

Chapter 2. Agricultural Trade and the General Agreement on Tariffs and Trade

2.1. Introduction

The GATT is the primary multilateral mechanism for regulating agricultural trade among nations. The most recent Uruguay Round of GATT negotiations included discussion of substantial institutional restructuring and strengthening with implications for agricultural trade and the use of technical barriers. The Final Act of the Uruguay Round includes the Agreement Establishing the World Trade Organization. One of the major functions of the WTO is to act as a dispute settlement and enforcement mechanism. When the Final Act became effective in 1995, there were also substantial revisions in the GATT rules governing agricultural trade including the Agreement on Agriculture, the Agreement on the Application of Sanitary and Phytosanitary Measures, and the Agreement on Technical Barriers to Trade.

Under the Agreement on Agriculture, member nations make specific numerical commitments in the areas of market access, domestic support, and export subsidization. The unique features of technical barriers make these measures distinct from other trade distorting policies and thus they are regulated by separate Agreements. The use of technical barriers is especially prevalent in agricultural markets where concerns over the safety of food products and the protection of domestic resources from exotic pests and diseases are intrinsic. The SPS Agreement addresses technical measures related to plant, animal, or human health or safety and the TBT Agreement addresses all other technical measures. In contrast to the Agreement on Agriculture, which sets numerical limits and commitments, provisions of the SPS and TBT Agreements provide guidelines for government behavior in implementing technical measures. These guidelines are designed to help identify when such barriers are misused, but the legitimacy of specific technical barriers has to be evaluated on a case-by-case basis.

The purpose of this chapter is to review the GATT disciplines of particular relevance to agricultural trade and technical barriers. The overall institutional structure of the GATT Agreements and the WTO, including strengthened WTO dispute settlement measures, is described in Section 2.2. In Section 2.3, the Agreement on Agriculture is presented along with some implementation issues. In Section 2.4, a precise economic definition of the term “technical barriers” is explicated to highlight some of the unique features of these measures. Sections 2.5 and 2.6 discuss the two Agreements specifically addressed to technical barriers; the SPS and TBT Agreements, respectively. A summary and conclusions are presented in Section 2.7.

2.2. Institutional Structure of the GATT

The primary instrument for multilateral regulation of agricultural trade relations, including technical barriers, is the General Agreement on Tariffs and Trade.¹ The Final Act of the Uruguay Round included the Agreement Establishing the World Trade Organization and four Annexes. Annex 1A contains the Multilateral Agreements on Trade in Goods, which includes the General Agreement on Tariffs and Trade 1994, the General Agreement on Tariffs and Trade 1947, the Agreement on Agriculture, the Agreement on the Application of Sanitary and Phytosanitary Measures, and the Agreement on Technical Barriers to Trade (see Appendix A for a list of the Uruguay Round Agreements).² Thus the Uruguay Round Agreements include the provisions of the GATT negotiated in previous periods. It is possible for countries to be signatories of GATT 1947 without signing GATT 1994 but not vice versa.

There have been eight rounds of GATT negotiations through 1997: Geneva (1947), Annecy, France (1949), Torquay, England (1950-1951), Geneva (1956), Dillon (1961-1962), Kennedy (1964-1967), Tokyo (1974-1979), and Uruguay (1986-1994). The GATT Agreements, their history, and their impact on agricultural trade compose a vast subject.³ The discussion in this section will introduce the organizing principles of the GATT Agreements, the institutional structure of the WTO, and the dispute settlement mechanisms. A review of some of the benefits and limitations of the multilateral agreements is included in each section to highlight the impacts on agricultural trade that have been debated in the professional literature and policy arena.

2.2.a. Organizing Principles

In the 1940s, as World War II drew to a close, there was recognition of the need for post-war international economic cooperation, including multilateral negotiations on trade policies. A 1947 Havana Charter for trade policy regulation called for creation of the International Trade Organization [ITO] as a new governing body for world trade. However, there was opposition in the United States Congress to vesting power in a new multilateral institution. The proposal to establish the ITO was never ratified and was subsequently dropped by other countries participating in the negotiations (Josling, Tangermann, and Warley 1996). Instead in 1947, a trade accord of tariff schedules, the GATT, was ratified by 23 countries. For most of its existence, the GATT has constituted a set of trade agreements between governments, in contrast to an international organization. Under this institutional structure, all decisions are taken by the GATT contracting parties acting jointly and not by a ruling body (Jackson 1990).

Josling, Tangermann, and Warley (1996) characterize nine essential principles that served as the foundation for the first, and subsequent, GATT Agreements (pp. 9-10). These nine

¹ There are also bilateral and plurilateral agreements that address agricultural trade and the use of technical barriers. For example, the North American Free Trade Agreement [NAFTA] contains provisions for the use of science in setting technical measures. See for example, Wirth (1994).

² The complete text of the legal agreements can be found at WTO (1997) under legal texts and in the U.S. implementing legislation, Uruguay Round Trade Agreements (1994).

³ Josling, Tangermann, and Warley (1996) provides a good recent reference for information on agriculture and the GATT, and is used extensively in this section.

organizing principles have provided the fundamental basis for commercial trade relations and negotiations between countries since World War II.

1. People will enjoy a higher standard of living if they have free access to all the world's material and human resources through trade. The lowering or removal of barriers to trade should therefore be an objective for all governments, though they are not obligated to undertake it.
2. All countries benefit from the order, fairness, and predictability that come from trade relations based on rules rather than on economic weight alone. The principles and standards of acceptable conduct that guide international commerce should therefore be codified and embodied in international commitments of a legal character.
3. Market forces should be the major regulator of international commerce. Governments should be discouraged from erecting direct or indirect barriers to trade, and their interference with market forces should be permitted only in exceptional and specified circumstances.
4. If national efforts to promote economic and social objectives affect trade relations, they are of international concern. Countries should respect the legitimate trade interests of other countries in devising and implementing domestic policies and programs, and should seek to avoid harming them.
5. Where protection is given it should be afforded only by duties and similar direct charges. The tariff is a visible barrier that readily lends itself to negotiation. Indirect methods of protection should not be used save in exceptional circumstances and according to prescribed rules.
6. Trade barriers of all types should be administered on a nondiscriminatory basis. Imports should be treated in the same manner as national products in respect to charges and regulations. Any trade benefit conferred on one country should be extended unconditionally to all other suppliers. New preferences should not be created by raising trade barriers, and all preferences should be progressively reduced and ultimately eliminated through the liberalization of trade.
7. When negotiations to reduce trade barriers are entered into, they should be carried out in such a manner as to establish a balance of mutual advantage.
8. If the balance of advantage established in negotiations is subsequently disturbed by the actions of a country, means should be provided for its restoration. If a mutual accommodation cannot be reached by consultation, balance can be restored by the measured release of the injured countries from some of their obligations.
9. Maximum use should be made of the opportunities for consultation and cooperation provided by the GATT for making the above principles effective, for solving common problems, and for resolving trade disputes.

The first principle specifically recognizes that economic efficiency and world welfare will be maximized through free trade. The second principle rationalizes pursuing further international negotiations with the goal of lowering trade barriers through formal agreements. The third principle reinforces the underlying belief that a market solution will maximize welfare. It also concedes that there are some specific instances when the market solution may not be optimal. The fourth principle recognizes that domestic policies can shift the competitive advantage among countries and therefore have trade implications. The fifth principle acknowledges the need for transparency of barriers in order to allow monitoring and enforcement of agreements among nations. The sixth principle states the beliefs in non-discrimination (no difference in the treatment of domestic and foreign products) and most-favored-nation status (no difference in the treatment of foreign products from different nations). The seventh and eighth principles are statements supporting non-discrimination among nations in the negotiation process and results. Finally, the ninth principle recognizes the GATT as an institutional mechanism for implementing the previous set of beliefs.

Despite these organizing principles, actual implementation of the basic principles has been sporadic for agricultural trade. It is estimated that the average tariff rate on manufactured products was reduced world-wide from 40 percent prior to World War II to less than 5 percent in the early 1990s (Kotschwar, Simon, and Peterson 1993). On the other hand, agricultural trade received very little attention in the early rounds of negotiations and many exceptions to the GATT rules were allowed. Prior to the Uruguay Round, only 58 percent of the agricultural tariffs were bound compared to 78 percent of industrial tariffs (OECD 1995). Waivers to established rules were used extensively in agricultural markets and unrestricted domestic agricultural policies often had wide-ranging market implications for trade. In addition, the initial GATT Agreements had relatively weak provisions for dispute resolution and compliance enforcement, so for many years countries had little official recourse against violations. A number of the perceived weaknesses of the original GATT Agreements with respect to agriculture trade were addressed in the recent Uruguay Round of negotiations.

