Policy Options for Open Borders in Relation to Animal And Plant Protection and Food Safety

Spencer Henson[1] and Maury Bredahl[2]

1. Introduction

In recent years, increasing attention has been given to the impact of technical measures, and in particular sanitary and phytosanitary (SPS) regulations and standards, on trade in agricultural and food products. With the progressive dismantling of formal barriers to trade through international trade negotiations at both the bilateral and multilateral levels, analysts have focused in on other measures that have the potential to impede trade. Simultaneously, our understanding of the manner in which technical measures can influence trade has improved.

The range and diversity of SPS and other technical measures applied to agricultural and food products are typically large and increasing over time. For example, Figure 1 reports the numbers of notifications of new SPS measures by Canada, Mexico and Canada under the WTO SPS Agreement over the period 1995-2001. The number of annual notifications for the United States has increased from less than 50 in the each of the first three years of the Agreement to more than 150 for the most recent two years. In total more than 500 notifications have been registered by the United States, while Mexico has registered less than 200 and Canada only slightly over 100. Simultaneously, the qualitative nature of these measures is changing reflecting advances in scientific understanding of risk and risk analysis, changes in priorities, the evolution of international standards, and changes in agricultural (bio) technology. Consequently, the task of analysing the impact of a SPS measures on trade in agricultural and food products has become even more problematic and resource intensive.

2. SPS measures as technical barriers to trade in agricultural and food products

Non-tariff trade barriers (NTBs) are defined by Hillman (1991) as all restrictions, other than traditional tariffs, which distort international trade. Such measures directly impede the importation of products and, because they do not apply in an equivalent manner to domestic production, discriminate against imports (Beghin and Bureau, 2001). In some cases such measures are explicitly trade-related, for example import prohibitions and quantitative restrictions, aimed at restricting imports. In others, they do not explicitly aim to provide trade protection, but can act to restrict trade flows, for example technical barriers to trade (TBTs).

Roberts and De Kremer (1997) define TBTs as:

> 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.

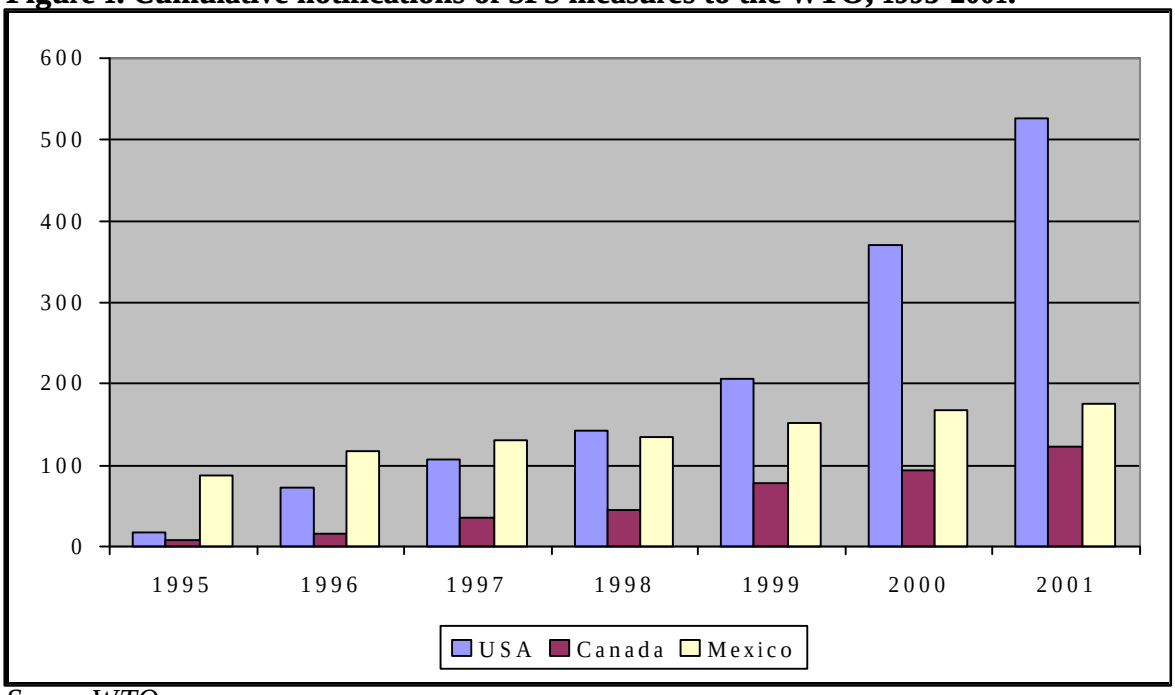
These measures aim to prevent the entry into national markets of products that fail to meet pre-specified standards. In this context, 'standards' are technical specifications relating to characteristics

[1] Associate Professor, Department of Agricultural Economics and Business, University of Guelph, Canada.
[2] Professor Emeritus, Department of Agricultural Economics, University of Missouri, USA.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

of products or to the manner in which they are produced and processed. Equivalent measures may or may not be applied to domestic products, depending on their relative characteristics and the risks that pre-specified standards would be violated.

Figure 1. Cumulative notifications of SPS measures to the WTO, 1995-2001.



Source: WTO.

A variety of policy instruments can be employed by governments to correct (real or perceived) market failures. Our interest here is in those measures that are applied to imports (Table 1). Three broad categories of measures are applied (Roberts *et al*., 1999). *Firstly*, import bans prohibit the entry of a product entirely, from a particular country/region, or at a specific time of the year. These are most widely applied to products that pose a great risk to human, plant or animal health and where alternative methods of control are technically or economically infeasible. *Secondly*, technical specifications define requirements that products must satisfy in order to be permitted entry. These can encompass the characteristics of the product itself, the process by which it is produced and the manner in which it is packaged. Predefined methods of conformity assessment are specified to determine whether the product is in compliance and can be permitted to enter. *Thirdly*, information measures require certain information to be disclosed on the product label and/or control the claims that can be made about the characteristics of the product.

Table 1. Classification of technical barriers to trade.

Import Bans		**Technical Specifications**			**Information Requirements**	
Total Ban	Partial Ban	Process Standards	Product Standards	Packaging Standards	Labelling Requirements	Controls on Voluntary Claims

Source: Roberts et al. (1999).

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Technical barriers to trade are applied to address a wide range of societal interests, notably protecting the economic interests of suppliers (agricultural producers, food processors etc.), the health and economic interests of food consumers, and the natural environment (Table 2) (Roberts *et al*., 1999). For each of these objectives a distinction can be made between measures associated with risks to human, plant or animal health or the environment, and measures associated with other societal objectives, for example protecting the economic interests of consumers. The focus of this paper is on this first set of measures, which are commonly referred to as SPS measures.

Table 2. Classification of technical barriers to trade by objective.

Societal Interests	Risk-Reducing Measures	Non Risk-Reducing Measures
Suppliers	Protection of commercial animal/plant health	Compatibility of products
Consumers	Food safety	Quality characteristics
Natural Environment	Protection of natural environment from harmful non-indigenous species	Environmental conservation

Source: Roberts et al. (1999).

Technical measures differ in the extent to which they discriminate between domestic and imported products. Non-discriminatory measures are applied equally to domestic and imported products, although differences may remain in the manner in which conformity assessment is undertaken.[3] Discriminatory measures apply additional and/or qualitatively different requirements to imported products. Furthermore, measures can be applied to all imports regardless of source or discriminate between individual exporting countries. The extent to which technical measures discriminate between products according to source is an important factor influencing the impact on trade, both in terms of total trade flows and flows between particular countries.

Whereas much of the concern about the impact of technical measures on trade has concentrated on mandatory government requirements, there is growing awareness that voluntary standards can also impede trade. *Firstly*, compliance with established voluntary standards may be essential because consumers require compatibility with complementary products or services (for example plastic containers and microwave ovens). *Secondly*, voluntary standards may be closely related to consumer preferences (for example safety marks that are seen by consumers as an essential guarantee of minimum product quality). *Thirdly*, voluntary standards may be considered crucial for compliance with mandatory standards (for example ISO 9000 as a means to satisfy the requirements of food safety regulations). If such standards are so widely applied that they become *de facto* mandatory, there may in practice be little choice but for foreign suppliers to comply.

In addition to the standards associated with technical barriers to trade, the methods applied to assess conformity can also discriminate between domestic suppliers and exporters, often explicitly by applying additional or different methods of conformity assessment to imports. For example, imports are frequently subject to inspection at the border, whilst domestic products are not subject to an equivalent process of conformity assessment prior to sale.

[3] Imported products may be subject to border inspection, whereas no comparable system of inspection is applied to domestic products.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Some analysts dispute the above definition of TBTs. Rather they consider the term 'barrier' should be not be applied to measures whose principle objective is to correct market inefficiencies, but happen to have an incidental impact on trade (Beghin and Bureau, 2001). For example, Baldwin (1970) considers that national technical measures (NTMs) having an overall positive welfare effect should not be classified as NTBs. Other analysts define NTBs by reference to the difference between an existing measure and the measure that would be applied if all supplies were from domestic sources (for example Maskus *et al*., 2001).

In the case of SPS measures specifically, the use of the term 'barrier' may be guided by the rules of the SPS Agreements. Both Agreements define criteria to assess whether a technical measure is 'justified'. This is assessed according to the specific nature of the measure, its objectives and the potential impact on trade. This is essentially a scientific – does the measure address a real risk to human, animal or plant health of the environment – and an economic – does the measure distort trade to the minimum extent possible – issue.

