. Third, since the final agreement (if any) that may emerge from the Doha Round is essentially unknown, evaluating its impacts on sustainability, *a priori*, is a complete guessing game. Fourth, environmental mitigation and enhancing measures are presented as *post hoc* responses to assumed trade liberalization, and do not allow for exceptions (for example, under Article XX) to such liberalization.

Despite its laudable effort to consider the impacts of trade measures on the environment, the SIA would benefit from a more intense focus on a few key “hotspots,” in which it is clear that trade expansion will be harmful to natural ecosystems. These might include ocean fisheries, marginal lands subject to intensification or extensification of agriculture, or transportation corridors likely to become congested and polluted from additional traffic. In these areas, mitigation and enhancement measures could then be more fully elaborated, and become part of the fabric of the trade agreement.

References

- Arrow, K., M. Cropper, G. Eads, R. Hahn, L. Lave, R. Noll, P. Portney, M. Russell, R. Schmalensee, K. Smith and R. Stavins. 1996. "Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science* 272(April 12): 221-222.
- Bhagwati, J. and T. N. Srinivasan. 1997. "Trade and the Environment: Does Environmental Diversity Detract from the Case for Free Trade?" In J. Bhagwati and Robert E. Hudec, eds., *Fair Trade and Harmonization: Prerequisites for Free Trade? Volume I: Economic Analysis*. Cambridge, MA: MIT Press.
- Center for International Environmental Law (CIEL). 1994. "GATT Tuna-Dolphin II: Environmental Protection Continues to Clash with Free Trade." CIEL Brief No. 2 (Goldberg) [CCB94-2]. Washington, D.C. June.
- Charnovitz, S. 1998. "Environment and Health Under WTO Dispute Settlement." *The International Lawyer* 32: 901-921.
- Economist*. 2003. "The GM Gamble." May 15.
- Ervin, D. 1999. "Toward GATT--Proofing Environmental Programs for Agriculture." *Journal of World Trade*. Kluwar Law International. April.
- Gorman, W.M. 1953. "Community Preference Fields." *Econometrica* 21(January): 63-80.
- Hauer, G.K. 1997. "International Pollution Externalities: Public Bads with Multiple Jurisdictions." Ph.D. Thesis. St. Paul, MN: University of Minnesota, Department of Applied Economics.
- Hudec, R. 1998. "GATT/WTO Constraints on National Regulation: Requiem for an 'Aims and Effects' Test." *The International Lawyer* 32: 619-649.
- Hudec, R. and D. Farber. 1992. "Distinguishing Environmental Measures from Trade Barriers." Paper prepared for Workshop in International Economic Policy, University of Minnesota, November 17.
- King, N. 2003. "EU Ban or Biotech Products to Face Challenge from U.S." *Wall Street Journal*, May 9.
- Meuller, D.C. 1997. *Perspectives on Public Choice: A Handbook*. New York: Cambridge University Press.

