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Overview of Foreign Technical Barriers to U.S. Agricultural Exports

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Overview of Foreign Technical Barriers to U.S. Agricultural Exports. By Donna Roberts and Kate DeRemer. Commercial Agriculture Division, Economic Research Service, U.S. Department of Agriculture. Staff paper number AGES-9705.

Abstract

Technical barriers affecting agricultural trade are emerging at the center of agricultural trade policy debates with increased frequency. These barriers include sanitary and phytosanitary measures; measures to prevent commercial fraud, such as standards of identity and standards of measure; consumer measures, which regulate food quality attributes; trade measures aimed at protecting the global commons; and others. Although many international trade experts in the public and the private sectors concur that technical barriers are a significant impediment to agricultural trade, evidence in support of this view has primarily been anecdotal. This report aims to provide the first general overview of technical barriers that currently confront U.S. agricultural exports. It presents summary descriptive statistics of foreign technical barriers developed from a survey of USDA's foreign attachés and representatives from agricultural producer groups who identified more than 300 measures in 63 foreign markets, and estimated that these technical barriers threatened, constrained, or blocked $4.97 billion of U.S. exports in 1996.

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Foreword

In 1995 and 1996, the Economic Research Service participated in an interagency activity designed to inventory and provide an empirical perspective on the combined impact of the most significant and debatable technical barriers to exports of U.S. agricultural products. The informed opinions of regulatory agency scientists, ERS and FAS economists, and private company cooperators were compiled in a consensus-based inventory of significant and debatable technical barriers to trade. The market and policy expertise of FAS attaches at 50 overseas posts provided the basis for estimating the importance of these technical barriers in terms of the value of blocked, constrained, or threatened exports of U.S. agricultural products in 1996.

This staff paper is being distributed to the government and academic research community for the purposes of soliciting comments on the process and methodology used to compile the inventory and estimate the trade impacts of technical barriers, generating suggestions for future research by ERS, and stimulating research on technical barriers within the university community. The results reported in this staff paper make a significant contribution to our understanding of where (in which regions) debatable technical barriers pose the largest obstacle to U.S. exports, which U.S. commodities and products are most affected by technical barriers, and what types of debatable technical barriers represent the most significant trade barriers; these results therefore help guide future research. However, as the report discusses, considerable work is still needed to organize and categorize the large array of technical barriers in ways most useful to economic and policy analyses, and to develop economic models to estimate both the economic costs and benefits of technical barriers.

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Introduction

It is widely recognized that technical barriers to trade create numerous obstacles to the international exchange of agricultural goods. Such barriers exist in most industries, but are particularly important in the trade of primary and processed agricultural products. Agricultural exporters are often required to demonstrate that native species or human health are not endangered by their products, while simultaneously satisfying the nutrition, packaging, and labeling standards of the importing country. Policymakers acknowledge that the recent prominence of technical barriers is due in part to growing demands in the developed world for enhanced food safety and for protection of the earth's resources. However they also recognize that the disingenuous use of technical measures can provide a nontransparent means of providing protection for domestic producers. The proliferation of these measures in recent years has been a catalyst for the negotiation of new disciplines on the use of technical barriers in the Uruguay Round of Multilateral Trade Negotiations and in other recent trade liberalization negotiations.

What Are Technical Barriers?

There are differing views on what constitutes a technical barrier. Some have defined this term broadly, so as to include nearly every trade policy instrument except tariffs and quotas; others have favored a narrower interpretation, arguing that customs certification requirements or environmental measures belong in separate categories of non-tariff barriers. For this study, technical barriers are defined as internationally divergent regulations and standards governing the sale of products in 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.

An *externality* is defined by economists as a direct and unintended side effect of an activity of one individual or firm on the welfare of other individuals or firms. An example might be microbial contamination that occurs during the processing of a particular food, which subsequently causes consumers to fall ill. Given such an occurrence, the government might choose to adopt a regulation if, in the opinion of regulatory authorities, market incentives alone had not produced the "efficient" amount of food safety -- that is, if consumers would have been willing to pay more (perhaps through higher food prices) to avoid illness.