2.2.b. World Trade Organization

The Agreement Establishing the World Trade Organization encompasses all the GATT Agreements and arrangements up to and including the Uruguay Round modifications. By September 1997, there were 132 Member countries in the WTO. Specific functions of the organization are to administer the trade agreements, serve as a forum for trade negotiations, handle trade disputes, monitor national trade policies, provide technical assistance and training for developing countries, and cooperate with other international organizations (WTO 1997).

Establishment of the WTO provides a formal institution to govern the administration of multilateral trade agreements as was proposed, but not implemented, at the 1947 Geneva conference. The organization is structured as a pyramid: a Ministerial Conference governs a General Council, a Dispute Settlement Body, and a Trade Policy Review Body. There are numerous committees that operate under the supervision of the General Council, including the Council on Trade in Goods which oversees the Committee on Agriculture, the Committee on Sanitary and Phytosanitary Measures, and the Committee on Technical Barriers to Trade.

Member countries are represented at each level of the organization and the WTO operates on a one-country, one-vote principle. The original ITO proposed a weighted voting system similar to that established for the International Monetary Fund [IMF] and World Bank.⁴ In contrast, the original GATT Article XXV provides for a one-country, one-vote majority rule decision process.

The concept of the GATT as a single undertaking is new with the Uruguay Round Agreements. Prior to 1995, Members were able to sign the basic GATT Agreement without signing numerous side-agreements that were also negotiated among subsets of Members. The legal relationship between the side-agreements, which were not binding on non-signatory nations, and the obligations of the GATT, which affected all Members, was not clear. The lack of a single-integrated rule system was often cited as an impediment to interpretation and enforcement of Member obligations (Jackson 1990).

Establishment of the WTO should reduce much of the uncertainty that has surrounded the administration of GATT rules in the past. Since 1995, all Members are bound by the full set of GATT/WTO obligations. Proponents of a formal structure argue that the existence of the organization itself provides the biggest benefit, by providing coherence within the trading system (Jackson 1989). Even those economists who see only limited short-term impacts from establishment of the WTO agree that it has an important role as a focal point for achieving and maintaining future cooperation among nations (Whalley and Hamilton 1996).

Although the establishment of the WTO and the associated institutional changes are an advancement towards achieving the organizing principles of the GATT as outlined above, several analysts have argued that the WTO's immediate effectiveness may be constrained. First, it is not clear whether the WTO will have the capacity to address regional trading arrangements that have proliferated and which often openly conflict with the principle of non-discrimination (Whalley 1996; Abbott 1997). Even if an adequate set of guidelines and obligations are articulated, the budget of the WTO Secretariat is limited for addressing this and other issues. In 1996 there were only 500 permanent employees with a total budget of \$93 million (one-fifth the budget for the IMF). In contrast, the size of individual Members' missions to the WTO is constrained only by domestic support and resources, and may increase to facilitate WTO implementation.

Moreover, the WTO continues to operate through the consensual support of its Members and their willingness to abide by the rules and decisions of the organization. By its nature, a consensus system is designed to provide equivalent representation for all Members, a characteristic reinforced by the one-country, one-vote principle. The ability of smaller countries to influence decisions through coalitions may operate against the interests of more powerful members at times. The ability of larger countries to avoid compliance (or threaten avoidance) with some majority decisions may influence the outcomes on some issues (Jackson 1990). As WTO implementation continues, balancing majority versus minority interests and retaining the

⁴ In the IMF and World Bank systems, Member votes are weighted according to each country's financial obligation to the organization.

support of small and large Members will be necessary to achieve the trade liberalization envisioned when the Uruguay Round Agreements were signed (Evans and Walsh 1995).

2.2.c. Dispute Settlement

The effectiveness of the GATT will depend critically on WTO's institutional ability to enforce Member compliance with treaty obligations. One of the major functions of the WTO is to provide a dispute settlement and regulatory enforcement mechanism. Prior to the Uruguay Round, implementation of the GATT Agreements rested on a consensus-based system which included procedures for consultation, recommendations from Members, and ultimately authorization for the withdrawal of trade concessions but which had little enforcement ability (Abbott 1997). Even the fundamental objective of the original dispute settlement procedures was unclear and their effectiveness has been controversial.

There were implicit contradictions between desires to solve immediate trade conflicts (rules-applications) and desires to promote long-term institutional goals through negotiation. The process was deemed to be fairly successful in negotiation towards long-term goals including developing a set of institutional procedures for dispute settlement. However, proponents of strict rules-applications were often critical of the dispute settlement procedures that evolved (Jackson 1990; Hudec 1993).

Early dispute settlements tended to be informal and result in diplomatically negotiated solutions. By the 1980s formal dispute processes had become more frequent and often more complex. There were only nine GATT dispute settlement decisions published between 1948 and 1959 (see Table 2.1). The longest decision was 14 pages and the average length was seven pages. In contrast, between 1985-1989 there were 20 decisions published with an average length of 42 pages. The longest decision in the later period was 82 pages. The increased demands placed on the settlement mechanism resulted in an increased number of failures to achieve acceptable outcomes (Hudec 1993). Critics argued that violations were often unchallenged, application of the formal rules was ambiguous, and the penalties for non-compliance were weak (Whalley 1996).

Table 2.1. Published GATT dispute settlement decisions, 1948-1989

Date	Published Full Decisions	Average Length of Decision	Longest Decision
	---- number ----	----- pages -----	
1948-1959	9	7	14
1960-1969	4	7	10
1970-1979	14	15	39
1980-1984	32	32	82
1985-1989	20	42	82
Total	79		

Source: Hudec (1993), p. 49.

Prior to the Uruguay Round, a full consensus among Members was required either to undertake a formal dispute investigation or to find a violation. Therefore, it was relatively easy for a Member to block or delay indefinitely a complaint against it. Still 207 complaints were filed before 1989; 89 involved disputes over agriculture commodities and 118 were non-agriculture related (see Table 2.2). Panel rulings were made in 88 cases, 37 of which involved agriculture. Of the 37 panel rulings made for agriculture complaints, violations were found in 31 (84 percent) compared to violations found in 73 percent of rulings on the non-agriculture complaints. Likewise, of the 64 cases conceded by the defendant before a ruling was made, 30 involved agricultural disputes. Of the 55 complaints withdrawn by the complainant before a panel ruling was made, 22 involved agriculture.

Table 2.2. Resolution of GATT dispute complaints filed, 1950-1989

Date	Complaints Filed			Panel Rulings			Conceded By Defendant			Complaints Withdrawn		
	Ag.	Non-ag.	Total	Ag.	Non-ag.	Total	Ag.	Non-ag.	Total	Ag.	Non-ag.	Total
	----- number -----											
1950s	12	41	53	n/a	n/a	21	n/a	n/a	22	n/a	n/a	10
1960s	6	1	7	n/a	n/a	5	n/a	n/a	2	n/a	n/a	0
1970s	17	15	32	n/a	n/a	15	n/a	n/a	12	n/a	n/a	5
1980s	54	61	115	22	25	47	17	11	28	15	25	40
Totals	89	118	207	37	51	88	30	34	64	22	33	55

n/a = not available

Source: Hudec (1993)

Since these figures represent only formal complaints, they do not include disputes that were resolved through alternative means, such as informal consultations. Many agricultural disputes remained outside the reach of the GATT legal system and the cases where formal complaints were filed tended to address peripheral issues that were relatively easy to resolve (Hudec 1993). There were virtually no formal dispute resolutions over SPS measures prior to the Uruguay Round (Stanton 1997). However, there were heated disagreements that failed to reach the stage of a panel hearing. Prominent among these was U.S. objections to the European Union's [EU] ban on the imports of beef from cattle treated with growth-promoting hormones. Under the pre-Uruguay Round institutional arrangements, no mechanism was effective in bringing the dispute to formal resolution.⁵ Once the WTO dispute settlement procedures were enacted, the U.S. was able to effectively push for formal hearings and an initial panel report was issued in August 1997.

⁵ The U.S. claimed that the EU ban on beef from cattle treated with growth-promoting hormones was a disguised trade restriction designed to protect European beef producers. In 1987, the U.S. requested a technical experts panel to investigate the case. The EU argued successfully that the policy was a production and processing standard not covered by the existing agreements. The U.S. subsequently introduced retaliatory measures on a list of other products imported from the EU. The EU called for a panel hearing on the new measures, which was blocked by the U.S. The case was deadlocked and no formal hearings were undertaken until after completion of the Uruguay Round. Kramer (1989) and Roberts (forthcoming) provide detailed discussions of the US-EU beef hormone controversy.

Under pre-Uruguay Round consensus dispute settlement procedures, once a panel was formed all parties, including the two Members involved in the disagreement, had to agree to a ruling before it could be enforced. The incentives for compliance were the threat of unilateral retaliation by the injured party or the resulting loss of political reputation from violating the established rules. These informal pressures for compliance were often strong enough that governments did not block formal panel rulings (Jackson 1990; Hudec 1997). However, large countries with strong bargaining positions were less vulnerable to these informal pressures for compliance and slippage was more often observed when the domestic political stakes were high (Hudec 1993; Sykes 1995).