- Michelmann, H.J., J. Rude, J. Stabler and G. Storey (eds.). 2001. "Agricultural Trade and the Environment: Issues and Challenges," Chapter 1 in *Globalization and Agricultural Trade Policy*. Boulder, CO: Lynne Rienner Publishers, pp. 13-31.
- Raiffa, H. 1970. *Decision Analysis: Introductory Lectures on Choice under Uncertainty*. Reading, MA: Addison-Wesley.
- Richardson, S. 2000. "A 'Critique' of the EC's WTO Sustainability Impact Assessment Study and Recommendations for Phase III." Maeander Enterprises Ltd. March.
- Runge, C.F., François Ortalo-Magné and P. Vande Kamp. 1994. *Freer Trade, Protected Environment: Balancing Trade Liberalization and Environmental Interests*. New York: Council on Foreign Relations Press.
- Runge, C.F. 1998. "Emerging Issues in Agricultural Trade and the Environment." Paper presented at Organization for Economic Cooperation and Development (OECD) Workshop on Emerging Trade Issues in Agriculture. COM/AGR/CA/TD/TC/WS(98)103. Session IIc. Paris, France. October 26-27.
- Runge, C.F. 1999. "A Conceptual Framework for Agricultural Trade and the Environment: Beyond the 'Green box'." *Journal of World Trade* 33(6)(December): 47-68.
- Runge, C.F. and G. Fox. 1999. "Issue Study 2: Feedlot Production of Cattle in the United States and Canada: Some Environmental Implications of the North American Free Trade Agreement (NAFTA)." In *Assessing Environmental Effects of the North American Free Trade Agreement (NAFTA): An Analytic Framework (Phase II) and Issue Studies*. Montreal (Quebec) Canada: Communications and Public Outreach Department of the CEC (Commission for Environmental Cooperation) Secretariat.
- Sampson, G.P. 1999. "Trade, Environment, and the WTO: A Framework for Moving Forward." Washington, D.C.: Overseas Development Council Policy Paper. February.
- Samuelson, P.A. 1950. "Evaluation of Real National Income." *Oxford Economic Papers*. N.S. 1(January): 1-29.
- U.S. Trade Representative. Press Release. 2003. "U.S. and Cooperating Countries File WTO Case Against EU Moratorium on Biotech Food and Crops." Washington, D.C., May 13.
- Victor, D.G. and C.F. Runge. 2002. "Sustaining a Revolution: A Policy Strategy for Crop Engineering." Council on Foreign Relations, New York.

Victor, D. and F. Runge. 2003. "A trade battle that will cost America dear." *Financial Times*, May 15.

Endnotes

-
1. In this paper, “trade measures” encompass both liberalization and restricting measures, although most of the discussion focuses on liberalizing measures that may have negative environmental impacts. Environmental measures include a wide array of environmental policies, especially those in agriculture, including regulations, restrictions on chemical use, or land conservation programs. They may also include taxes and subsidies.
 2. The intuition was that of triage, in that some policies with questionable trade impacts would be designated as “yellow” and those that clearly distorted trade were “red.” In moving from green to yellow and yellow to red, the presumption in favor of including them in the AMS increased. It should be noted that “green box” does not use “green” in the sense of environmentalism. However, agricultural program payments with environmental objectives were granted green box status under two conditions in Annex 2 (p. 61) of the Uruguay Round Agreement. First, eligibility for the payments “shall be determined as part of a clearly-defined government environmental or conservation program and be dependent on the fulfillment of specific conditions under the government program, including conditions related to production methods or inputs.” Secondly, the payment amount “shall be limited to the extra costs or loss of income involved in complying with the government program.” For a discussion, see Ervin (1999).
 3. In scrutinizing trade measures, an important question is whether trade is the primary cause of environmental damages. Experience with NAFTA shows that it is often difficult to isolate the pure effects of trade on the environment, although quantitative and qualitative judgments can be made. In a case study of the North American cattle feedlot industry (Runge and Fox, 1999), for example, linkages from NAFTA to various shifts in cattle production, and their environmental implications, were clearly identified. Judgments must then be made concerning an appropriate regulatory response. Striking a balance between trade and the environment requires a careful assessment of the cost of minimizing environmental damages and the fact that additional environmental regulations are not free. Fundamentally, this is a matter of offsetting damages linked to trade by choosing the best in a set of regulatory alternatives, including changes in economic incentives through taxes, subsidies, or fees.
 4. “United States--Restrictions on Imports of Tuna,” GATT Doc. No. DS21/R (September 3, 1991). This U.S. action was challenged by Mexico and several other GATT contracting parties as an unwarranted reach into the commerce of the embargoed nations, or extrajurisdictionality. In this case (Tuna-Dolphin I), neither the United States nor Mexico asked the GATT Council to adopt the decision, which found the United States in violation of the GATT articles, in part because delicate NAFTA negotiations were underway. Subsequently, the European Economic Community requested a second dispute resolution panel (Tuna-Dolphin II) to review again the U.S. restrictions on tuna imports from countries failing to meet provisions of the U.S. Marine Mammal Protection Act (MMPA). On May 20, 1994, the panel found that the U.S. embargo violated GATT prohibitions on quantitative restrictions and did not fall under any of the exceptions to the GATT's general obligations. However, as some