Assume that regulators had three options for reducing the probability of food contamination, including a) proscribing use of a certain input; b) mandating a longer chilling period for the processed food or c) specifying a maximum tolerance for pathogen incidence. If the home country adopts the input standard (a) and its trading partner chooses the product standard (c) then

a home country firm wishing to produce for both markets faces a technical barrier -- the costs of complying with the trading partner's regulation, which in this example would entail additional resources for pathogen monitoring. These compliance costs may hinder the ability of exporting firms to fully exploit the economies of scale that international trade can offer.

This view of technical barriers is both broader and narrower than previous definitions found in the agricultural economics literature. It excludes incentive measures such as taxes and subsidies, even though these measures may have been established to address externalities. A specific example of a measure that would fall outside of this definition would be a tax on product packaging, with rates that varied with the degradability of the packaging material, so that the social costs of disposal were incorporated into firms' private costs. The above definition also excludes regulatory non-tariff barriers, such as those that govern the administration of import licenses or state trading entities, for example, whose main objective is not the correction of market externalities. However, this view of technical barriers is broader than others in that it comprises more than just a small set of border measures, such as import bans, which often dominate discussion of agricultural technical barriers. It also includes measures that range from organic production standards to specifications for statistical sampling processes that confirm the pest-free status of an exporting country. And although most technical barriers in agricultural markets appear to be regulations, this definition also includes voluntary standards developed by the private sector.

The term *technical barrier* is not necessarily pejorative, given this definition. The phrase *technical barrier* draws attention to the cost of such measures--the impedance of trade--without recognizing their potential benefits--such as disease-free animal herds. The unfortunate connotation of the term can result in the facile conclusion that a technical barrier to trade must be undesirable if one accepts the neoclassical economic argument that free trade is optimal. Under the standard assumptions of the textbook trade model, preferences are identical in the home and foreign country, there are no externalities, and economic welfare is maximized when trade flows are unimpeded. But technical barriers can often arise from internationally heterogeneous tastes, incomes, or income distributions. It is widely acknowledged, for example, that wealthier nations have higher food safety standards than poorer countries. Mandating the international harmonization of food safety standards might increase trade flows, but could also lower economic welfare by establishing a standard below the optimal level in the wealthy country (consumers would be willing to pay more to avoid illness) and higher than the optimal level in the poor country (consumers are paying for a higher level of food safety than they want). However, even well-intentioned measures can create *unnecessary* impediments to trade. In the end, it is an empirical matter whether the costs of complying with multiple regulatory regimes exceed the benefits.

International variation in tastes and incomes does not account for all technical barriers. There are at least two other reasons why technical barriers exist. Many emerge by chance, the inevitable result of national governments independently developing technical measures. The regulatory variation that emerges in these instances can often limit consumer choice while offering few

identifiable benefits. An example might be a government's specifying mandatory dimensions for beverage containers, dimensions that vary only marginally from those of its trading partners or some international norm.

A second source of variation in technical measures may result from a calculated departure from the social interest, called *regulatory capture* by economists. This refers to instances where domestic producers who have a vested interest in limiting competition are able to influence unduly the regulatory process, resulting in measures that may represent a net cost to society. The words "prima facie" in the definition of technical barriers are there to acknowledge the existence of regulatory capture. An example of such a measure would be a ban on grain imports because of the presence of an innocuous substance that poses no phytosanitary risks. With no foreign competitors, domestic grain prices can rise higher than the international market price, which results in higher profits for domestic producers and higher prices for domestic consumers. However, in this example, these higher grain prices have not purchased an additional measure of "phytosanitary security" since the substance posed no risk.