This slippage contributed to the risk that compliance with the GATT rules would break down more broadly. In particular, developing countries lacked effective means to apply penalties and often avoided the dispute settlement process (Whalley 1996). Between 1948 and 1989, 73 percent of all complaints were filed by the U.S., the EU or EU members, Canada, or Australia. Approximately 83 percent of all complaints were filed against the U.S., EU or EU members, Canada, or Japan. In total, developing countries only filed 19 percent of complaints and were a defendant in 13 percent of the cases (Hudec 1993).

One of the primary goals of the Uruguay Round negotiations was to establish a more efficient and credible dispute settlement mechanism that would be based on an agreed set of procedures (Hudec 1993; Kahler 1996). In order to achieve this goal, four principal changes took place to move the previous consensus-based system to a quasi-judicial system governed by the WTO (OECD 1995; Whalley 1996; Abbott 1997). First, under the new system Members have the right to initiate a panel hearing without a full consensus. Second, there are strict time limits set for each stage in the dispute process. Third, panel reports can only be rejected by unanimous vote. Thus under the auspices of the WTO, a panel ruling is binding on all Members and only consensus can overturn a ruling, just the opposite of the earlier rules.

The strengthened dispute settlement procedures are likely to be of particular relevance to technical barriers since the SPS and TBT Agreements provide guidelines for government behavior, as opposed to numerical limits on policy adoption. In contrast to the pre-Uruguay Round period, seven formal complaints alleging violation of the SPS Agreement were filed in the first eighteen months of the new Agreement (Stanton 1997). By the end of 1997, two SPS cases had been settled, two were pending consultations, one was undergoing active panel review, one was under appeal, and an appellate body report had been adopted in the remaining case. The increase in formal complaints over SPS issues and their movement towards resolution suggests that changes in the dispute settlement mechanisms have improved the prospects for disciplining the use of technical barriers (Roberts 1998).

The four principal changes in dispute resolution have moved the GATT somewhat from a system of “soft law,” where legal norms do not effectively compel compliance, to one of “hard law,” where there is a relatively high expectation of compliance with legal norms. This has increased the likelihood of compliance and the credibility of the enforcement mechanisms, but some critics have argued that it may not enhance the long-run prospects for freer trade (Abbott 1997). There has been an increase in the number of disputes which may, in the long-run, cause governments to resist making new commitments or lead to a breakdown in negotiations; the old

potential conflict between rules-applications and long-term institutional goals reemerges despite the formal changes. Further, the new hard laws may not be designed to decrease trade barriers. For example, as discussed in some depth below (Section 2.5), the SPS Agreement authorizes Members to set their own acceptable level of risk. Potentially this could legitimize trade restrictions. Finally, since the WTO ultimately still depends on the consensus and support of Member nations, the dispute settlement procedures may not be the constraining factor for government behavior. Rather it is the commitment of governments to freer-trade that allows the rules to be effective (Hudec 1997). In order for the dispute settlement reforms to be considered successful, individual governments must continue to make commitments to the underlying principles of the GATT.

2.3. Agreement on Agriculture

The Agreement on Agriculture is contained in Annex 1 to the 1994 Agreement Establishing the World Trade Organization. The goal of the Agreement on Agriculture is to reduce the current and future use of trade-distorting policies and move towards freer agricultural markets in accordance with the organizing principles of GATT. Three distinct types of trade distorting policies that impact agricultural markets are addressed in separate provisions of the Agreement: restricted market access, domestic support, and export subsidization. Each of these provisions will be discussed briefly in this section, along with the implications for agricultural markets and some limiting factors related to implementation strategies followed by Member nations.

The Agreement on Agriculture is composed of the main text, which lays out the general provisions, and the individual country schedules, which establish specific national commitments in terms of tariff bindings, non-tariff concessions, total domestic support, and export subsidies. By requiring Members to publish their specific numerical commitments, and allowing comments on the commitments of other Members prior to adoption of the Final Act, the country schedules may reduce future disputes over interpretation of the general provisions of the Agreement on Agriculture.⁶ Including the specific commitments in the formal Agreement should eliminate the need for future interpretations of the general rules for each policy of each country (IATRC 1994).

All members are required to abide by the general provisions in the Agreement unless exempted in their individual country schedules. There is a six-year implementation period (1995-2000) that is expanded to a ten-year period (1995-2004) for developing countries. The Preamble to the Agreement calls for “taking into account the possible negative effects of the implementation of the reform programme on least-developed and net food importing developed

⁶ A separate document, GATT (1993), contains most of the details regarding the calculation of commitments participating countries were required to make. The detailed calculations are not written into the text of the Agreement on Agriculture itself, but the specific results were binding after the country schedules were accepted as a part of the Final Act. IATRC (1994) and OECD (1995) provide summaries of the Agreement on Agriculture provisions.

countries.” In concordance with this policy, least-developed countries are exempt from reduction commitments in all three areas; market access, domestic support, and export subsidies.

2.3.a. Market Access

Market access provisions center on the conversion of non-tariff barriers to tariff equivalents (tariffication) and the subsequent binding of all tariffs. Tariffication is a direct effort to increase the transparency of agricultural barriers. After the required tariffication was undertaken and the resulting numerical commitments recorded in the country schedules, Members could more easily compare the actual reductions in trade-restricting policies across nations. A ban was placed on introducing any further non-tariff barriers, and the Agreement states that “Members shall not maintain, resort to, or revert to any measures of the kind which have been required to be converted into ordinary customs duties” (Art. 4, Para. 2).

Non-tariff barriers that must be converted to tariff equivalents include “quantitative import restrictions, variable import levies, minimum import prices, discretionary import licensing, non-tariff measures maintained through state trading enterprises, voluntary export restraints and similar border measures other than ordinary customs duties.” For each commodity a base rate of duty is defined to provide a level of protection equivalent to that applied in 1986-1988, the period at which the Uruguay Round negotiations had begun. The base rate is either 1) the current tariff rate if that rate had been bound in the past; 2) the September 1, 1986 rate if an ordinary customs duty had been applied in the past but its level had not been bound by an earlier GATT Agreement; or 3) the difference between the internal and external prices, during the base period 1986-1988, if non-tariff measures were used in the past and tariffication was undertaken.

The base rate of duty provides an upper limit on the applied tariff levels in 1995, the first year of Agreement implementation. Once a base tariff had been calculated, including the conversion of non-tariff barriers, specific reductions in the level of protection were required. For developed countries, there is a scheduled 36 percent average reduction in the base tariff levels over the six-year implementation period, with a minimum 15 percent reduction for each tariff line. For developing countries, the scheduled average reduction is 24 percent over a ten-year period, with a minimum of 5 percent reduction for each tariff line. The resulting maximum rate of duty to be applied in each year is called the bound rate of duty.⁷

The market access provisions also establish minimum access commitments for some commodities. Imports equal to 3-5 percent of domestic consumption are required under a system of tariff-rate quotas [TRQs]. Under a tariff-rate quota, a specified amount of the commodity is imported with reduced tariffs while a higher (essentially prohibitive) tariff rate is imposed on additional quantities. There is an additional requirement in the Agreement on Agriculture to maintain or increase 1986-1988 access levels for tightly-controlled imports that were initially greater than the minimum commitments.

⁷ The required reduction rates are given in GATT (1993) and specific commitments are listed in the individual country schedules.

Member countries followed several strategies to limit the immediate effects of the market access provisions of the Agreement on Agriculture. The first strategy involved setting the initial base tariff rate as high as possible.⁸ In cases where an ordinary customs duty had been applied in the past, selection of 1986-88 as the reference period often resulted in base rates higher than the applied tariff rate when the Uruguay Round concluded in 1994.

World agricultural prices were at low levels during 1986-88 which resulted in higher than average calculated rates of protection in cases where tariffication occurred. In addition, when the calculations were undertaken by many importing countries, the prices employed were often selected to reflect even higher levels of protectionism. This process has been called “dirty tariffication” (IATRC 1994; OECD 1995; Josling, Tangermann, and Warley 1996).

An indication of the extent of dirty tariffication is shown in Table 2.3 as the difference between the 1995 base rates listed in the country schedules and the 1986-88 estimated *ad valorem* tariff equivalents. Many of the entries in Table 2.3 are positive indicating tariffication resulted in base duties higher than the estimated effect of non-tariff barriers during the 1986-1988 reference period. For example, the base tariff rate on rice in the EU was 207.5 percent higher than the estimated 1986-88 tariff equivalent. Similarly, the base tariff rates on dairy products were 287 percent and 474 percent higher than the estimated tariff equivalent in Norway and Sweden, respectively.⁹ These positive numbers likely underestimate the difference between base tariff rates and the tariff equivalents of non-tariff barriers in the mid-1990s due to the low 1986-88 agricultural prices and resulting higher than average rates of protection during the reference period.