3. SPS and other technical measures and trade within NAFTA

The foregoing discussion suggests that agricultural and food products are typically subject to a wide range and diversity of SPS and other technical measures that have the potential to impede trade. This section now explores the incidence of these measures in Canada, Mexico and the United States. In so doing, the aim is to highlight the extent to which agricultural and food products are subject to SPS and other technical measures in intra-NAFTA trade. This analysis is based on data derived from UNCTAD's TRAINS database, which includes an inventory of non-tariff measures, including technical measures, applied to agricultural and food products at the eight-digit level.

Tables 3 and 4 detail the number of technical measures applied to agricultural and food products in Mexico. The most widely applied measures are labelling requirements (22.7%), testing, inspection and quarantine requirements to protect plant health (16.5%), and product characteristic requirements for plant health protection (12.3%). Collectively, these account for over 50 percent of the measures applied. The products to which technical measures are most widely applied are live animals, fruit, vegetable and nut preparations, oilseeds, dairy products, eggs and honey, and meat and edible meat offal. Relatively few technical measures are applied to other vegetable products, cocoa and cocoa preparations, and gums, resins etc.

In Canada, the most frequently applied technical measures are authorization for plant health, human health and animal health protection, and marking and product characteristic requirements for human health protection. (Tables 5 and 6) The products to which measures are most widely applied are edible vegetables, roots and tubers, meat and edible meat offal, edible fruits and nuts, fish, crustaceans, molluscs etc, and dairy products, eggs and honey.

Tables 7 and 8 detail the numbers of technical measures applied to agricultural and food products in the United States. The most frequently applied measures are testing, inspection or quarantine requirements to protect human, and health and product characteristic requirements for human health protection. Collectively, these account for around 70 percent of the measures applied. The incidence of technical measures is highest in the case of dairy products, eggs and honey, fruit, vegetable and nut preparations, and fish crustaceans, molluscs etc.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 3. Number of technical measures applied to agricultural and food products in Mexico by measure, 2001.

Measure	Number	%
Authorization for human health protection	204	9.1
Technical requirements	28	1.3
Product characteristics requirements for human health protection	234	10.5
Product characteristics requirements for animal health protection	227	10.2
Product characteristics requirements for plant health protection	275	12.3
Product characteristics requirements to protect wildlife	31	1.4
Labeling requirements	506	22.7
Packaging requirements	97	4.3
Testing, inspection and quarantine requirements to protect animal health	227	10.2
Testing, inspection and quarantine requirements to protect plant health	367	16.5
Testing, inspection and quarantine requirements to protect wildlife	35	1.6
TOTAL	**2,231**	**100.0**

Source: UNCTAD.

Table 4. Number of technical measures applied to agricultural and food products in Mexico by product, 2001.

HS-Code	Product	Number	% Tariff Lines	Measures per Line
1	Live animals	104	100	4.3
2	Meat and edible meat offal	148	100	1.6
3	Fish, crustaceans, molluscs etc.	116	92.3	1.1
4	Dairy products, eggs and honey	287	96.4	1.1
5	Other products of animal origin	69	100	3.3
6	Live plants, flowers etc.	105	100	3.8
7	Edible vegetables, roots and tubers	130	77.4	0.8
8	Edible fruits and nuts	130	95.2	1.1
9	Coffee, tea and spices	83	100	1.9
10	Cereals	67	100	3.2
11	Products of the milling industries	64	100	1.7
12	Oilseeds	204	100	3.5
13	Gums, resins etc.	22	100	1.5
14	Other vegetable products	12	64.3	0.9
15	Animal and vegetable oils and fats	51	48.5	0.8
16	Preparations of meat and fish	86	89.2	0.9
17	Sugar and sugar confectionery	27	22.7	0.4
18	Cocoa and cocoa preparations	20	18.2	0.3
19	Cereal preparations	50	56.3	0.7
20	Fruit, vegetable and nut preparations	215	100	1.3
21	Other preparations	79	72.9	0.9
22	Beverages, spirits and vinegar	92	93.0	1.3
23	Residues and waste from food industry	44	92.2	1.2
24	Tobacco and manufactured tobacco substitutes	26	14.1	0.3

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Total	**2,231**

Source: UNCTAD.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 5. Number of technical measures applied to agricultural and food products in Canada by measure, 2001.

Measure	Number	%
Authorization for human health protection	252	17.1
Authorization for animal health protection	221	15.0
Authorization for plant health protection	363	24.6
Authorization to protect wildlife	43	2.9
Product characteristic requirements for human health protection	194	13.1
Labeling requirements	178	12.0
Marking requirements to ensure human health	197	13.3
Quarantine to protect animal health and life	29	2.0
TOTAL	**1,477**	**100.0**

Source: UNCTAD.

Table 6. Incidence of technical measures applied to agricultural and food products in Canada by product, 2001.

HS-Code	Product	Number	% Tariff Lines	Measures per Line
1	Live animals	88	100	3.7
2	Meat and edible meat offal	148	100	1.6
3	Fish, crustaceans, molluscs etc.	133	100	1.2
4	Dairy products, eggs and honey	326	100	1.3
5	Other products of animal origin	43	100	2.0
6	Live plants, flowers etc.	88	100	3.1
7	Edible vegetables, roots and tubers	206	100	1.3
8	Edible fruits and nuts	138	100	1.2
9	Coffee, tea and spices	72	100	1.7
10	Cereals	33	100	1.6
11	Products of the milling industries (starch, gluten etc.)	92	100	2.4
12	Oilseeds	78	100	1.3
13	Gums, resins etc.	18	73.3	0.8
14	Other vegetable products	14	100	1.0
15	Animal and vegetable oils and fats	0	0	0.0
16	Preparations of meat and fish	0	0	0.0
17	Sugar and sugar confectionery	0	0	0.0
18	Cocoa and cocoa preparations	0	0	0.0
19	Cereal preparations	0	0	0.0
20	Fruit, vegetable and nut preparations	0	0	0.0
21	Other preparations	0	0	0.0
22	Beverages, spirits and vinegar	0	0	0.0
23	Residues and waste from food industry	0	0	0.0
24	Tobacco and manufactured tobacco substitutes	0	0	0.0
Total		**1,477**		

Source: UNCTAD.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 7. Number of technical measures applied to agricultural and food products in United States by measure, 2001.

Measure	Number	%
Authorization to protect human life	27	1.1
Authorization to protect animal health	47	1.9
Authorization to protect plant health	322	12.9
Authorization to protect wildlife	67	2.7
Product characteristics requirements for human health protection	829	33.2
Product characteristics requirements plant health protection	28	1.1
Marking requirements	59	2.4
Marking requirements to protect human health	27	1.1
Labeling requirements	60	2.4
Labeling requirements to protect human health	27	1.1
Testing, inspection or quarantine requirements to protect human health	922	36.9
Testing, inspection or quarantine requirements to protect animal health	47	1.9
Testing, inspection or quarantine requirements to protect plant health	35	1.4
TOTAL	**2,497**	**100.0**

Source: UNCTAD.

Table 8. Incidence of technical measures applied to agricultural and food products in the United States by product, 2001.

HS-Code	Product	Number	% Tariff Lines	Measures per Line
1	Live animals	49	95.8	2.0
2	Meat and edible meat offal	138	100	1.5
3	Fish, crustaceans, molluscs etc.	281	100	2.6
4	Dairy products, eggs and honey	522	100	2.1
5	Other products of animal origin	60	100	2.9
6	Live plants, flowers etc.	75	100	2.7
7	Edible vegetables, roots and tubers	201	100	1.3
8	Edible fruits and nuts	162	100	1.4
9	Coffee, tea and spices	5	11.6	0.1
10	Cereals	21	100	1.0
11	Products of the milling industries	0	0	0.0
12	Oilseeds	28	41.4	0.5
13	Gums, resins etc.	0	0	0.0
14	Other vegetable products	0	0	0.0
15	Animal and vegetable oils and fats	8	12.1	0.1
16	Preparations of meat and fish	204	100	2.3
17	Sugar and sugar confectionery	24	18.2	0.4
18	Cocoa and cocoa preparations	0	0	0.0
19	Cereal preparations	136	100	2.0
20	Fruit, vegetable and nut preparations	340	100	2.0
21	Other preparations	176	100	2.0
22	Beverages, spirits and vinegar	119	82.2	1.6
23	Residues and waste from food industry	0	0	0.0
24	Tobacco and manufactured tobacco substitutes	0	0	0.0
Total		**2,497**		

Source: UNCTAD.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Technical measures are more likely to impede trade, everything else being equal, where multiple measures are applied simultaneously to a single commodity. Figure 2 details the number of technical measures applied to agricultural and food products per tariff line in Mexico, Canada and the United States. In Canada, multiple technical measures are applied to around 22 percent of tariff lines. This contrasts to Mexico and the United States, where the proportion of tariff lines to which more than one technical measure is applied is 79 percent and 75 percent respectively.

Whilst the data presented above indicates the number and types of technical measures applied in the NAFTA countries, it may be of little use in itself in assessing the importance of such measures to trade. However, two measures can be calculated that provide some indication of the proportion of trade subject to technical measures. The Trade Coverage Ratio (TCR) (C_{jt}) estimates the percentage of trade subject to NTMs, in total or of a particular type, for an exporting country (j) at a particular level of product aggregation:

$$C_{jt} = \left[\frac{\sum D_{it} \bullet V_{iT}}{\sum V_{iT}} \right] \bullet 100$$

where:

D_i is a dummy variable that takes the value of one if a technical measure is applied and zero otherwise.