The previous discussion implicitly notes two features of technical barriers that distinguish them from other trade policy instruments. Unlike conventional trade measures, such as tariffs and quotas, technical barriers can sometimes be economically efficient. Also, a large and important class of technical barriers, sanitary and phytosanitary regulations, are not "most favored nation" trade policy instruments, that is, the conditions for gaining access to the importing country's market are not identical for all trading partners. Sanitary and phytosanitary regulations, as well as "measures relating to the conservation of natural resources" fall into the category of "general exceptions" to the Articles of the General Agreement on Tariffs and Trade (GATT) including Article 1 (General Most Favored Nation Treatment, which mandates that a country accord most-favored nation status to all trading partners) and Article 3 (National Treatment on Internal Taxation and Regulation, which mandates that imported products be accorded the same treatment as domestic products). This implies that four countries that wanted to export beef to the same country may--legitimately under the terms of the Uruguay Round Agreement--face four different measures to gain entry to the same market.

Examples of Technical Barriers

A formal classification of all agricultural technical barriers is beyond the scope of this report. Some classification concepts found in the literature are:

-- organizing technical barriers by *regulatory target*, e.g., input standards, technology standards or production and processing methods, products standards, packaging standards, transport standards, and so on;

-- partitioning technical barriers into *performance* (the lumber must be free of Bursaphelenchus Xylophohilus) and design (the lumber must be kiln dried at x degrees Fahrenheit for y number of minutes) measures;

-- distinguishing between measures that regulate *compatibility* and those that regulate *quality*;

-- or classifying measures by *policy instrument*, e.g., import bans, seasonal import bans, mandatory product treatments, size restrictions and requirements, transport restrictions and requirements, packaging restrictions and requirements, and so on.

Perhaps the most common means of grouping technical barriers is by regulatory objective. A few representative categories are:

Animal and plant health measures protect commercial plant varieties and animal breeds, as well as native species of flora and fauna, from risks arising from feed additives, toxins, pests, pesticides, diseases, and disease-causing organisms. Examples would include seasonal restrictions on produce imports to reduce the probability of the introduction of a quarantine pest, and mandatory temperature/time regimes for cooking imported meat to prevent introduction of hoof and mouth disease.

Food safety measures protect human life and health from risks arising from foodborne pathogens/contaminants, pesticide residues, additives, veterinary residues, naturally occurring toxins, and transgenetic diseases. Examples of measures in this category are mandatory labeling of potentially allergenic foods and maximum residue limits for pesticides in food products.

Commercial fraud prevention measures have two principal sub-categories: standards of measure and standards of definition. Measures that mandate standard linear, volume, or weight units for market transactions for agricultural products within the importing country are standards of measure. These measures prohibit sales of agricultural products that are not packaged in containers that conform to regulatory specifications at the wholesale or retail level. Standards of identity regulate the compositional integrity of products, commodities, or breeds. These standards may prohibit sales of a product under a generic name such as "pasta," "beer," or "scallops" unless exporting firms use the exact ingredients or process specified by the regulatory authorities in the importing country. This category also includes instances where a country refuses to import any "inferior breeds" of livestock to maintain the purity of national herds.

Food quality measures regulate food attributes other than safety, such as size, appearance, freshness, taste, and other characteristics that might constitute arguments in a consumer's utility function. Examples include mandatory nutrition labels and product shelf-life restrictions.

Global commons measures aim to protect extraterritorial resources, or "global commons," natural resources that are not "owned" by any individual or country. An example would be the prohibition of imports of shrimp caught with nets that do not have turtle extruder

devices or use an equivalent technology to protect Sea Turtles, an endangered species. Mandatory eco-labeling is another prominent example of a global commons measure.

Demonstrating conformity to a foreign regulation to the satisfaction of customers or regulators abroad can be a technical barrier as well as the technical regulation itself. This is an especially prevalent type of technical barrier for agricultural goods. Proving that your regions are pest free, that your domestic herds are disease-free or that your certified seed is not co-mingled with weed seed can represent enormous--often prohibitive--compliance costs for an exporting country. Conformity assessment measures are a distinct class of measures in each regulatory objective category.

Technical Barriers--How Important Are They?