Table 2.3. Base tariff rates under the Uruguay Round market access commitments minus 1986-88 *ad valorem* tariff equivalents for selected countries and commodities

Country	Commodity							
	Rice	Wheat	Coarse Grains	Sugar	Beef/ Veal	Pork	Poultry	Dairy
	----- percent -----							
Australia	-13.5	-0.7	0.4	40.6	0.0	0.0	0.0	-42.6
Canada	n/a	27.7	-4.3	-4.3	36.0	0.0	207.0	101.4
EU	207.5	52.6	1.4	63.0	28.0	0.0	-8.0	12.0
Japan	n/a	-411.4	-445.9	-57.9	-48.5	-11.7	1.0	-11.6
New Zealand	0.0	0.0	7.2	2.9	0.0	18.3	-72.2	19.6
Norway	n/a	229.0	33.0	n/a	260.0	173.0	-235.0	287.0
Switzerland	n/a	-66.0	16.0	-4.0	243.0	70.0	182.0	474.0
U.S.	4.0	-14.0	4.0	66.0	28.0	0.0	-8.0	12.0

n/a = not applicable

Source: Hathaway and Ingco (1996), pp. 43-44.

⁸ Since countries are free to vary the level of tariff as long as it is less than the bound level, it would be possible to link tariffs to domestic prices and use them as *de facto* variable levies (Ingco 1997).

⁹ Note that a few entries in Table 2.3 are negative, indicating cases where base tariffs provided less protection than that estimated for the 1986-1988 reference period. For example, the base tariff on poultry in Norway was 235 percent lower than the estimated 1986-88 tariff equivalent.

The second strategy used by Members to avoid Uruguay Round market access disciplines involved varying the percentage tariff reductions across commodities over the implementation period. Since the reduction commitments for tariff levels is a simple average, it was possible to manipulate the process by taking large reductions in those commodities where a country was either competitive in production or the initial base rate was artificially high. Table 2.4 indicates the wide variation in tariff reductions among commodities within a specific country. For example, the U.S. committed to a 55 percent reduction in the base tariff on common wheat but only a 15 percent reduction in the base tariff on refined sugar.

Table 2.4. Percentage reduction commitments in base tariff rates under the Uruguay Round market access provisions for selected countries and commodities

Country	Commodity						
	Wheat	Maize	Refined Sugar	Skim Milk Powder	Beef	Pork	Poultry
	----- percent -----						
Australia	n/a	50	50	n/a	n/a	n/a	n/a
Canada	15	36	15	15	30	n/a	15
EU	36	36	20	20	36	36	36
Iceland	50	50	50	15	15	15	15
Japan	15	20	15	15	46	15	15
Mexico	10	10	10	10	10	10	10
New Zealand	n/a	n/a	n/a	36	n/a	58	36
Norway	n/a	30	70	15	15	15	15
Switzerland	15	36	15	15	15	15	15
U.S.	55	74	15	15	15	n/a	20

n/a = not applicable

Source: OECD (1995), Tables III.1 – III.10.

Average tariff reduction calculations for the EU, Japan, and the U.S. under the market access provisions are shown in Table 2.5. The average reduction rate across commodities exceeds the 36 percent requirement, and thus meets the market access commitments, in all cases. However, the change in average tariff level between the base and final period, calculated as a percentage of the base period average tariff, is less than 36 percent for all three countries. The coefficient of variation is higher for the final tariffs than for the base tariffs, again indicating that reductions have not been in equal increments across tariff lines. There is an increased variability in relative price signals, potentially increasing distortions in resource use among agricultural products.

Table 2.5. Aggregated tariff reduction commitments for the EU, Japan and the U.S. under Uruguay Round market access provisions

Calculations	EU	Japan	U.S.
	----- percent -----		
1. Base period average tariff level	26.2	52.3	11.3
2. Final period average tariff level	17.7	40.2	7.9
3. Simple average reduction rate across commodities	37.7	36.8	38.8
4. Total aggregate percentage reduction between base and final period [1-2 /1]	32.4	23.2	30.0
5. Coefficient of variation for base tariffs	163.7	399.8	213.6
6. Coefficient of variation for final tariffs	169.6	426.4	259.0

Source: Josling, Tangermann, and Warley (1996), p. 188.

2.3.b. Domestic Support

Under the Agreement on Agriculture Members are bound to specific reduction commitments on “domestic support measures in favour of agriculture producers” except for those measures which are specifically exempt (Art. 6, Para. 1). An Aggregate Measure of Support [AMS] is calculated for each country and product and used as the measure of domestic support.¹⁰ Market price support, non-exempt direct payments, and other non-exempt domestic subsidies are included in the calculation.

The AMS for 1986-88 are aggregated across policy instruments and commodities to calculate the total base AMS. Total base AMS is required to be reduced by 20 percent in equal installments during the six-year implementation period. Developing countries are required to reduce their AMS by 13 percent, and least-developed countries are required to not exceed the AMS established during the base period.

Several domestic policies are exempt from the AMS calculation.¹¹ The AMS calculation includes those policies where an administered price exists, but not border interventions (which are constrained by the market access commitments). Support measures judged to be minimally or non-trade distorting are exempt (Annex 2). These measures, called “green-box” policies, include research, extension, inspection, marketing and promotion, infrastructure, food security stocks, domestic food-aid, crop insurance, income safety-net schemes, disaster payments, retirement programs, set-asides (if land is retired for a minimum of three years), structural adjustment programs, environmental programs, and “decoupled” income support. In addition,

¹⁰ The method of calculation is described in GATT (1993). The specific AMS calculations became part of each country’s schedule.

¹¹ A *de minimis* provision exempts all support that is below five percent of the value of production of any given commodity.

input subsidies and support to encourage agricultural and rural development and diversification are exempt for developing countries.

There is also a “blue-box” exemption for direct payments under production limiting programs, if they are made on the basis of fixed area and yield or on a maximum of 85 percent of the base level of production. The blue-box policies were adopted specifically to apply to U.S. deficiency payments (adopted in 1973 and extended in U.S. farm bills of 1977, 1981, 1985, and 1990) and to the EU Common Agricultural Policy compensation payments (adopted in 1992).¹²

The domestic support provisions of the Agreement on Agriculture are in concordance with the recognition that national policies that promote agricultural production have effects on international markets. The Uruguay Round Agreement thus marks a new initiative in addressing domestic policies for agriculture. In the past, domestic agricultural policies, while causing distortions in international markets, were generally not addressed by GATT disciplines.

As with the market access provisions, specific commitments for AMS reductions are based on national totals, allowing countries to manipulate the levels of support among commodities and still meet their overall commitment. Just as low world price levels during 1986-88 often resulted in high tariffs, so too domestic support levels were high in the reference period, resulting in relatively high base AMS (François, McDonald, and Nordström 1996). There is also the likelihood that, over time, governments may substitute among policy instruments. Green-box policies, currently considered minimally trade distorting and exempt from the AMS calculation, may eventually prove to have larger than expected effects on trade as countries switch to these measures (Josling, Tangermann, and Warley 1996).

2.3.c. Export Subsidies

The Agreement on Agriculture states that “A Member shall not provide export subsidies...in excess of the budgetary outlay and quantity commitment levels specified” (Art. 3.3). Export subsidies are defined as payments-in-kind; subsidized stock exports; producer-financed export subsidies; export marketing cost subsidies; export-specific transportation subsidies; and subsidies on goods incorporated into exports (Art. 9). However, subsidies which decrease the marketing costs of exports and subsidies for internal transportation and freight for exports are exempt from reduction commitments in developing countries.

Individual maximum subsidy levels for twenty-two aggregated product groups are specified in each country schedule. The base levels of subsidies is calculated as the average quantity exported with subsidies and average subsidy expenditure between 1986 and 1990. Specific reduction commitments are made for each of the separate product groups. Subsidies not

¹² This exemption was negotiated bilaterally in the 1992 Blair House Accord between the U.S. and EU and then incorporated into the Final Agreement. Unlike the green-box policies which are not subject to countervailing duties and other GATT challenges during the implementation period, blue-box policies are subject to countervailing duties if they can be shown to cause injury. The 1996 U.S. farm bill eliminated direct payments linked to production limiting programs, adopting instead fixed payments that fit the green-box classification. Thus, in 1998, the blue-box exemption is applicable only to EU policies.

specifically listed in the individual country schedules are prohibited and the Agreement requires that no new export subsidies be introduced in the future (Art. 3).