environmental commentators noted, there are “significant differences between the analytical paths taken in the two decisions” (CIEL, 1994). Similar issues of extrajurisdictionality arose prominently in the Shrimp-Turtle case, in which the United States banned the importation of shrimp and shrimp products from countries found to be in violation of Section 609 of U.S. Public Law 101-162, which authorizes such bans if sea turtles are caught and adversely affected incidental to shrimp fishing. In a report of a panel formed under challenge to the U.S. action, the ban was found in violation of GATT Article XI.I and was not justified as an exception under Article XX. The WTO Appellate Body reversed the finding concerning the application of Article XX and found that Article XX(g), “relating to the conservation of exhaustible natural resources,” did in fact apply but that the U.S. measure nonetheless failed to meet the requirements of the chapeau to Article XX.

5. Robert Hudec, personal communication. For a recent exposition of these issues, see Hudec (1998).
6. Charnovitz (1998) provides a summary and critique of the case.
7. Ervin (1999) has proposed an additional set of justifications to “GATT-proof agroenvironmental measures in the form of a Code of Good Process. These justifications overlap substantially with those described above. They include: specifying clear environmental objectives for the programs; clarifying property rights in environmental payments; preferring the least trade-distorting instrument; establishing scientific linkage between the environmental objective and the program instrument; implementing monitoring and evaluation to document program efficacy; applying equal treatment for domestic products and imports; and ensuring the transparency of agroenvironmental measures.
8. This discussion echoes Samuelson’s (1950) analysis of feasibility constraints and social welfare.
9. This point relates to the rejection of compensation schemes that are only hypothetical in nature, consistent with a rejection of “potential” compensation (see Samuelson, 1950).
10. Motivation for this criterion arises in part from conclusory arguments developed in the U.S.-Canada case respecting salmon and herring catch requirements imposed by Canada on the U.S. fishing fleet. For a further discussion of the salmon-herring case, see Runge, et al. (1994), pp. 80-87 and Section 4 of this paper.
11. This was, in fact, the argument made in connection with landing rights for salmon and herring fished off the western coast of Canada in *U.S.-Canada Binational Panel Final Report, ITRD*, Vol. 12 (October 16, 1989): 1026-44. The report read in part: “The issue must be posed in terms of whether Canada would have adopted the landing requirement if that measure had required an equivalent number of Canadian buyers to land and unload elsewhere than their intended destination” (para. 7.09-7.10, pp. 1036-37).
12. The economic logic underpinning this argument arises from both the calculation of net welfare

benefits and the theory of public choice. If each individual or firm is granted similar weight in calculating a sum of net benefits, and the benefits received are approximately equal (and issues of extreme intensity of preferences are disregarded [see Gorman, 1953]), then the more widely distributed are net benefits, the more likely is the maximization of welfare benefits - an approximate restatement of Jeremy Bentham's argument for the "greatest good for the greatest number." Public-choice theory (see Meuller, 1997) predicts that trade protection is most likely to arise from narrow interests through rent-seeking, whereas environmental protection (a public good) is likely to fall short of full provision because its benefits are widespread and costs more narrowly distributed.

13. *U.S.-Canada Binational Panel Final Report*, para. 7.09-7.10, pp. 1036-37.

14. I have benefited from the analysis of sustainability impact assessments prepared by Sarah Richardson, "A 'Critique' of the EC's WTO Sustainability Impact Assessment Study and Recommendations for Phase III." It was prepared on behalf of Oxfam GB, WWF-European Policy Office, Save the Children and Action Aid in 2000.