The significance of technical barriers vis-a-vis other trade barriers for agricultural products is unknown, and as a practical matter, unknowable. This uncertainty stems primarily from the lack of systematic information on the incidence of the measures themselves. In order to assess the impact of all relevant technical measures on U.S. imports of apricots, for example, one would first have to collect information published by four different agencies in three separate Titles of the U.S. Code of Federal Regulations (CFR).[1] Even then, the information would be incomplete, since specific "administrative instructions" are "incorporated by reference" in the CFR itself. In the case of phytosanitary regulations for apricot imports, for example, administrative instructions by APHIS would be in the form of a trading partner/measure matrix which specifies different phytosanitary measures--such as mandatory treatments, import bans, or seasonal restrictions--for each potential exporter. By way of contrast, the three different tariff rates for U.S. imports of apricots are succinctly summarized in one line of the Harmonized Tariff Schedule of the United States.

Once the painstaking task of collecting data on the incidence of technical measures is complete, economists face the challenge of empirically estimating the trade and welfare impacts of these measures. The principal challenge is to properly model the compliance costs associated with different technical measures, which generally entails translating qualitative information into quantitative data. Other important challenges include incorporating the risk of low-probability, high-consequence events such as pest infestations into standard trade models, or accounting for the fact that the bilateral nature of many technical barriers can beget product differentiation, create market power, or transform "small countries" into "large countries." Economists concur that empirical methodology to formally assess the trade impacts of even the most pervasive types of technical trade barriers has remained underdeveloped.

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[1] USDA's Agricultural Marketing Service and Animal and Plant Health Inspection Service publish relevant measures in Chapters 1 and 7 of Title 7 (Agriculture) of the CFR; the Food and Drug Administration publishes requirements in Title 21 (Food and Drugs); and the Environmental Protection Agency publishes relevant information in Title 40 (Protection of the Environment).

As a result of the difficulties associated with data collection and methodology described above, empirical evaluations of technical trade barriers have been primarily limited to studies of particular markets and industries in which disputes have arisen. There are a few studies that provide broad descriptive surveys of technical trade barriers, or of the technical barriers in selected markets. Even fewer studies attempt to model the trade and welfare impacts of these barriers. Together, the studies that have been undertaken provide only fragmentary empirical evidence about the costs to the international economy associated with technical trade barriers.

However, even in view of the lack of broad systematic studies of technical barriers, there is widespread consensus among economists that technical measures have been and remain a substantial barrier to the increased international flow of goods. Aside from anecdotal evidence, strong support for this view is found in the experience of the European Communities following the establishment of the single market initiative, known as "EC 92." The objective of this initiative was to foster further economic integration of EC member states by means of harmonizing measures that hindered the free movement of goods and factors within the Community. After years of legislative and judicial initiatives to eliminate these impediments, an extensive survey of business executives and detailed sectoral studies requested by the Commission of the EC indicated that technical measures were still regarded as "significant barriers" to intra-EC trade, including trade in food and tobacco [Sykes, 1995, p. 11]. This finding is important, argue some experts, because the EC member states have surely made more progress in aligning their technical measures than have other sovereign nations in the international trading community.

The current focus on technical barriers in trade policy circles stems from a number of developments in both the public and private sectors. The single most important factor behind the rising interest in these barriers has likely been the new Agreement produced by the Uruguay Round of Multilateral Trade Negotiations which proposed to effectively discipline the use of technical barriers for the first time. The World Trade Organization (WTO) Agreement established specific rights and obligations of signatory nations with respect to technical trade barriers (see box). Similar disciplines are found in the North American Free Trade Agreement (NAFTA), and are being negotiated as part of the Free Trade Area of the Americas (FTAA) and among Asia Pacific Economic Cooperation (APEC) participants.[2]

A key motivation for adoption of new disciplines was that by lowering the level of protection provided by tariffs and many non-tariff barriers (NTBs), the international agreements increased the relative and absolute importance of existing and potential technical barriers. This was particularly relevant in agricultural markets, since the use of most agricultural NTBs had not previously been disciplined. By reducing the ability of governments to protect domestic producers through various other border and domestic support measures, the agriculture

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[2] Sanitary and phystosanitary (SPS) measures are addressed in the NAFTA chapter on Agriculture and Sanitary and Phytosanitary Measures; TBT measures are addressed in the NAFTA chapter on Standards-Related Measures.

agreements in the WTO and NAFTA may have unintentionally created an incentive to replace former NTBs with new technical barriers. The new technical barrier disciplines were viewed as critical to remedying this unintended consequence.