The Agreement requires Members to reduce budget expenditures for export subsidies by 36 percent over the implementation period. Quantities exported with subsidies are to be reduced by 21 percent over the same period. Developing countries are required to make reductions of 24 percent and 14 percent in budget expenditures and quantities exported, respectively, and are allowed a ten-year implementation period.

The reduction commitments for export subsidies could have a significant impact on world markets because the share of agricultural trade affected by export subsidies has historically been large (Ingco 1997). Table 2.6 shows projected percentage decreases in subsidized world trade of five major agricultural products as a result of the Uruguay Round commitments. The estimates are based on a 21 percent decline in the quantity of subsidized exports relative to 1989-93, given constant world trade shares.

Table 2.6. Estimated decrease in the quantity of subsidized world trade for selected commodities due to Uruguay Round export subsidy commitments

Commodity	Decrease in subsidized trade
	----- percent -----
Dairy	20.0
Butter	17.5
Wheat	15.4
Poultry	9.3
Beef and Veal	8.8

Source: Ingco 1997

Even with the export subsidy reductions required under the Agreement on Agriculture, at the end of the implementation period there will still be substantial subsidized trade in specific products. One-third or more of the trade in beef and veal, wheat, pigmeat, and vegetable oil and one-fifth or more of the trade in poultry and coarse grains could continue to be subsidized after 2000 (Hathaway and Ingco 1996). The Agreement does not specify which export policies must be modified to meet the export subsidy reduction commitments. Again, there is the possibility of substitution among policies or substitution among specific products included in the aggregate product groups to mitigate the immediate effectiveness of the commitments.

2.4. Technical Barriers

Even though the immediate economic impacts of the Uruguay Round Agreement on Agriculture may be limited as Member countries manipulate their base commitments and substitute among alternative policy strategies to avoid trade liberalization, the intention of the WTO to lower tariff and non-tariff barriers in agriculture is signaled clearly. Technical barriers are an additional form of non-tariff restriction that are not covered by the Agreement on Agriculture, but are addressed in separate GATT Agreements. One particular concern was that

as Member countries reduced their tariff and other non-tariff barriers to meet their commitments under the Agreement on Agriculture, they would substitute a higher level of technical restrictions to maintain a similar level of economic-based protection for domestic industries (OECD 1995; Thiermann 1997; James and Anderson 1998). At the very least, the relative, and perhaps, absolute importance of technical barriers will increase as other trade barriers are lowered (IATRC 1994).

Figure 2.1 shows schematically how technical barriers fit within a more general classification of trade restricting policies. Tariffs and non-tariff barriers define the set of policies that can be used as trade barriers. Trade-restricting regulations, along with contingent protection measures, quantitative restrictions, domestic subsidies and taxes, and administrative barriers, make up the set of non-tariff limitations on trade. Technical barriers are one type of trade restricting regulation. Examples of technical barriers would include policies that ban the import of cattle from regions where foot-and-mouth disease is present, an ingredient-labeling requirement on processed products for purposes of food safety, quarantine and testing procedures to detect the presence of particular pests or disease, or restrictions on the import of products containing genetically modified organisms.

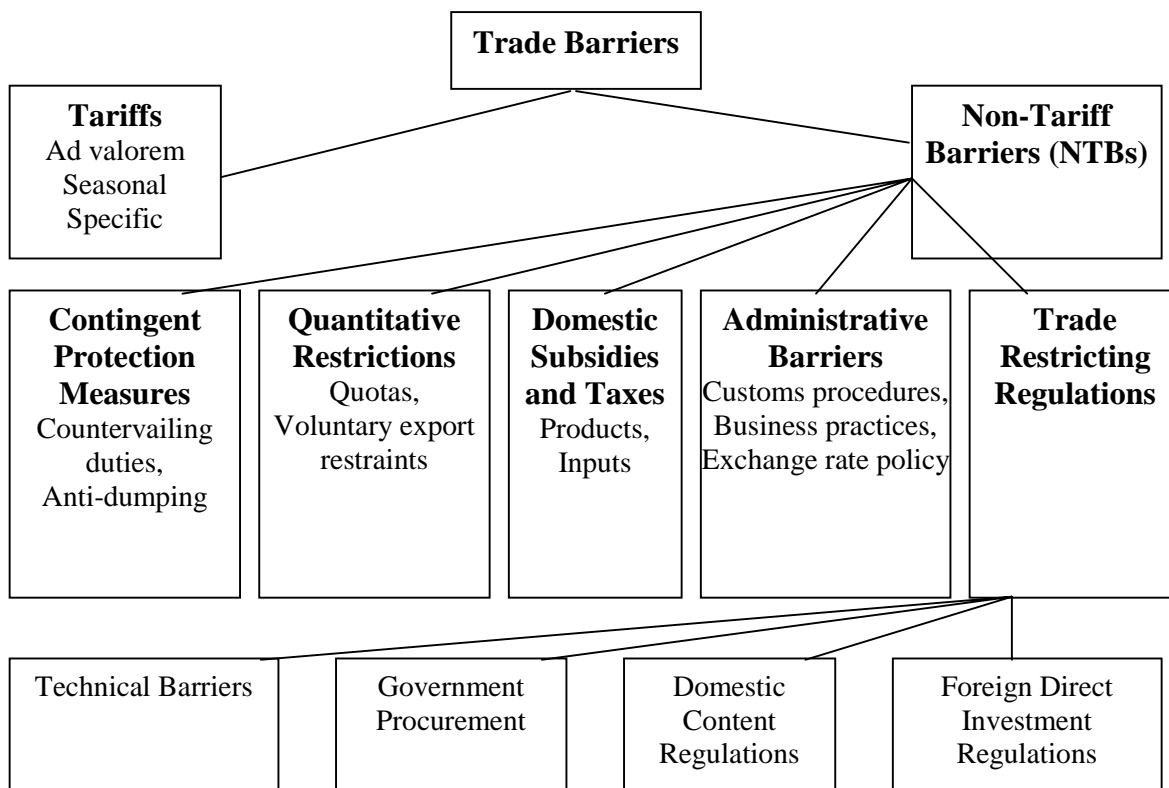


Figure 2.1. Tariff and Non-Tariff Barriers to Trade.

Source: Thornsby, Roberts, DeRemer, and Orden (forthcoming)

Definition and use of the term “technical barriers” varies extensively in professional literature. Hillman (1997) notes that confusion over the definition of technical barriers is one reason that the economic methodology for addressing their effects has been slow to develop. At times, the term technical barriers is used synonymously with food safety regulations (Caswell 1991), or with issues specifically covered only by either the TBT or the SPS Agreement (MacLaren 1997; Sumner and Lee 1997). At other times, technical barriers are not defined explicitly but are discussed in the broad context of environmental trade issues (Baldwin 1970; Kuch and Reicheferger 1992; Uimonen 1995). Frequently, technical barriers are subsumed as one subset in the broad category of non-tariff barriers (Gawande 1991; Ndayisenga and Kinsey 1994).

Roberts, Josling, and Orden (1998) propose an economic definition of technical barriers that distinguishes them from other forms of trade-restricting policies and emphasizes their unique features. Technical barriers are defined as “regulations and standards governing the sale of products into national markets which have as their *prima facie* objective the correction of market inefficiencies stemming from externalities associated with the production, distribution and consumption of these products” (p.4).

In the Roberts, Josling, and Orden definition technical barriers include “regulations and standards” that specify the desired characteristics for a product, or related production and processing methods used in an industry. The difference between regulations and standards arises in compliance enforcement. Compliance with standards is voluntary and enforcement occurs primarily through private sector activities. Compliance with regulations is mandatory and enforcement occurs through administered procedures and legal means (Sykes 1995). Regulations may be rules established in the legal codes of the importer or *de facto* rules which, although enforced, have never been officially adopted.

The stated objective of technical barriers is to increase welfare through the “correction of market inefficiencies.” Inefficiencies arise from externalities such as the involuntary introduction of a pest or disease, degradation of a global commons, information asymmetries between producers and consumers across borders, and other market failures. The existence of technical barriers constitutes acknowledgement of negative externalities that can be associated with trade in goods among nations, and the recognition that market mechanisms do not provide socially desirable outcomes in these cases. When such market failures occur, regulatory intervention may provide protection from the adverse effects of market exchange. Technical barriers are trade restricting regulations that have the potential to increase societal welfare, even in the small country case where the terms-of-trade effects are negligible.¹³ This will be referred to throughout this dissertation as externality-based protection.

The definition of technical barriers also recognizes the potential for their intentional misuse. Noting that the correction of market inefficiencies is the “*prima facie* objective” of technical barriers allows for the possibility of regulatory capture, where agents with vested

¹³ The net national welfare effects of trade policies will vary depending on the national volume of trade relative to the total world volume of trade in the product under consideration. A nation is “small” if its potential trade volume relative to the world market is so small that its possible effect on international prices is negligible.

interests in the policy outcome are able to successfully influence or control the decision-making process of government to secure favorable outcomes. Technical barriers may provide disguised protection for a domestic industry by insulating producers from the effects of the international market. This will be referred to throughout this dissertation as economic-based protection. It is this dual nature – both the potential for externality-based protection and economic-based protection components – that makes technical barriers unique among trade restricting policies.