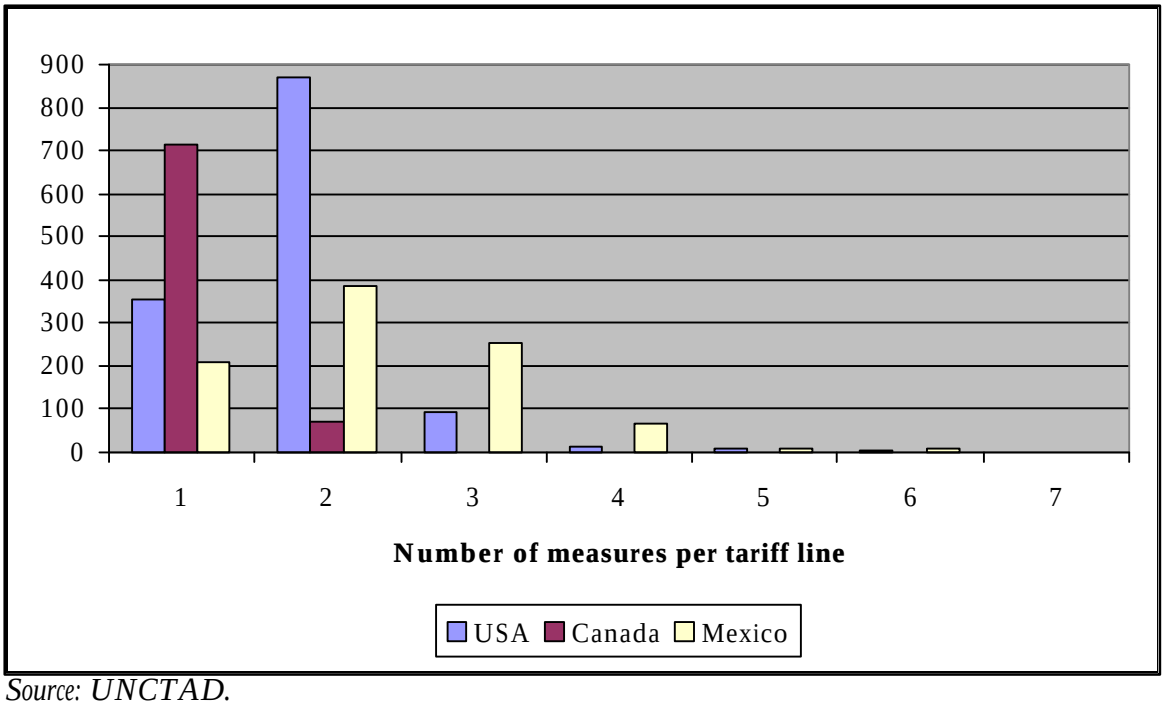
V_i is the value of imports of tariff line i.

t is the year of measurement of the technical measure.

T is the year of the import weights.

Figure 2. Number of technical measures applied to agricultural and food products per tariff line, 2001 (8-digit level).

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.



Source: UNCTAD.

An alternative measures that overcome the problem of endogeneity of the import value weights is the frequency index (FI) (F_{jt}):

$$\left[\frac{\sum D_{it} \bullet M_{iT}}{\sum M_{iT}}\right] \bullet 100$$

where:

D_i is a dummy variable that takes the value of 1 if a technical measure is applied and zero otherwise.

M_i is a dummy variable that takes the value of 1 if there are imports from the exporting country j and zero otherwise.

T is the year of measurement of the technical measure.

The FI does not reflect the relative weight of the affected products and, as a consequence, does not give any indication of the importance of measures to an exporter overall, or between export items.

Whilst frequency-based approaches provide some indication of the incidence of SPS and other technical measures, in practice there may be little relationship between frequency of application and the magnitude of any associated trade effects. Rather, the exact nature of the measure applied is probably of greater importance. Thus, whilst the data presented below may indicate where SPS measures are applied and could be a problem, they do not indicate

Tables 9 to 11 report the TCR and FI for bilateral exports of agricultural and food products between Mexico, Canada and the United States. Across all three markets, the majority of commodities have an estimated TCR and FI of 100 percent, indicating that all trade is subject to technical measures.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Conversely, there are commodities for which the TCR and FI have values of zero. There are also significant differences in the estimated TCR and FI between bilateral trade flows, reflecting variation in the structure of trade and the incidence of technical measures.

The relative values of the TCR and FI provide information on the distribution of technical measures versus the value of trade flows. For example, in the case of sugar and sugar confectionery exports to the United States the TCR has a value of 70 percent, whilst the FI has a value of only 18 percent. This indicates that, whilst the majority of tariff lines where trade occurred were free of technical measures, the majority of trade occurred along tariff lines to which technical measures were applied.

Whilst the TCR and FI provide some indication of the proportion of trade subject to technical measures, they do not provide any indication of the extent to which such measures actually impede trade. To assess the extent to which technical measures are actually TBTs requires further analysis. In many instances this is undertaken on a case-by-case basis, as in the case of US phytosanitary restrictions on Mexican exports of avocados (see Case 1). However, some information can be gleaned from other published data, for example on US border detentions.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 9. Frequency measures of technical measures on Mexican agricultural and food exports to Canada and United States, 1999.

HS-Code	Product	Canada		United States	
		TCR	FI	TCR	FI
1	Live animals	100%	100%	100%	100%
2	Meat and edible meat offal	100%	100%	100%	100%
3	Fish, crustaceans, molluscs etc.	100%	100%	100%	100%
4	Dairy products, eggs and honey	100%	100%	100%	100%
5	Other products of animal origin	100%	100%	100%	100%
6	Live plants, flowers etc.	100%	100%	100%	100%
7	Edible vegetables, roots and tubers	100%	100%	100%	100%
8	Edible fruits and nuts	100%	100%	100%	100%
9	Coffee, tea and spices	100%	100%	0%	0%
10	Cereals	100%	100%	100%	100%
11	Products of the milling industries (starch, gluten etc.)	100%	100%	0%	0%
12	Oilseeds	100%	100%	78.4%	64.7%
13	Gums, resins etc.	100%	100%	0%	0%
14	Other vegetable products	100%	100%	0%	0%
15	Animal and vegetable oils and fats	0%	0%	2.9%	5%
16	Preparations of meat and fish	0%	0%	100%	100%
17	Sugar and sugar confectionery	0%	0%	70.4%	18.2%
18	Cocoa and cocoa preparations	0%	0%	0%	0%
19	Cereal preparations	0%	0%	100%	100%
20	Fruit, vegetable and nut preparations	0%	0%	100%	100%
21	Other preparations	0%	0%	100%	100%
22	Beverages, spirits and vinegar	0%	0%	93.6%	80.0%
23	Residues and waste from food industry	0%	0%	0%	0%
24	Tobacco and manufactured tobacco substitutes	0%	0%	0%	0%

Table 10. Frequency measures of technical measures on Canadian agricultural and food exports to Mexico and United States, 1999.

HS-Code	Product	Mexico		United States	
		TCR	FI	TCR	FI
1	Live animals	100%	100%	100%	100%
2	Meat and edible meat offal	100%	100%	100%	100%
3	Fish, crustaceans, molluscs etc.	100%	100%	99.8%	95.7%
4	Dairy products, eggs and honey	100%	100%	100%	100%
5	Other products of animal origin	100%	100%	100%	100%
6	Live plants, flowers etc.	100%	100%	100%	100%
7	Edible vegetables, roots and tubers	97.8%	60%	100%	100%
8	Edible fruits and nuts	100%	100%	100%	100%
9	Coffee, tea and spices	100%	100%	4.1%	21%
10	Cereals	100%	100%	100%	100%
11	Products of the milling industries (starch, gluten etc.)	100%	100%	0%	0%
12	Oilseeds	100%	100%	53.9%	53.6%
13	Gums, resins etc.	100%	100%	0%	0%
14	Other vegetable products	0%	0%	0%	0%
15	Animal and vegetable oils and fats	23.3%	66.6%	1.7%	12.5%
16	Preparations of meat and fish	100%	100%	100%	100%
17	Sugar and sugar confectionery	74.3%	66.6%	55.8%	18.2%
18	Cocoa and cocoa preparations	100%	100%	0%	0%
19	Cereal preparations	100%	100%	100%	100%
20	Fruit, vegetable and nut preparations	100%	100%	100%	100%
21	Other preparations	79%	87.5%	100%	100%
22	Beverages, spirits and vinegar	100%	100%	66.9%	77.8%
23	Residues and waste from food industry	99.1%	80%	0%	0%
24	Tobacco and manufactured tobacco substitutes	0%	0%	0%	0%

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 11. Frequency measures of technical measures on US agricultural and food exports to Canada and Mexico, 1999.