The new rules on technical barriers to trade are expected to increase requests for international trade panels to review technical restrictions, which will heighten their profile. In the meantime, countries are reviewing and sometimes modifying existing regulations in order to comply with the new obligations, which also contributes to the current visibility of technical barriers in trade policy circles.

Another product of recent trade liberalization agreements, new regional trade areas, have also put technical barriers in the public policy spotlight. When nations try to harmonize their respective technical regulations so as to permit the free movement of goods within the region, their external trading partners frequently face new technical requirements for gaining entry to the market. A recent case for U.S. exporters involved proposed changes in phytosanitary import requirements when a country with virtually no domestic apple production became part of a common market with countries that did produce apples. These external regulatory changes, or even *proposed* regulatory changes, can lead to market disruptions for the private sector, which in turn can produce trade conflicts for the public sector to resolve. New trade alliances--as well as the enlargement and deeper integration of older alliances--have been one of the most important factors in the increase in new technical barriers brought to the attention of U.S. policymakers by exporters who either face new requirements or face uncertainty about new requirements.

The current prominence of technical barriers does not arise solely from recent public sector policy events. New pathogen detection and eradication technology developed in the private sector can produce changes in regulatory policies, which in turn can create trade frictions. Trade officials can also be drawn into a public debate when exporters believe that lengthy regulatory review of new food products is motivated by a desire to protect producers rather than consumers in the importing country. Measures that regulate imports of a number of other new agricultural products developed by the private sector, ranging from new animal genetics to new disease-resistant seeds, have also spawned disagreements between trading partners in recent years. In fact, new products--genetically altered commodities--have been at the center of perhaps the most prominent debate over technical barriers in recent months, as importing countries consider whether genetically modified organisms (GMOs) pose a risk to consumers or to biodiversity. There is no reason to expect that the number of agricultural product and technology innovations--or the number of measures to regulate their entry into importing countries--will diminish, so technical barriers will likely remain an important topic of discussion in both the international regulatory and trade communities for the foreseeable future.

New Multilateral Disciplines for Technical Barriers

The negotiation of the Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures revision of the Agreement on Technical Barriers to Trade (TBT) during the Uruguay Round was motivated by shortcomings in both the original GATT Articles and the 1979 Tokyo Round Agreement on Technical Barriers to Trade, a side agreement known as the Standards Code. Sub-parts (b) and (g) of GATT Article XX (General Exceptions) state that measures "necessary to protect human, animal or plant life or health" or "relating to the conservation of exhaustible natural resources" could be adopted by a country as long as they "are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade." Likewise, the 1979 Standards Code stated that governments could adopt "measures necessary to ensure the quality of its exports, or for the protection of human, animal or plant life or health, of the environment, or for the prevention of deceptive practices" as long as the standards or regulations did not create "unnecessary obstacles to international trade."

However, these provisions failed to stem disruptions of trade in international markets caused by proliferating technical restrictions because of three flaws in the pre-Uruguay Round GATT Agreements: 1) the lack of a single integrated rule system (sometimes referred to as "GATT à la carte"); 2) the GATT's consensus-based dispute settlement process; and 3) the arguable exemption of production and process standards from the disciplines of the Standards Code. Prior to the Uruguay Round, not all signatories of the previous GATT Agreement had signed the Standards Code, effectively precluding a number of standards-related disputes from being brought before a GATT panel for resolution. But even if two countries had signed the TBT agreement, the consensus-based dispute settlement process allowed either country to easily block a panel report, or even a request to convene a panel. Another loophole was created by the Standards Code itself, by only disciplining measures that "lay down characteristics of a product such as levels of quality, performance, safety or dimensions" -- omitting explicit reference to production and process standards.