Technical barriers are frequently internationally divergent. The heterogeneity among countries can result from a variety of sources: different countries autonomously developing national standards, differences among nations in tastes and income, differences in objectively assessed risk factors, and differences in trans-scientific factors such as risk attitudes (Roberts, Josling, and Orden 1998).¹⁴

Technical restrictions can be applied by a country bilaterally, to a few nations, or equally across all of its trading partners. They have the potential to influence the patterns and overall level of international trade flows, and are not necessarily “most-favored-nation” policies where the conditions for gaining access to a market are identical across all exporters. Further, technical barriers can diverge across nations, not only because the measures imposed are divergent but also because the procedures necessary to show compliance with the measures may differ (Sykes 1995).

Prior to implementation of the Uruguay Round Agreements, technical measures were governed by the original GATT Articles (primarily Article XX) and by the 1979 Tokyo Round Agreement on Technical Barriers to Trade. Although these codes required that measures not be applied in a discriminatory manner, create unnecessary obstacles to trade, or act as disguised trade restrictions, it was generally agreed that they were not effective in preventing the misuse of technical barriers (Roberts 1998). The SPS and TBT Agreements were negotiated during the Uruguay Round to address technical barriers in response to these concerns.

2.5. Sanitary and Phytosanitary Agreement

The SPS Agreement covers all technical measures taken to protect human, animal, or plant life or health within the territory of the Member from risks arising from 1) the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms; 2) additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; or 3) diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests (Annex A, Para. 1a-c). The goal of the SPS Agreement is to ensure the right of an importing country to set its own health and safety measures without providing a loophole to avoid the trade liberalizing disciplines of the Agreement on Agriculture. The SPS Agreement does not set specific numerical commitments for reductions in trade barriers but instead, provides criteria to evaluate the legitimate externality-based protection component of SPS regulations (OECD 1995). GATT guidelines for both technical standard setting and policy

¹⁴ Alvin Weinberg’s definition of trans-scientific, as presented in Wirth (1994), includes questions which can be asked of science and yet which cannot be answered by science.

implementation will be discussed in this section, along with positive implications for agricultural trade and some limitations that have been presented in the literature.

The correction of market inefficiencies is considered a legitimate purpose of technical barriers under the SPS Agreement. Members are encouraged to base their technical barriers on guidelines established by recognized international organizations in order “to harmonize sanitary and phytosanitary measures on as wide a basis as possible” (Art. 3, Para. 1). The relevant international organizations are recognized as the Codex Alimentarius Commission (food additives, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling, and codes and guidelines of hygienic practice); the International Office of Epizootics (animal health); and the International Plant Protection Convention (plant health) (Art. 3, Para. 4).¹⁵

These international scientific organizations themselves have no legal authority to enforce their standards. However, national policies which set measures equal to the standards promulgated by the international organizations are “deemed to be necessary to protect human, animal, and plant life or health and presumed to be consistent with the relevant provisions” of the GATT Agreements (Art. 3, Para. 2). The SPS Agreement encourages Members to participate in the standard-setting organizations to promote the development and periodic review of standards, guidelines, and recommendations (Art. 3, Para. 4).

Recognizing that the international guidelines may not reflect the preferences for externality mitigation within a particular nation, the SPS Agreement also allows Members to set their own levels of protection. Specifically, Members may “introduce or maintain sanitary or phytosanitary measures which result in a higher level of ... protection than would be achieved by measures based on the relevant international standards, guidelines, or recommendations, if there is a scientific justification” (Art. 3, Para. 3). In such cases, “Members shall ensure that their sanitary or phytosanitary measures are based on an assessment...of the risks to human, animal or plant life or health” (Art.5, Para. 1).

Risk assessment is defined as “the evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member ...and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health arising from additives, contaminants, toxins or disease-causing organisms in food, beverages, or feedstuffs” (Annex A, Para. 4).

In conducting a risk assessment, Members are encouraged to use risk assessment techniques developed by the international standard-setting organizations (Art. 5, Para. 1). Countries “shall take into account available scientific evidence; relevant processes and

¹⁵ The Codex is a subsidiary body of two United Nations organizations, the World Health Organization and the Food and Agriculture Organization. Its charter is the protection of consumers’ health and ensuring fair practices in the trade of food. The International Office of Epizootics is an independent scientific organization established in 1924 that has a long history of promoting cooperation among countries in controlling the spread of contagious animal diseases. The International Plant Protection Convention is a subsidiary body of the United Nations Food and Agriculture Organization designed to promote international efforts to control the spread of plant pests and diseases worldwide.

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” (Art. 5, Para. 2). In addition, the “relevant economic factors” should be considered when assessing the risk to animal or plant life or health (Art. 5, Para. 3).

The determination of an appropriate level of protection is a separate process from making a risk assessment (Greifer 1998; Roberts 1998). According to the SPS Agreement, “each Member shall avoid arbitrary or unjustifiable distinctions in the [level of protection] it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade” (Art. 5, Para. 5). However, the SPS Agreement includes a precautionary clause that allows Members to “provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information” in cases where the scientific information is incomplete (Art. 5, Para. 7).

Analysis of the risk-reducing provisions of the SPS Agreement has focused on the use of international standards, the role of science and risk assessment, and determination of an appropriate level of protection from risks. The use of science as criteria for policy evaluation is a unique feature of the SPS Agreement. The requirement of a scientific basis for such barriers provides some stability in expectations concerning trade and designing domestic regulations (Bhagwati 1996). It arguably holds governments to a higher standard of accountability when compared to criteria used as the basis for implementing other, non-SPS, technical measures, such as those covered by the TBT Agreement (Roberts 1997).

Countries may object to accepting the international standards as the basis for national policies for several reasons. Even before adoption of the SPS Agreement, there was concern that internationally adopted standards will reflect the least-common-denominator, or lowest level of protection, in order to reach a negotiated consensus (Bernier 1982). The emphasis on consensus may also ensure that discussion on controversial matters is delayed or avoided (Sykes 1995).

Other frequent objections to international standards are based on the argument against a loss in national sovereignty. Governments may assert that their own interests are not represented adequately in international decision-making, particularly developing countries, where the resources to participate in multiple meetings and organizations is limited (Evans and Walsh 1995). In addition, governments may argue that national protection levels should be set within their boundaries and without the negotiated consideration of other interests that is a part of many international decisions (Farber and Hudec 1996). An additional objection is that the international agencies themselves may indirectly be subject to regulatory capture by interest groups. For example, although national delegations are sent to the intergovernmental organizations, the Codex Alimentarius Commission has often been accused of primarily representing producer interests and not the food safety interests of consumers (Sykes 1995).

There may also be fundamental differences among countries in the way standards are developed that make harmonization around international standards difficult. For example, U.S. standards have historically been based on production and processing methods as opposed to the

Codex standards which have historically been based on micro-biological and other product characteristics (Bredahl and Forsythe 1989).

While the use of science as criteria for policy evaluation in the Uruguay Round SPS Agreement is more stringent than criteria negotiated in previous GATT Rounds, there is substantial room for interpretation by Members.¹⁶ Other than requiring a risk assessment, the SPS Agreement does not provide guidelines for identifying acceptable scientific procedures. Concurrence on acceptable science is often difficult to achieve since science is, by definition, “the observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena” (American Heritage Dictionary, p. 1162). In practice, science is usually the findings and explanations proposed by various experts in the field of concern. The knowledge of experts is incomplete and there is often disagreement between opposing scientific views. In terms of technical trade barriers, there may be disagreement among the scientific experts representing the importing and exporting nations. In evaluating a particular technical barrier, these experts will often disagree over both the probability of possible events that may occur and the magnitude of the consequences.

Science forms the basis for risk assessment (Greifer 1998). Since there are no specific procedures mandated by the SPS Agreement for making scientific assessments, criteria in use will change as scientific methodology evolves (Powell 1997). As technology for detection and measurement of physical occurrences becomes more sophisticated, the range of disagreement can potentially become very large. In addition, risk assessment methodology itself is still evolving. Biological hazards, such as plant pests and microbial pathogens, are projected to be the center of an increasing number of technical disputes. Yet the methodology for biological risk assessment is relatively new and much more complex than that for toxicological and chemical risks (Ahl 1998).