HS-Code	Product	Canada		Mexico	
		TCR	FI	TCR	FI
1	Live animals	100%	100%	100%	100%
2	Meat and edible meat offal	100%	100%	99.9%	97.9%
3	Fish, crustaceans, molluscs etc.	100%	100%	100%	100%
4	Dairy products, eggs and honey	100%	100%	100%	100%
5	Other products of animal origin	100%	100%	99.9%	90.9%
6	Live plants, flowers etc.	100%	100%	100%	100%
7	Edible vegetables, roots and tubers	100%	100%	95.5%	83%
8	Edible fruits and nuts	100%	100%	99.5%	95.1%
9	Coffee, tea and spices	100%	100%	100%	100%
10	Cereals	100%	100%	100%	100%
11	Products of the milling industries (starch, gluten etc.)	100%	100%	100%	100%
12	Oilseeds	100%	100%	100%	100%
13	Gums, resins etc.	100%	100%	41.1%	80%
14	Other vegetable products	100%	100%	65.1%	75%
15	Animal and vegetable oils and fats	0%	0%	78.6%	56.8%
16	Preparations of meat and fish	0%	0%	100%	100%
17	Sugar and sugar confectionery	0%	0%	81.9%	66.6%
18	Cocoa and cocoa preparations	0%	0%	100%	100%
19	Cereal preparations	0%	0%	100%	100%
20	Fruit, vegetable and nut preparations	0%	0%	100%	100%
21	Other preparations	0%	0%	99.6%	93.7%
22	Beverages, spirits and vinegar	0%	0%	100%	100%
23	Residues and waste from food industry	0%	0%	79.8%	66.6
24	Tobacco and manufactured tobacco substitutes	0%	0%	100%	100%

The US Food and Drugs Administration (FDA) routinely publish data on consignments of agricultural and food products that are detained at the US border. These data only cover products and controls for which the FDA is responsible (and thus most meat and meat products are excluded) and do not provide information on the eventual fate of detained consignments – whether they are eventually permitted to enter, are re-exported, or destroyed.

Table 12 details the number of detained consignments from Mexico and Canada in 2001. In the case of Mexico, the most frequently detained commodities were processed fruit and fresh vegetables. In the case of Canada, meat products and fish were most frequently detained. The predominant reasons for detention were pesticide residues, microbiological contamination, filth and non-permitted additives in the case of Mexico, and labelling and microbiological contamination in the case of Canada.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 12. US border detentions of agricultural and food products by product, 2001.

Product	Mexico	Canada
Fresh vegetables	716	12
Processed vegetables	252	27
Fresh fruit	152	4
Processed fruit	1,188	5
Fish	156	51
Beverages	336	16
Baked goods	180	15
Confectionery	216	30
Spices/seasoning	22	2
Meat products	24	123
Dairy products	0	9
Other	15	24
TOTAL	**3,257**	**318**

Source: Analysis of FDA data.

Table 13. US border detentions of agricultural and food products by reason, 2001.

Product	Mexico	Canada
Microbiological contamination	1,044	132
Physical Contamination	624	34
Labelling	312	105
Pesticide residues	1,140	0
Non-permitted additives	576	15
Non-registration	165	66
Other	48	4

Source: Analysis of FDA data.

4. Rules governing application of SPS measures in NAFTA

As discussed above, SPS measures are laws, regulations or procedures aimed at the protection of human, animal and plant health. More specifically, the SPS Agreement defines SPS measures as any measure applied:

- To protect animal or plant life or health within the territory of the member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms.
- To protect human or animal life within the territory of the member from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages, or feedstuffs.
- To protect human life or health within the territory of the member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests.
- To prevent or limit other damage within the territory of the member from the entry, establishment of spread of pests.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Box 1. Phytosanitary controls on Mexican exports of avocados to the United States.

There has been a longstanding, and high profile dispute over US phytosanitary controls on imports of avocados from Mexico. In 1914, US officials identified avocado seed weevil in Mexican avocados and instituted an import ban. After repeatedly rebuffing Mexican requests for import permission for almost 80 years, in July 1993, APHIS permitted Hass avocados grown in Michoacan to be imported into Alaska under certain conditions. Growers and packers in Michoacan adopted improved grove management techniques, packing practices and shipping practices in order to export their avocados (Roberts and Orden, 1997, Bredahl 2001).

In 1994, Mexico requested extended entry for Hass avocados to the North Eastern States. On February 5 1997, APHIS published its final rule allowing Mexican Hass avocados to enter 19 states and the District of Columbia

Imports are permitted from the state of Michoacan under certain conditions. The approval is based on scientific risk assessments that include a series of inter-related restrictions termed a 'systems approach'. Under the systems approach, commercial shipments of fresh Hass avocados grown in approved orchards in Michoacan may be imported into 19 North Eastern states and the District of Columbia during the period November to February. The systems approach safeguards are designed to progressively reduce risk to an insignificant level. The safeguards make up what is termed a 'fail-safe' system, which means that if one of the mitigating measures should fail, there are others in place to ensure that the risk is managed and reduced. It is a system of safeguards that occur consecutively in stages. The nine mitigating measures consist of: 1) natural host plant resistance to fruit flies; 2) field surveys; 3) pest trap and bait measures in the orchards; 4) field sanitation measures; 5) post-harvest safeguards; 6) winter shipping; 7) packinghouse instructions; 8) port-of-arrival inspections; 9) limited US distribution. All stages are overseen and supervised by APHIS. Should pests in the avocados be detected at any stage in the system, avocado imports may be suspended from affected areas.

Since the lifting of the restrictions, Mexican exports of avocados to the United States have increased significantly (Figure 3). In 1991, Mexican exports of avocadoes to the United States were negligible at 367 tonnes, accounting for only 2 percent of total imports. However, by 2000, exports had increased to 14,479 tonnes, accounting for 17 percent of total imports.

In September 1999, Mexico requested that the United States extend both the seasonal period and geographical region to which avocados can be exported from Mexico. In November 2001, APHIS issued a new rule, extending the number of states to which avocados can be exported to 31 and extending the permitted entry period to six months from October 15 to April 15.

Chapter 7 of the NAFTA Agreement lays down rules for the application of SPS measures. The aim of the Agreement is to:

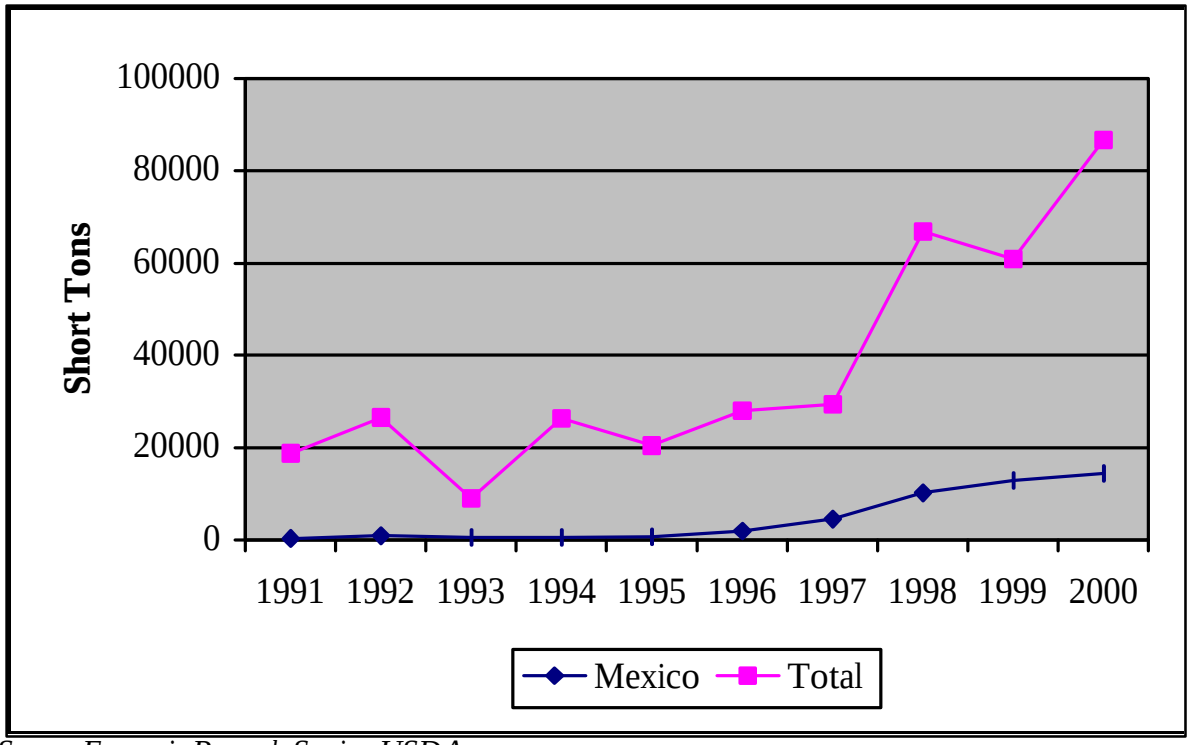
> "…establish a framework of rules and disciplines to guide the development, adoption and enforcement of sanitary and phytosanitary measures…"

and applies to any measure of a Party that may, directly or indirectly, affect trade between Parties. To a large extent the provisions of the Agreement are modelled on the text of the WTO SPS Agreement, although this was still evolving at the time the NAFTA Agreement was signed. It also

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

forms the basis of the text relating to SPS measures in the draft Agreement of the Free Trade Area of the Americas (FTAA).

Figure 3. Imports of avocados to the United States, 1991-2000.



Source: Economic Research Service, USDA.

The NAFTA Agreement permits the Parties to adopt, maintain or apply any SPS measures necessary for the protection of human, animal or plant life or health ion its territory, including measures more stringent that international standards, guidelines or recommendations. Furthermore, in protecting human, animal or plant life of health, Parties are able to establish their own '*appropriate level of protection*'. Notwithstanding the above, the Agreement requires that SPS measures are based on *scientific principles*, are not maintained where there is no longer a scientific basis, and are based on a *risk assessment*, as appropriate under the circumstances. Further, Parties must not adopt measures must arbitrarily or unjustifiably discriminate between their goods and like goods of any other country where identical or similar conditions prevail.