Upon completion of the Uruguay Round negotiations, *all* signatory countries (now members of the World Trade Organization (WTO)) became parties to the WTO's single integrated rules system, which includes, among many other things, both the SPS and TBT Agreements as well as the GATT Articles. Moreover, under the new Understanding on Rules and Procedures Governing the Settlement of Disputes, it is no longer possible for a single country to block a dispute ruling. The loophole in the Standard Code has been closed, as the new TBT Agreement now stipulates legally binding rules for "related processes and production methods," and the new SPS Agreement features new disciplines which are designed to prevent the disingenuous use of health and safety regulations as a nontransparent means of providing protection for domestic producers.*

*Note that there have been no subsequent revisions to paragraph 2 (b) of Article XI (General Elimination of Quantitative Restrictions) of GATT 1947 which allows quantitative restrictions "necessary to the application of standards or regulations for the classification, grading or marketing of commodities in international trade."

The SPS Agreement establishes a number of new legally binding disciplines on a Member's use of sanitary and phytosanitary regulations, defined as measures applied to protect 1) plant and animal health from risks arising from pests, diseases, and disease-causing or disease-carrying organisms; 2) human and animal health from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; 3) human health from risks arising from diseases carried by animals, plants or their products; and 4) the territory from entry, establishment or spread of pests. The TBT Agreement protects the right of Members to adopt measures which ensure the quality of exports; protect human, animal, or plant life; protect the environment; or prevent deceptive practices, as long as these measures do not breach the disciplines set forth in the Agreement. Many of the disciplines in the TBT Agreement are essentially identical to those in the SPS Agreement (for example, the procedural disciplines that oblige Members to notify trading partners of a proposed regulation that could affect trade, and to allow foreign governments an opportunity to comment), but the TBT Agreement explicitly states that SPS measures are bound only by the terms of the SPS Agreement.

Distinctions between SPS and TBT Measures: Examples

During the course of actual dispute settlement proceedings, the question of whether a measure is challenged or defended under the terms of one or more GATT Articles and/or the SPS or TBT Agreement can often hinge on subtle legal arguments and the details of the application of the measure. The following discussion aims only to broadly illustrate some potential distinctions between the two types of measures.

Sometimes SPS and TBT policy instruments are identical, the only difference between them being the stated objective of the regulation. For example, restrictions on product shelf life might be adopted as a food safety (SPS) measure, or to regulate product freshness -- a food quality regulation that would be classified as a TBT measure. Similarly, a food-labeling regulation might be justified on the basis that it provided information about ingredients that were potential allergens for some consumers (an SPS measure) or that it informed consumers about the nutritional profile of the product (a TBT measure).

Sometimes the broad objectives of TBT and SPS measures can be identical -- such as protection of plant, animal and human health, or protection of the environment -- and other factors create the legal distinction between the two types of measures. For example, by definition, SPS measures protect animal, plant, and human life and health *within* the territory of the Member. Therefore, a ban on imports of a product to safeguard domestic wildlife would be an SPS measure; a ban on imports of a product that threatened the existence of a globally endangered species would be a TBT measure. And although both types of measures can have as their objective the protection of human life and health, only those that mitigate specifically enumerated risks (cited briefly above) are SPS measures. Therefore, a regulation that stipulated a maximum residue level for a pesticide in order to safeguard human health is an SPS measure; a regulation that stipulated handling requirements for this same pesticide in order to safeguard human health would be a TBT measure.

A Survey of Technical Barriers to U.S. Agricultural Exports

USDA recognized the need for an assessment of technical barriers faced by U.S. agricultural exporters as these barriers began to emerge with increased frequency at the center of international commercial disputes. And although developing a comprehensive overview of technical barriers for policymakers was viewed as the primary goal of this assessment, it was clear that a catalogue of all foreign technical rules regulating the imports of agricultural products would likely be both infeasible and unproductive. To appreciate the size of such a catalogue, it is instructive to note that a complete inventory of relevant U.S. regulations *alone* would include 8,000 maximum residue limits, as well as tens of thousands of other regulations. Moreover such a catalogue, once compiled, would not indicate which foreign measures differed from U.S. regulations, and of those, which ones caused actual export revenue losses for U.S. firms. A survey was therefore viewed as the most efficient means of identifying relevant foreign technical barriers to U.S. agricultural exports. In lieu of an extensive formal statistical survey of individual production and exporting firms, the USDA began its assessment of technical barriers in 1996 with a survey of experts from six economic and regulatory agencies within USDA, in addition to a survey of representatives of selected producer groups. This type of assessment capitalized on the internal multi-disciplinary expertise of the Department, permitting a focus on foreign technical measures for which remedies were potentially available under the new multilateral and plurilateral trade liberalization agreements.