The results of a risk assessment depend critically on the probabilities associated with specific events and outcomes. Probabilities reflect both objective information about the events and subjective information given the risk-assessor’s beliefs about the events, so *ex ante* probabilities are not always consistent with risk assessment results. In particular, probabilities for low-probability, high-consequence events are often over-estimated (Cramerer and Kunreuther 1989). Low-probability high-consequence events are relevant to SPS trade barriers. For example, the probability of introducing a non-indigenous pest as a result of relaxing a technical measure may be quite low, but the economic consequences of such an event could be quite significant for domestic crop or livestock producers.

Even if there is agreement among risk assessors based on scientific evidence, scientific results are not designed to provide answers to normative questions (Hillman 1997). There are two normative issues that must be resolved in setting an appropriate level of risk protection: whose interests should be protected and what level of risk is acceptable. Importation of a given

¹⁶ Under Article XX of the 1947 GATT Agreement use of science is not explicitly required as a criteria for policy evaluation. Instead technical barriers are permissible as long as they are considered necessary, do not unjustifiably discriminate among nations, and do not constitute disguised restrictions in trade without any criteria given for making these judgements (Josling, Tangermann, and Warley 1996).

product may result in a pest infestation that increases the costs of domestic producers but lowers the market equilibrium price faced by domestic consumers. Orden and Romano (1996) illustrate this dichotomy among outcomes of a SPS policy decision. They examined a long-standing SPS dispute over the import of Hass avocados into the United States from Mexico and conclude, in part, that even when an SPS trade barrier is based on sound scientific analysis, it may not be the preferred economic policy in terms of maximizing national welfare. In a similar analysis of the Australian ban on banana imports, James and Anderson (1998) estimated that net surplus would increase between \$104-242 million if the ban was lifted, even if producer surplus falls to zero.¹⁷ These cases consider only domestic welfare impacts. In the case of a global commons issue, there may be impacts beyond national borders.

Once a low-probability, high-consequence event has occurred, scientific experts may agree that reoccurrence is unlikely. Yet public concerns about the probability of a reoccurrence are likely to be biased upward, and the public demand for stricter regulations may increase. This type of dilemma between scientific evidence versus consumer sovereignty has been reflected, for example, in the EU's longstanding ban on imports of cattle and beef products produced with growth-promoting hormones, one of the most contentious SPS disputes since the 1970s (Roberts, 1998).¹⁸

The SPS Agreement does not provide clear guidance on the relationship between the appropriate level of protection and the risk assessment (Greifer 1998). Decision-makers must often choose among policy options when they are uncertain about the probabilities to associate with specific outcomes. They are missing information about the consequences of their actions that could be known if more precise scientific knowledge was available. Often, in these instances, the missing information is the knowledge about which scientific expert's analysis is correct (MacLaren 1997). In such cases, decision-makers often exhibit a cautious approach and can be shown to prefer situations where they have more knowledge (Kelsey and Quiggin 1992; Cramerer and Weber 1992).

Since each nation can set its own acceptable level of risk to allow under the SPS Agreement, almost any policy outcome can be achieved from a given risk assessment. A famous example, more general than trade policy risk, is the now revised U.S. Delaney Clause which set the acceptable level for cancer-causing residues in new pesticides at zero. The standard was highly contentious and subject to much debate and interpretation. Nevertheless, the acceptable level of risk was clearly set at zero.¹⁹

¹⁷ In both of these studies, the range in surplus gains is determined by changing assumptions about the demand and supply elasticities and marketing margins in the domestic industry.

¹⁸ The original EU ban was promulgated in response to widely publicized reports of adverse consequences to children from residues of illegal growth hormones found in veal products. The U.S. argued that the ban of all growth promoting hormones was a crisis management decision without scientific foundation. The dispute involved six alternative hormones; three of which are endogenously produced by humans and animals and three of which mimic the actions of the natural hormones (Roberts 1998).

¹⁹ The U.S. Delaney Clause was cited by the EU as a guideline for its adoption of a zero risk policy in setting the standard for use of growth hormones in beef products.

The ability of Members to set a prohibitively low level of acceptable risk will be limited by the non-discrimination policy of GATT, which requires that domestic and imported products be subject to the same requirements. Further, Members are required to avoid arbitrary or unjustifiable differences in the appropriate level of protection they use in different situations (Uimonen 1995). An emerging consensus in the SPS Committee is that the objective is for Members to adopt a consistent “appropriate level of protection” but the obligation is to avoid arbitrary or unjustified distinctions between the level used across regulatory measures (Greifer 1998).

The issues surrounding WTO acceptability of technical measures providing externality-based protection may lead to a number of dispute settlement cases because the SPS Agreement is designed to provide guidelines for regulatory behavior instead of specific numerical commitments, like the Agreement on Agriculture. Eventually an accumulation of panel hearings and rulings on specific cases will clarify the relationships between international standards, the role of science, risk assessment, and the appropriate level of protection from risk. The ability to reach a ruling in the US/EU beef hormone case, a high profile dispute between the two largest actors in the world trading system, has provided the first indication that the SPS Agreement, along with Uruguay Round dispute settlement procedures, has strengthened the rule of law in international agricultural trade (Roberts 1998).

The legitimate use of technical barriers to provide externality-based protection allows an opportunity for barriers to be enacted as measures of disguised economic-based protection for domestic industries. In addition to the guidelines related to the level of externality-based protection considered legitimate, the SPS Agreement includes several provisions relating to the implementation of technical barriers that are designed to further limit such misuse.

Although countries are allowed to enact appropriate SPS measures, given a scientific basis and an appropriate risk assessment, they are required to “ensure that any ... measure is applied only to the extent necessary to protect human, animal or plant life or health” (Art. 2, Para. 2). Further, SPS measures should not arbitrarily or unjustifiably “discriminate between Members, where identical or similar conditions prevail, including between their own territory and that of other Members” (Art. 2, Para. 3). These principles can be considered variants of the GATT most-favored-nation and national treatment articles (Roberts 1998).

The SPS Agreement requires that technical barriers enacted restrict open markets by the least amount possible, given the regulatory objective. This requirement is designed to minimize the cost of compliance for exporters, and provide the least trade distortions. Thus, Members may challenge another Member’s SPS regulation, not only on the underlying standard that is being set, but also on the regulatory means for achieving the standard.

Article 4 of the SPS Agreement deals specifically with the issue of equivalence. Members are required to accept the equivalence of other Members’ SPS measures if they achieve the same level of risk protection. In order to determine if the level of protection is the same, Members are encouraged to provide access for testing, inspection of facilities, or other relevant procedures (Art. 4, Para. 1).

In an analysis of the SPS Agreement, Sykes (1995) notes a more subtle, trade-liberalizing impact of the equivalence principle. By specifically allowing Members the chance to demonstrate the equivalence of their regulatory measures, the SPS Agreement allows public comparison of the regulatory processes among nations. The possibility of public scrutiny can raise the political costs of providing economic-based protection through SPS regulations.

Article 6 of the SPS Agreement obliges Members to adopt their regulations to conditions in regional areas and not necessarily be constrained by geographical areas defined by national borders. In particular, Members are obliged to recognize the existence of pest- or disease-free areas within an exporting nation. The burden of proving that regional differences exist falls on an exporter that cannot be certified as being pest-free on a national level (Art. 6, Para. 3).

The regionalization criterion has the potential to open up previously restricted areas to trade. For example, prior to the Uruguay Round Agreements, cattle, swine, sheep and some meat from countries where foot-and-mouth disease was present were banned from entry to the United States. Revised, post-Uruguay Round U.S. regulations will allow imports from low-risk regions within a country. As a result, Argentina is now able to export these products to the United States on a limited basis (Paarlberg and Lee 1998).

Member countries are required to notify the WTO of changes in their technical barriers if the change puts in place restrictions that are not substantially the same as an international standard, guideline or recommendation and if the measures may have a “significant effect” on trade (Annex B, Para. 5). Prompt publication of proposed changes is required and Members are requested to provide an appropriate time frame for comment before implementation. The *ex ante* opportunity for Members to comment on proposed regulatory changes has been enhanced by the SPS Agreement. For example, notification by the EU of a future decrease in the acceptable maximum level of aflatoxin residues resulted in a large number of comments from both developed and developing countries that may have had difficulty learning about the proposed change prior to implementation of the SPS Agreement (Roberts 1997).

Members are obliged to provide an inquiry point for questions and supply specified relevant information and documents. In each instance, Members are asked to provide explicit information about which products are affected, justification of the measure, and to note whether their regulation conforms to an existing international standard.²⁰ The transparency requirements are obligatory for all Members, including least-developed countries, except when urgent problems arise. A provision for emergency notifications allows *ex poste* publication of regulatory changes in these cases (Annex B, Para. 6).

Transparency requirements may prove to be the catalyst for effective implementation of the SPS Agreement as countries publicize their regulatory measures (Roberts 1997). A total of

²⁰ Although the SPS Agreement calls for notification of regulations it does not specify transparency for the procedures necessary to achieve compliance with the regulatory measure. As Kotschwar, Simon, and Peterson (1993) noted in a case study of U.S. livestock exports, this can often be an impediment sufficient to block trade. On the other hand, detailed requirements may create additional incentives to avoid notification if the administrative costs of meeting the requirement becomes too high (Sykes 1995). The transparency provisions of the SPS Agreement are designed to balance these two concerns.