The NAFTA Agreement promotes the *harmonisation* of SPS measures by requiring Parties to base their SPS measures on relevant international standards, guidelines and recommendations with the objective of ensuring such measures are, at the least, equivalent to those of other Parties. Measures that conform to international standards, guidelines and recommendations are considered justified from a scientific perspective. It also promotes the *mutual recognition* of SPS measures by requiring Parties to pursue *equivalence* of their respective measures to the greatest extent practicable. This requires that, through use of risk assessment methodologies, the measures adopted by an exporting country are demonstrated to provide the 'level of maintained by an importing country.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

The Agreement also recognises the concept of *regionalization*, whereby, whilst an exporting country may not be free of a pest or disease, specific territories within that country may be pest- or disease-free, or have a low prevalence. It requires that Parties recognise pest- or disease-free areas and apply SPS measures accordingly.

Provisions are made for the exchange of information on SPS measures between Parties. As a general rule, Parties are required to *notify* other Parties and provide a full text of proposed measures at least 60 days prior to the adoption of modification of the measure. Further, each Party is required to establish an *Enquiry Point*, as a single point of contact for questions and requests for documentation relating to SPS measures proposed, adopted or maintained.

The Agreement establishes a Committee on Sanitary and Phytosanitary Measures, comprising representatives from each party with responsibility for SPS matters. The Committee is responsible for facilitating:

- The enhancement of food safety and SPS conditions in the territories of the parties.
- Activities of the parties pursuant to international standard (Article 713) and equivalence (Article 714).
- Technical co-operation.
- Consultation on bilateral issues.

An SPS issue can be raised by any party and is then sent to the Committee for consideration. To date, the Committee has had ten meetings.

A series of bilateral or trilateral Technical Working Groups (TWG) has also been established, which consider subject-specific matters and aim to develop proposals relating to, for example, harmonisation and equivalence. Currently, TWG operate in the areas of:

- Animal health (bilateral)[4].
- Dairy, fruits, vegetables and processed foods (US-Canada).
- Fish and fishery product inspection (trilateral).
- Food additives and contaminants (trilateral).
- Labelling, packaging and standards (trilateral).
- Meat, poultry and egg inspection (trilateral).
- Pesticides (trilateral).
- Plant health, seeds and fertiliser (bilateral).[5]

As well as the NAFTA institutions, arrangements exist bilaterally through which SPS issues are raised and addressed. For example, the Agriculture Working Group of the US-Mexico Binational Commission has provided a forum through which various initiatives have been developed for c-operation on SPS issues. For example, in 1998 a co-operative agreement was established between Mexico and the United States aimed at enhancing activities of mutual interest relating to the safety of foods for human consumption. More generally, the Agriculture Working Group has provided a forum through which concerns relating to SPS measures are addressed. For example, the group has

[4] North American Animal Health Committee provides a trilateral forum.

[5] North American Plant protection Organisation provides a trilateral forum.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

been instrumental in the acceptance of the Mexican state of Yucatan as an area of low risk for classical swine fever by the United States, and thus providing market access for Yucatan pork and pork products.

Table 14 provides a summary of the major issues raised at the eight meetings of the NAFTA SPS Committee over the period 1994-99. The majority of issues concern controls relating to plant or animal diseases and acceptance of pest or disease-free status. These issues have been most frequently raised in the context of trade between Mexico and the United States. The main food safety issues raised through the Committee have been associated with the recognition of inspection or approval systems.

Table 14. Summary of issues raised at NAFTA SPS Committee, 1994-99.

Product	Export Market	Type of Measure
Mexico		
Horticultural products	US/Canada	Phytosanitary
Avocados	US	Phytosanitary
Wheat	US/Canada	Phytosanitary
Pitaya/Carambola	US	Phytosanitary
Papaya	US	Phytosanitary
Candies	US	Food safety
Horticultural products	US	Food Safety
Cattle	US	Food safety
Milk products	US	Food safety
Poultry	US	Food safety
Livestock	US	Animal disease
Meat	US	Animal disease
Pork	US/Canada	Animal disease
Poultry	US/Canada	Animal disease
United States		
Cherries	Mexico	Phytosanitary
Potato seeds & tubers	Mexico	Phytosanitary
Citrus fruit	Mexico	Phytosanitary
Sawn wood & plywood	Mexico	Phytosanitary
Processed food products	Mexico	Food safety
Canada		
Potato seed	Mexico	Phytosanitary

Source: Based on published minutes of NAFTA SPS Committee.

5. Overcoming the trade effects of SPS measures

A variety of rapprochement efforts can be made to overcome the trade effects of incompatibilities between standards across global markets. This section explores the main forms of rapprochement mechanisms in general and then assesses the extent to which these have been employed within NAFTA in an attempt to overcome the trade effects of SPS measures.

Figure 4 illustrates a simple scenario in which four trading partners apply a standard that differs quantitatively between 'high' and 'low' levels (Jacobs, 1994; Hooker and Caswell, 1996; 1999). A good example is maximum residue levels (MRLs) for pesticides in agricultural and food products. The width of the arrows in Figure 4 depicts the magnitude of trade flows that will normally take place between countries that apply a 'high' (C^H_1 and C^H_2) and 'low' (C^L_3 and C^L_4) standard.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Three forms of rapprochement can be used to address incompatibilities in the standard employed by individual trading partners: 1) co-ordination; 2) mutual recognition; and c) harmonisation. Co-ordination is the weakest form of rapprochement, whereby countries aim to narrow differences between standards, for example through the application of voluntary international codes of practice. Whilst such efforts may facilitate trade between countries that co-ordinate their requirements at a similar level, they do not overcome the problems faced by countries adopting relatively low standards (for example developing countries) when exporting to countries with relatively high standards (for example high-income countries). Thus, co-ordination may enable trade to proceed more easily from high to low standard countries, but trade in the opposite direction will remain impeded.

It is important to note that low standard countries may participate in co-ordination efforts, despite the fact that barriers to trade with high standard countries remain unaffected. For example, such an approach can facilitate trade between low standard countries and may be part of efforts to enhance domestic consumer protection. It may also be part of longer-term efforts to enhance regulatory capacity.

Mutual recognition is a stronger form of rapprochement. This approach is based on a recognition that technical requirements and/or conformity assessment procedures that differ can result in the same level of protection. Under mutual recognition, therefore, whilst countries may apply different technical standards, these measures are regarded as 'equivalent'. In this case, the dominant direction of trade is from low to high standard countries, presuming that lower standards are associated with lower costs of compliance. The SPS Committee within the WTO has recently established guidelines aimed at facilitating dialogue between Members regarding the equivalency of SPS measures (WTO, 2001).

An important factor determining the willingness of trading partners to engage in rapprochement efforts, and the likely success of the alternative mechanisms outlined above, is the state of SPS capacity, both in absolute terms and the relative position of the parties. Bolaños *et al.* (2001) report the results of an analysis of SPS capacity in the countries of the Americas, based on data collected over a three-year period. This analysis employs an analytical framework that defines SPS capacity in terms of three frameworks. These frameworks are identified using cluster analysis of variables corresponding to key elements of the SPS system:

- **Institutional framework:** Mechanisms through which national SPS interests are represented and defended, agreements implemented, and commitments acquired at the international level fulfilled.
- **Technological framework:** Systems of SPS controls through which SPS problems are identified, controls undertaken and performance monitored.
- **Regulatory framework:** Systems of legislation relating to SPS issues and the mechanisms through which these are brought into compliance with international commitments.

Figure 5 presents the results of the assessment of SPS capacity for the United States, Canada and Mexico. All three countries have relatively well-developed capacity with respect to all frameworks, in particular the regulatory framework. However, the level of capacity in Mexico is judged to be less well developed than in Canada and the United States, particularly in the case of the institutional and

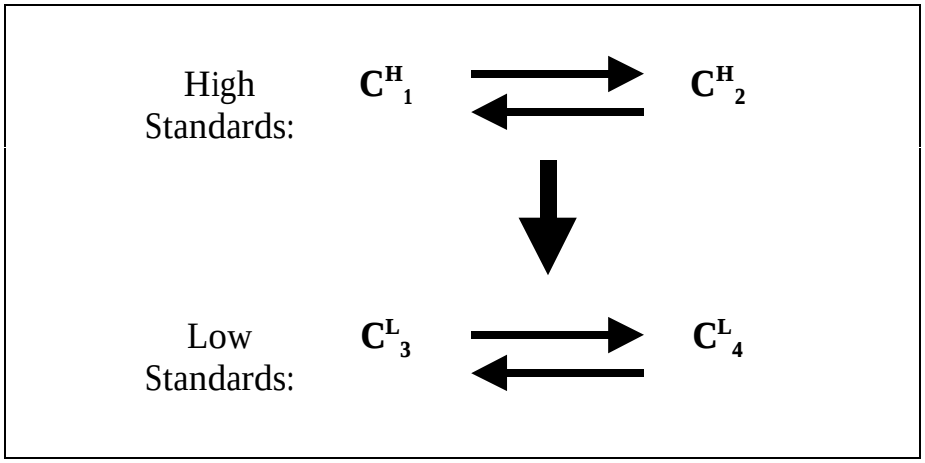
Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

technological frameworks. This suggests there may be the greatest opportunities, and indeed willingness, to undertake rapprochement efforts bilaterally on the part of Canada and the United States. However, rapprochement efforts are likely to be more problematic between Canada/United States and Mexico It also highlights the need for efforts to enhance SPS capacity in Mexico, in which both Canada and the United States can play a part.