The Survey Design and Process

In June 1995, the Economic Research Service (ERS) and the Foreign Agricultural Service (FAS) collaborated on an initial pilot survey of foreign technical trade barriers. FAS attachés posted in the most important U.S. export markets were asked to identify technical barriers in the countries that they covered, and estimate the export revenue losses caused by these foreign technical barriers. The survey respondents identified 157 existing measures that reduced potential 1995 U.S. agricultural export revenues by an estimated $2.35 billion and 48 proposed measures that could reduce U.S. agricultural exports by an additional $2.38 billion. These results indicated that the incidence and impact of foreign technical barriers warranted further assessment.

In 1996, the USDA extended the scope of the survey in three dimensions. First, the survey was sent to all 50 FAS field offices, not just those located in the most important commercial markets. These posts collectively cover 132 countries which represented 98 percent of the U.S. export market for agricultural, forestry, and fish products in 1996. Second, input was solicited from the private sector. The 1996 survey was sent to each producer group that participates in the FAS Cooperator Program.[3] And finally, USDA's four regulatory agencies aided ERS and FAS in the collection and review of the information on foreign technical barriers in 1996 (table 1).

[3] The cooperator program at FAS includes approximately 40 groups representing specific U.S. commodity sectors such as horticultural products, feed grains, wheat, soybeans, rice, etc. These groups are funded by their members, primarily agricultural producers and processors. FAS and the cooperators share in the cost of overseas market development activities.

Table 1--USDA regulatory agencies that participated in the 1996 technical barrier survey

USDA agency	*Scope of regulatory authority*
Agricultural Marketing Service (AMS)	Horticultural product marketing, standards, and grades
Animal and Plant Health Inspection Service (APHIS)	Domestic animal and plant health
Food Safety and Inspection Service (FSIS)	Food safety issues for animal products
Grain Inspection, Packers and Stockyards Administration (GIPSA)	Grain quality issues

The survey process occurred in four stages. First, ERS compiled a preliminary list of technical barriers from four sources: the 1995 pilot survey; cables exchanged between FAS overseas posts and Washington, DC, headquarters; the minutes of the weekly meetings of the USDA interagency Technical Working Group; and the 1996 National Trade Estimate Report on Foreign Trade Barriers published by the Office of the U.S. Trade Representative.