724 notifications were made in the first two years that the SPS Agreement was in force. Although this represents less than a 50 percent compliance rate among Members, most of the major agricultural importing and exporting nations are already observing the transparency obligations (Roberts 1997).

2.6. Technical Barriers to Trade Agreement

The TBT Agreement covers all technical regulations and standards not covered by the SPS Agreement. The goal of the TBT Agreement is to ensure that technical regulations, standards, and the conformity assessment procedures that must be undertaken by an exporter to indicate the product conforms to the underlying technical regulation or standard, do not create unnecessary obstacles to trade (Anderson 1996). As such there were some important changes included in the TBT Agreement compared to prior GATT disciplines. These changes will be presented in this section along with the implications of the TBT Agreement for agricultural trade and some important distinctions between the TBT and SPS Agreements.

Technical barriers were not addressed as a distinct subset of non-tariff barriers in the original 1947 GATT Agreements. By the 1974-1979 Tokyo Round non-tariff barriers were the major focus of the negotiations for the first time and nine different special agreements on non-tariff barriers were completed (Jackson 1990). The precursor to the Uruguay Round TBT Agreement was the Tokyo Round Agreement on Technical Barriers to Trade, known as the Standards Code, which took the first steps towards increasing the openness and transparency of technical measures, promoting access to domestic certification requirements, and the acceptance of international standards (Bredahl and Forsythe 1989). The Standards Code was fairly successful in the industrial sector, but it did not provide much discipline on trade in agricultural products (Kinsey 1993). The Uruguay Round TBT Agreement refined the rules that had been previously established in the Standards Code. The framework of the earlier agreement was retained but some important loopholes were closed (OECD 1994; Sykes 1995).

One important change of the Uruguay Round Final Agreement was inclusion of the TBT Agreement in Annex 1A to which all Members are obliged. Earlier, the Standards Code had been negotiated as a separate agreement, to which Members did not have to commit when they signed the GATT. Only 45 nations had signed the Standards Code by 1993. Most of the major agricultural trading nations were signatories but there were some notable exceptions; for example, Australia (Sykes 1995).

The Standards Code covered only product requirements. This was extended in the TBT Agreement to include processes and production methods related to the final characteristics of the product. Existing regulations are included, not just new or revised rules, as had been the case previously. Member countries are bound to discard any outdated or unnecessary regulations (OECD 1994).

In the Standards Code there was a distinction between central governments, which were bound by the Agreement, and local governments and non-government organizations, which were

only obliged to apply their “best endeavors” towards compliance (Bernier 1982). Recognizing that technical regulations and standards are often promulgated by entities other than central governments, a Code of Good Practice, included in the TBT Agreement, attempts to regulate restrictions imposed by local governments and non-governmental organizations (Annex 3). Under the TBT Agreement, Members are specifically charged with taking “reasonable measures as may be available to them to ensure compliance by such bodies” with the provisions of the Agreement (Art. 3, Para. 1). All public and private international, regional, national, and local standardizing bodies are encouraged to sign the Code of Good Practice which embodies the basic obligations of the TBT Agreement. Although the Code is not legally binding on signatories other than the central governments, it does have the potential to increase the transparency of technical measures at all levels. In particular, when technical restrictions arise from the unintended or arbitrary consequences of bureaucratic decisions, the Code of Good Practice may allow for more input in the discussion process by those affected internationally (Sykes 1995).

The Standards Code covered all technical regulations. While the TBT Agreement includes both industrial and agricultural products, measures governed under the SPS Agreement and government procurement specifications are specifically exempt (Art. 1). As clarified by the WTO Secretariat (1995), it is the type of measures which determines if a regulation is governed by the TBT Agreement (a technical restriction) but the purpose of the measure which determines if it is governed by the SPS Agreement. Examples of technical regulations for agricultural products which would be governed by the TBT Agreement include enforcement of grading measures, packaging restrictions (either in terms of size or composition), and labeling, shelf-life, and product conformity requirements not related to human, animal, or plant life or health.

In some cases, policymakers can alter the wording of a regulation so that it falls under the jurisdiction of the TBT or the SPS Agreement. Roberts (1997) provides several examples of a single policy which could be governed under one Agreement or the other based only on a change in the stated objective. Restrictions on product shelf-life could be adopted as a food safety measure (a SPS measure) or a measure to regulate product freshness (a food quality regulation or TBT measure). A food labeling regulation could be used to provide information about ingredients that were potential allergens for some consumers (SPS) or to inform consumers about the nutritional profile of a product (TBT).

The technical measures governed by the TBT Agreement, like those governed by the SPS Agreement, can provide both externality-based and economic-based protection. For this reason, the structure of both Agreements is similar. Each Agreement provides a set of guidelines for government behavior in establishing technical regulations, and neither specifies numerical limits on the level of protection that can be applied. Members’ rights to enact technical regulations and standards to ensure product quality, to protect the environment, human, animal or plant life or health, or to prevent deceptive practices are recognized in the preamble to the TBT Agreement.

A key difference between the SPS and TBT Agreements is that the former requires that measures be based on a risk assessment while the latter does not. Like the SPS Agreement, the TBT Agreement allows Members to develop measures different from international standards when the standards are argued to be an ineffective or inappropriate means for meeting a legitimate technical objective. The TBT Agreement defines relevant elements of consideration

for a regulation to include “available scientific and technical information, related processing technology or intended end-uses of products” (Art. 2, Para. 2).

Since technical barriers are, by definition, impediments to trade they are limited in the TBT Agreement to regulations which are not more trade-restrictive than necessary and which fulfill a legitimate objective. Legitimate objectives are defined as “*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” (Art. 2, Para. 2). None of the 400 technical barriers notified to the GATT Secretariat since 1980 has been challenged as being unnecessarily trade restrictive (Anderson 1996).

Most-favored-nation and national treatment principles are reiterated in the TBT Agreement where Members are obliged to ensure that imports receive treatment “no less favorable” than domestic products or “like products originating in any other country” (Art. 2, Para. 1). This wording has led to a debate over the legal definition of “like products.” There is no definition expressed in the GATT Agreements, although there have been some clarifying statements in dispute settlement panel reports. Criteria suggested for a like-products determination are the product properties, nature, quality, and end-uses in a given market, and consumer tastes and habits. A more recent panel decision extended these criteria from a focus centered solely on product characteristics to include the intended purpose of the regulation. Specifically, if product differentiation is designed to achieve any goal other than economic-based protection for the domestic industry, then the products are deemed to be “unlike” and differential treatment may be allowed (Chakarian 1994). Therefore, for a TBT measure the issue of regulatory justification is considered simultaneously with the issue of national treatment (Farber and Hudec 1996).

2.7. Conclusions

The GATT is the primary multilateral instrument governing international trade relations. Its organizing principles are based on the premise that trade is desirable for the world economy and that all Members have a right to trade. Creation of the WTO in 1995 provided a formal organization to oversee the GATT Agreements and strengthened the compliance and enforcement mechanisms of the GATT.

The Uruguay Round Final Act includes significant changes for the regulation of trade in agricultural products. The Agreement on Agriculture brought agricultural trade discipline more in concordance with the underlying principles of the GATT by requiring specific numerical commitments on market access, domestic support, and export subsidies.

Unlike tariff and other non-tariff barriers, technical barriers are trade-restricting policies that can be welfare increasing because they mitigate negative externalities from the movement of goods across national boundaries. Technical barriers can serve to protect plant, animal, and human health and safety and the environment, or to provide public information in order to correct other market imperfections that arise from externalities associated with the trade of

goods. The use of technical barriers is especially prevalent in agricultural markets where concerns over the safety of food products and the protection of domestic resources from exotic pests and diseases are intrinsic.

Technical barriers can be used simply as a disguised form of economic-based protection for domestic industries. In these instances national welfare is lowered, except through terms-of-trade effects, just as it is with the more traditional forms of trade barriers. Technical barriers were specifically addressed in the Uruguay Round SPS and TBT Agreements. These agreements are designed to recognize the rights of governments to use technical barriers to correct negative externalities, while seeking to limit the ability of governments to intentionally misuse such measures.

Since technical barriers can provide trade restrictions deemed to be legitimate by the WTO, the dispute settlement process is likely to be increasingly important in resolving controversy over specific issues. Panel rulings and statements will help clarify the acceptable interactions of science, economics, and politics in determining the role of technical policies in agricultural trade. Taken together with the Uruguay Round Agreements themselves, this body of evidence indicates a set of criteria separating the externality-based from the economic-based protection components of technical barriers.