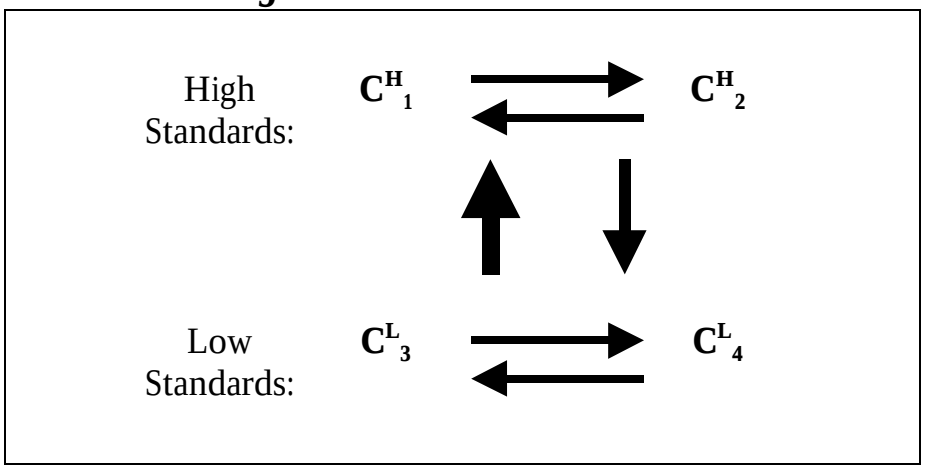
Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Figure 4. Trade effects of rapprochement of standards.

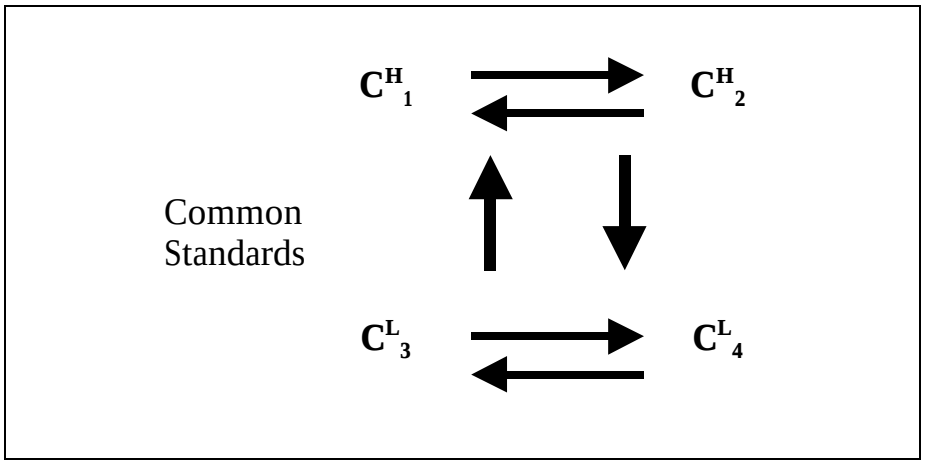
a. ***Co-ordination:***



b. ***Mutual recognition:***



c. ***Harmonisation:***



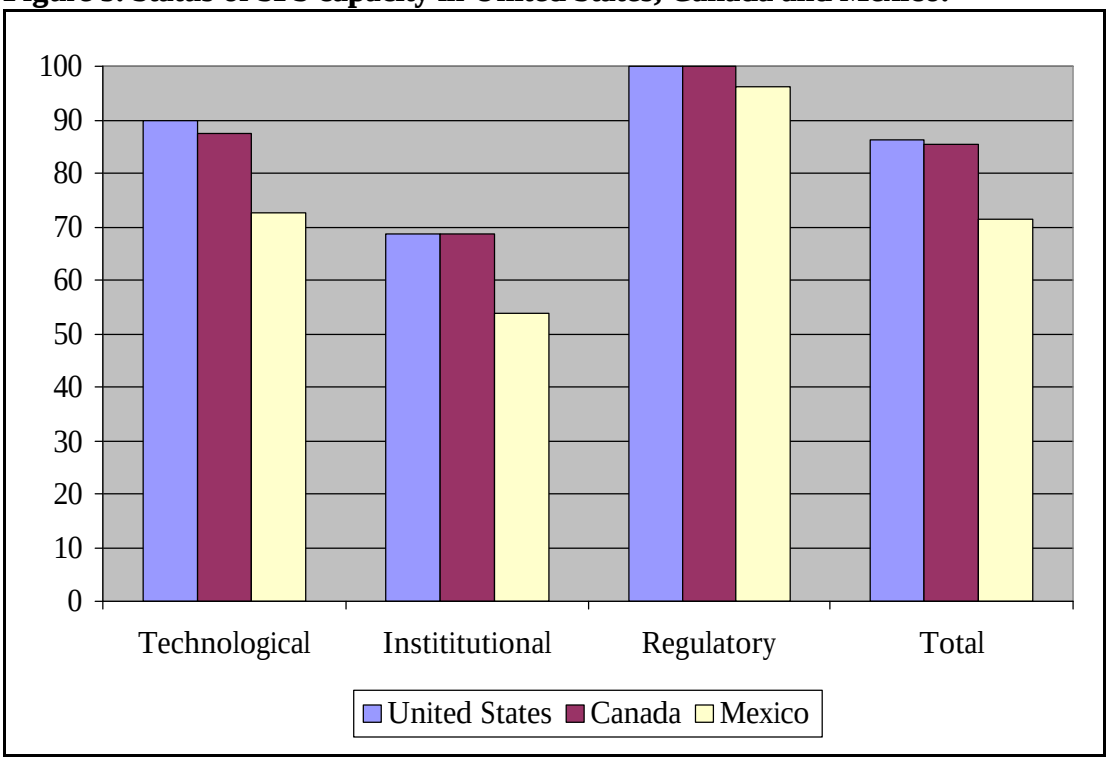
Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Source: Hooker and Caswell (1999).

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

It is noteworthy, that in Canada, Mexico and the United States, institutional capacity is least well developed. This suggests that there may be common weaknesses in institutions responsible for SPS matters at both the national and international levels. Indeed, the results reported by Bolaños *et al.* (2001) suggest that institutional capacity is relatively weak throughout the Americas.

Figure 5. Status of SPS capacity in United States, Canada and Mexico.



Source: Perez (2001).

The incidence data presented in Section 3 suggest that a large number of SPS and other technical measures are applied to agricultural and food products in Canada, Mexico and the United States. Further, many commodities are subject simultaneously to a number of measures. These measures differ widely, both qualitatively and quantitatively, and even subtle differences can produce distinct outcomes in terms of trade. Thus, in order for rapprochement efforts to have a noticeable impact, measures must be identified that have a significant trade effect and which are amenable to negotiation on a bilateral or trilateral basis. In many cases, such efforts require a great deal of time and effort on the part of the negotiating parties, particularly in the case of harmonisation and mutual recognition, and such inputs need to produce a demonstrable outcome to policy makers.

Table 15 provides examples of rapprochement efforts through the NAFTA SPS Committee and Technical Working Groups. It is evident that rapprochement has been undertaken at all three levels – co-ordination, mutual recognition and harmonisation. Further, these efforts have covered a wide range of issues associated with SPS controls, including inspection and certification systems, testing methods, laboratories and data requirements, labelling requirements, and food additives and pesticide policies. Although the United States and Canada appear to have been most active, all three parties to the NAFTA Agreement have been involved in these efforts.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 15. Examples of rapprochement efforts through the NAFTA SPS Committee and Technical Working Groups.

Co-ordination	Mutual Recognition	Harmonisation
FDA/CFIA Action Plan on Food Safety	US-Canada MRA on seafood inspection	Harmonisation of US-Canada potato grading scheme
Discussion of issues and positions for the Codex Committee on food Additives and Contaminants	US-Canada equivalence agreement regarding molluscan shellfish inspection programme	Harmonisation of US-Canada food additive regulations
Principles for mutual support in animal health emergencies	Equivalency of greenhouse certification	Harmonisation of policies on BSE and other TSEs
Joint US-Canada reviews of pesticides	Recognition of accredited laboratories for seed certification	Harmonizing nutrition labelling and nutrient content claims
Co-ordination of activities relating to Codex Committee on Residues of Veterinary Drugs in Foods	Recognition by the United States of Mexican poultry slaughter system as equivalent	Harmonisation of data requirements for residue chemistry, seed treatments and terrestrial foods uses.
		Harmonisation of Japanese Beetle regulations

Source: Reports of NAFTA SPS Committee.

Whilst there is a long history of trading partners negotiating, both bilaterally and multilaterally, reductions in traditional barriers to trade, for example tariffs and quotas, substantive negotiations relating to SPS and other technical measures are a relatively new phenomenon. Whilst this lack of experience clearly influences the manner in which such negotiations have been pursued to date, the nature of SPS measures and the administrative structures with which they are associated are quite different to those related to traditional barriers to trade (Kerr, 1997):

- In the case of tariffs and other direct forms of trade protection, the magnitude of the measure is normally directly measured and any changes over time can be observed and monitored. SPS and other technical measures differ according to a wide range of qualitative and quantitative factors and, consequently, are not as amenable to such measurements. Thus, the costs and time taken to gather information to enable the consequences of alternative courses of action are likely to be considerable.

- Distinct institutions have developed with direct responsibility for international trade negotiations. In the United States, for example, the Office of the US Trade Representative (USTR) is the single institution responsible for such matters. In the case of SPS measures, however, a multitude of agencies may be involved. In the United States, for example, these include the Food and Drugs Administration (FDA), Food Safety and Inspection Service (FSIS), Animal and Plant Health Inspection Service (APHIS) etc. The responsibilities of these agencies are not focused on international trade relations. Indeed, this may be a relatively minor element of their day-to-day activities.

- Many agencies responsible for SPS matters lack expertise in national and international trade law. Whilst trade experts may become involved in negotiations relating to SPS measures in

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

an attempt to bridge this gap, these individuals typically lack expertise in SPS matters. Thus, international negotiations are likely to be mirrored by negotiations at the national level between policy makers responsible for trade and SPS-related matters.

Whilst measures such as tariffs and quotas have trade protection as their direct objective, SPS measures are not explicitly trade-related. Thus, negotiations relating to SPS measures involves trade-offs between, for example, trade-related objectives, consumer protection, protection of the economic interests of agriculture and the food processing sectors, protection of the environment etc. Thus, negotiations are likely to be protracted and involve processes of consultation, negotiation and compromise.

These differences suggest it might be reasonable to expect that negotiations relating to SPS matters to be more complex and protracted than those associated with traditional barriers to trade. In turn, this suggests that the resource costs for the negotiating parties will be greater. Indeed, history to date suggests that negotiations regarding rapprochement efforts, in particular relating to equivalency and harmonisation, take considerable periods of time. Such negotiations involve not only agreement and compromise over scientific issues, but also the development of trust and confidence between the negotiating parties. In view of the resource costs of such negotiations, the parties must have a reasonable expectation that an agreement can be reached before they will be willing to initiate such a process.

We turn now to some examples of SPS issues affecting trade within the NAFTA countries. We also include some examples that have surfaced in the FTAA negotiations. This information was gathered by an informal telephone survey of trade associations and government officials. As such, it is neither a comprehensive inventory nor a balanced survey, as we know more people in Canada and the United States than we know in Mexico or FTAA countries. Before proceeding with a discussion of our findings, an important factor affecting the application of SPS measures as trade barriers has been the discovery of antidumping actions as an effective and legal way to protect domestic producers. Once the purview of the United States, it is now the instrument of choice in Mexico and, unless constrained by the Doha Round of WTO negotiations, will become a universal tool to protect domestic producers from import competition.

As Table 16 indicates, contentious SPS issues often deal with minute details of administrative rulings and of SPS measures. Seemingly innocuous decisions such as where inspections are implemented can have important impacts on trade flows and the incidence of costs. But, resolution of some of the issues calls for the adoption of broad concepts that have more to do with incidence of costs than they do with safeguarding animal, plant or human health. None receives more attention than the framework to regulate the safety of imported meat and meat products. The two polar cases are the 'system approach' where nations approve the food safety system of the other country and the case-by-case approach that potentially requires every plant in every country to be inspected by representatives of food safety agencies of every trading partner. In the first case the cost is borne by governments, and in the second, they are borne by the owners of slaughterhouses and meat processing plants.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Table 16. Selected Examples of SPS Disagreements between the NAFTA Countries.

Item: Importer/Exporter	Description and Comments
Red Meats: Mexico/US	Mexico recently changed the location of inspection of meat imports from the United States. Under the previous system, Mexican inspectors on the US side of the border inspected meat. Now the loads are inspected in Mexico. The loads will carry an FSIS export inspection certificate. Several loads, either whole or partial, have been rejected in Mexico, creating a complex problem for disposal of the meat. It must be reexported back to the United States or destroyed in Mexico.
Live Feeder Cattle: Canada/US	Canada restricts the import of feeder cattle from the United States to the period October 1 to March 31. The restriction is to prevent the import and spread of antiplasmosis and blue tongue. Blood-sucking insects that are not, obviously, present after a killing frost, spread the diseases. The United States argues that climatic conditions will prevent the import and spread of the disease regardless of the season.
Beef Shelf life restrictions: Mexico/US	As part of the resolution of the antidumping case, Mexico does not allow the import of beef beyond 30 days from slaughter. Part of the rationalization was that US packers were dumping overage beef into the Mexican market.
Live Heifer Imports: US/ Mexico	US does not allow the importation of intact heifers from Mexico and has refused to consider imports on a regional basis. At issue is brucellosis and tuberculosis. Mexicans point out that the tests for these diseases are very expensive, and so the restriction is actually a prohibition.
Apples: Mexico/US	Mexico requires preshipment inspection and approval, by Mexican inspectors, of exports of apples to Mexico. The cost is paid by US packers and exporters. They felt that a preclearance program operated by APHIS should be sufficient, and would be a good deal less costly.
Red Meats: Mexico/US	The United States regulatory agencies have not been able to agree with their Mexican counterparts to a 'systems approval' of the slaughter and meat processing industry in Mexico. Representatives of the US red meat industry insist on that as the only option. If a plant-by-plant inspection system is imposed, the cost shifts from governments to plant owners. This tends to favour large firms with deep pockets and disadvantage small firms. If adopted widely it significantly increases costs as some US firms export to as many as 40 or 50 countries, each of which might require a plant inspection.
Potatoes: US/Canada	See case study in Box 2.
Karnal Bunt: Canada/US	Canada agreed to program to approve US areas as being free of karnal bunt disease (of wheat) in three phases over a three-year period. Carried out the first two phases, but have never completed the third and so four states are (unfairly) under quarantine restrictions.
Avocados: US/Mexico	See case study in Box 1.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

But the seeming logic of negotiating approval of national food safety systems may not withstand public scrutiny. The Washington Post, in its February 25th issue, critically noted: "in protecting nearly 4 billion pounds of meat imported each year, the USDA increasingly relies on foreign governments – including ones that have repeatedly failed to get the job done." (Warrick) The article goes on to reference a report by USDA Inspector General Roger C. Viadero: "He concluded that the USDA was failing to enforce its own rules, extending a welcome to imports and countries that had not been able or willing to meet U.S. standards. Viadero found that 19 out of 36 U.S. trading partners had exported meat to the United States, even though their meat-sanitation programs fell short in key areas, such as testing for chemical residues."[6] The article conceded: "the inspector general found no evidence that the agency's policies had allowed unsanitary meat to enter the country." A representative of a consumer group offers the opinion that the article clearly indicated the need for country of origin labelling. (Jaeger)

Private certification schemes, which are popular and widely used in Europe, may be the logical way out of the dilemma for livestock slaughter and meat processing. Certification to an independent food hygiene standard (like the European Food Safety and Inspection System), that required third-party audits, would combine elements of a systems approach and plant-by-plant approval. An important consideration in this approach would be the nature of product liability laws in importing countries.

The temporary banning of Canadian potato imports because of the discovery of potato wart fungus on Prince Edward Island provides a convenient case study to explore the resolution of a SPS disagreement under NAFTA rules and procedures. (See Box 2.for a brief summary of the case.) The case does indicate the transparency of the plant protection system, as Canada reported the discovery of the fungus and so observed its obligations under the North American Plant Protection Agreement. The reaction of the United States to the announcement, the ban on all potato imports from Prince Edward Island, is difficult to rationalize. Clearly, the Canadian Food Inspection Agency took immediate action to prevent the spread of the fungus to nearby fields and to other provinces in Canada. (An anonymous source did indicate that there was some concern on the US side about the competence of provincial authorities, and of role that CFIA would play in isolating the site.) The dispute was ultimately resolved with the US placing stringent requirements on the actions Canada must take to maintain isolation of the fungus.

One of the essential elements of the NAFTA and WTO SPS Agreements is that of risk assessment. One of the evolving areas of the interpretation and application of these agreements is what constitutes an acceptable risk assessment. Quite clearly, the risk assessment carried out by the United States must have allowed for a very, very small probability of introduction of the potato wart fungus. While the dispute was eventually resolved, it is not the high point of US implementation of the NAFTA SPS Agreement.

[6] US meat packers complain that the import requirements of the European Union are discriminatory because they require testing for the presence of (chemical) compounds that are not used in the United States. The only approved laboratory is located in Canada so the tests are very expensive.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Box 2. Resolution of the US Import Ban on Potatoes from Prince Edward Island.

On October 24, 2000, the CFIA confirm the discovery of potato wart disease in a .4 hectare portion of a 30 hectare field on Price Edward Island (PEI). On October 31, the USDA imposed a temporary emergency measure prohibiting the importation of seed and table stock potatoes from PEI. (Potato wart had previously been found only in Newfoundland and Labrador where a plant quarantine has been in place since 1912.)

In early November, the US and Canada agreed to a 'three tiered approach" to resolve the trade impasse. Stage 1: PIE potatoes may not be exported to the US. Exports of other potatoes must be accompanied by a CFIA certificate of origin. To prevent commingling of PEI potatoes with other Canadian potatoes, movements off the Island must be in consumer bags of 20 pounds of less. Stage 2: Canadian officials must propose a system that "adequate mitigates the risk of the potato wart." This proposal is to be reviewed by APHIS and a panel of experts, including the representatives from the CFIA. Stage 3: Canada "will aim at establishing regulated and non regulated areas, based on survey, inspection and investigation evidence. After completion of this stage, USDA will consider suspension of the requirements of the systems approach and allow shipment of tablestock from non regulated areas. Potatoes from areas regulated for potato wart may not be exported to the U.S." (Sherman)

On April 30, 2001 the US reopened its border to PEI potatoes under the following conditions (Baldacci): "four risk zones have been established within PEI. Potatoes within each zone will be subject to strict review and movement conditions. Zone one consists of the field where potato wart was detected and a half mile buffer area around the field. Zone two includes all fields that have shared farming equipment with the infected area. Zone three consists of the fields surrounding and between zones one and two. Zone four is the remainder of PEI. USDA officials have approved the following restrictions:

- Bulk importation of potatoes will remain suspended, as well as the importation of seed potatoes. In addition, fresh tablestock potatoes from zone one and two cannot be moved off PEI.
- The USDA will accept tablestock potatoes directly from zone four provided they are washed and treated with sprout inhibitor. These potatoes are limited to boxes and bags no larger than 50 pounds, and must be intensively inspected and certified by Canadian agriculture officials. All surface shipments of zone four PEI potatoes coming into the U.S. must enter in Houlton.
- Movement of PEI potatoes within Canada must also meet specific requirements. Tablestock potatoes from zone three and four may move only if the soil has been removed from the potatoes so that they meet Canada's most stringent standards for cleanliness. Additionally, the potatoes must be intensively inspected for potato wart disease and are limited to boxes or bags of 50 pounds or less.
- Seed potatoes may move within Canada from zones three and four if seed certification procedures and phytosanitary inspections at the point of shipment are followed and conducted. Sorting line soil sampling and testing must also be performed before seed potatoes can be shipped.

On August 1, 2002, agreement was reached on necessary conditions for free import of new crop potatoes from PEI. For three years, the CFIA must monitor and survey every field on PEI according to an agreed protocol. After three years, given that conditions favourable for the emergence of the fungus, all fields on PEI should have been inspect satisfactorily.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

6. Implications:

It is evident from the foregoing discussion that agricultural and food exports within NAFTA are subject to a range of SPS and other technical measures. These measures differ in their form and objectives and many products are simultaneously subject to multiple measures. Consequently, assessing the impact of SPS measures on trade is problematic. Whilst the incidence data presented above provide some indication of where SPS measures are likely to be more, or less, important, further analysis is required to identify the extent to which trade is actually impeded. Such an analysis inevitably has to be taken on a case-by-case basis and consequently the costs, both in terms of time and resources, are typically large.

It is evident from the proceedings of the NAFTA SPS Committee and other evidence, for example US border detention data, that SPS measures remain a major issue for agricultural and food product exporters. Indeed, at least in part because of the success of NAFTA in reducing traditional barriers to trade, for example tariffs, the impact of SPS and other technical measures on trade in agricultural and food products is coming to the forefront of our attention.

NAFTA defines procedures through which disputes between NAFTA members over SPS and other technical measures can be pursued. To date, however, these formal dispute settlement procedures have been mainly applied to conventional trade problems, for example tariffs and anti-dumping. Typically, disputes over SPS measures have been addressed on a bilateral basis. Such negotiations generally involve detailed and lengthy dialogues of both an economic and scientific nature and can take long periods of time to resolve, as is illustrated by the case of avocado exports from Mexico to the United States, and of potato exports from Canada to the United States.

In many cases, SPS measures are applied for legitimate reasons, as defined by the rules laid down for the application of SPS measures under NAFTA and the Uruguay Round Agreements. Thus, whilst such measures may have a significant impact on trade, they may not be technical barriers to trade, at least according to the strictest definition. In such circumstances trading partners must pursue rapprochement strategies in order to minimise the trade effects of incompatibilities in SPS requirements. Such strategies can be costly and time consuming to pursue, particularly where there are significant differences in SPS capacity and the need to establish trust and confidence in the efficacy of controls between trading partners. This could be a major impediment to such efforts as NAFTA evolves into the FTAA and encompasses countries with much lower levels of SPS capacity.

There are numerous examples of rapprochement efforts between the NAFTA Members, including the entire range of strategies detailed in Table 15. The majority have been pursued on a bilateral basis, particularly between Canada and the United States. However, such negotiations have typically been protracted and involved costly inputs on the part of each party. This experience is observed more widely, for example in negotiations between the European Union and United States over the equivalency of veterinary controls. These negotiations took many years to conclude and, to date, have still to produce observable benefits in terms of trade in animal products.

Two differing views of the WTO and NAFTA SPS Agreements are common. The first, held mostly by government (regulatory) officials and those negotiating trade agreements and disputes, is that the Agreements provide an excellent framework for resolving disputes and finding rapprochement

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

solutions. The second, held by the same type of officials in developing countries, is that the Agreements provide a justification and international defence for national standards (use of international standards, risk assessment, etc.) that is of little use to developing countries. In much of Africa, proprietary standards of food processors and European retailers determine import requirements and not the internal standards of the EU or the exporting countries. Such market solutions, third party certification to a private or proprietary standard, may be the way forward as the FTAA is negotiated.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

References:

Baldwin, R.E. (1970). *Non-Tariff Distortions of International Trade*. Brookings Institution, Washington.

Baldacci, John. U.S. Representative House of Representatives Press Release. April 26, 2001. (Downloaded February 2002 from http://www.house.gov/baldacci/010426.htm.)

Beghin, J.C. and Bureau, J-C (2001). *Measurement of Sanitary, Phytosanitary and Technical Barriers to Trade. Briefing* Paper, centre for Agricultural and Rural Development, Department of Economics, Iowa State University.

Bolaños, E., P. Fernández, E. Pérez and K. Walker. Situation of FTAA members for complying with the WTO Agreement on SPS Measures. *COMUNIICA*. 4 (5), 40-44.

Bredahl, M.E. (2001) Trade in Avocados. In: Loyns, R.M.A., Meilke, K., Knutson, R.D. and Yunez-Naude, A. (eds) *Trade Liberalization Under NAFTA: Report Card on Agriculture*. University of Guelph, Guelph.

Canadian Food Inspection Agency. "Potato Wart Found In Prince Edward Island." Fact Sheet (Downloaded February 2002 from http://www.inspection.gc.ca/english/plaveg/protect/facren/peiipee.shtml).

"Dispute No Small Potatoes for Canada, U.S." USA Today, January 3, 2001. (Downloaded February 2001 from http://www.usatoday.com/news/world/nwswed09.htm).

Hillman, J.S. (1991). *Technical Barriers to Agricultural Trade*. Westview Press, Boulder.

Hooker, N.H. and Caswell, J.A. (1996). Trends in Food Quality Regulation: Implications for Processed Food Trade and Foreign Direct Investment. *Agribusiness*, 10 (4), 275-292.

Hooker, N.H. and Caswell, J.A. (1999). A Framework for Evaluating Non-Tariff Barriers to Trade Related to Sanitary and Phytosanitary Regulation. *Journal of Agricultural Economics*, 50 (2), 234-246.

Jacobs, S.H. (1994). Regulatory Co-operation for an Interdependent World: Issues for Government. In: OECD. *Regulatory Co-operation for an Interdependent World.* Organisation for Economics Co-operation and Development, Paris.

Jaeger, Arthur S. Where Your Food Comes From. Washington Post. Page A18. March 4, 2002;

Kerr, W. (1997). Removing Health, sanitary and Technical Non-tariff Barriers in NAFTA. *Journal of World Trade*, 31 (5), 57-73.

Laird, S. (1997). Quantifying Commercial Policies. In: Francois, J.F. and Reinert, K.A. (eds). *Applied Methods for Trade Policy Analysis*. Cambridge University Press, Cambridge.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

Ontario Ministry of Agriculture, Food and Rural Affairs. "Potato Wart Erupts into Major Trade Dispute." (Downloaded February 2002 from http://www.gov.on.ca/OMAFRA/english/policy/atu0301.htm#7).

Orden, D. and Roberts, D. (1997). Determinants of Technical barriers to trade: The Case of US Phytosanitary Restrictions on Mexican Avocados, 1972-95. In: Orden, D. and Roberts, D. (eds). *Understanding technical barriers to Agricultural Trade*. International Agricultural Trade Research Consortium, University of Minnesota, St Paul.

Pérez, E. (2001). Personal Communication.

Roberts, D. and DeKremer, K. (1997). *Technical Barriers to US Agricultural Exports.* Economic Research Service, USDA, Washington DC.

Roberts, D., Josling, T.E. and Orden, D. (1999). *A Framework for Analysing Technical Trade Barriers in Agricultural Markets.* Economic Research Service, US Department of Agriculture, Washington DC.

Sherman, Amy. "Three Stage Proposal for Dealing with Potato Wart in Prince Edward Island." NPC Insider Report. National Potato Council November 9, 2000. (Downloaded February 2002 from http://www.uidaho.edu/ag/plantdisease/pwart4.htm).

USDA. U.S. "And Canadian Officials Agree On Surveillance Plan For Potato Wart" Press Release No. 0129.01. (Downloaded February 2001 from http://www.usda.gov/news/releases/2001/08/0129.htm).

Warrick, Joby. USDA Relies On Foreign Inspections; Meat Plants Abroad Fail Sanitation Checks. *Washington Post* Page A01, February 25, 2002.

WTO (2001). *Decision on the Implementation of Article 4 of the Agreement on the Application of Sanitary and Phytosanitary Measures.* World Trade Organisation, Geneva.

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.

C:\Files\Papers\Mexico\Policy Options for Open Borders in Relation to Animal 5 March 4.doc

Henson, Spensor, and Maury Bredahl. "Policy Options for Open Borders in Relation to Animal and Plant Protection and Food Safety." In Loyns, R.M.A., Karl Meilke, Ronald D. Knutson and Antonio Yunez-Naude, eds. *Keeping the Borders Open - Electronic Proceedings.* Proceedings of the Eighth Policy Disputes Information Workshop (March 6-9, 2002, Puerto Vallarta, Jalisco, Mexico). http://www.farmfoundation.org/policysystems.htm.