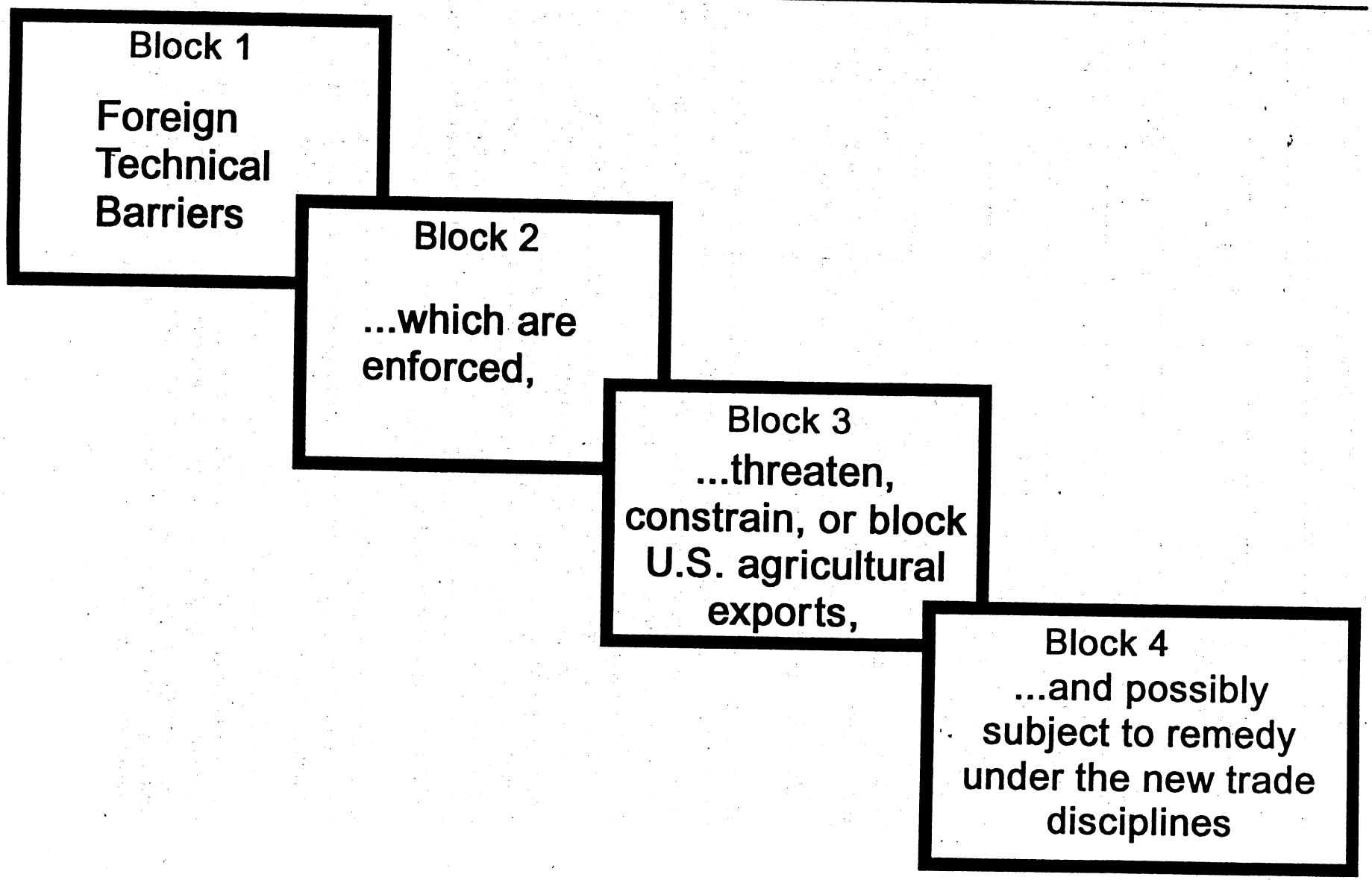
There were three criteria for inclusion of an issue in this preliminary list (figure 1). First, the measure had to be recently proposed or currently enforced by foreign government officials. This excluded measures which, although part of the official regulatory code of the foreign government, were not actually implemented by foreign authorities. However, this first criterion did permit inclusion of non-transparent measures, *de facto* regulations which had never been formally adopted or published by the foreign government. Second, the identified measure had to decrease or potentially decrease (in the case of recently proposed measures) U.S. exports of agricultural, forestry, or fishery products to the specified market. And finally, the identified measures had to appear to be in violation of one or more disciplines of the new trade agreements, although the determination of actual violation of any given measure would of course require substantial additional investigation.[4] This criterion limited the sample to those measures for which remedies might be available under the provisions of these agreements.

In the second stage, this preliminary list of technical barriers was reviewed by analysts in the FAS International Trade Policy program area and by scientists and trade analysts in the regulatory agencies. FAS personnel identified those issues that had been resolved, while experts

[4]An exception to this requirement was allowed for conformity assessment measures. Because of the difficulty in judging whether a foreign government's requests for information during initial technical exchanges will lead to completion of a risk assessment and a risk management decision within a reasonable period, or instead lead to repeated requests for additional information that seemed designed to delay a decision, all conformity assessment measures were included.

Figure 1

Technical barriers identified for the inventory



in the regulatory agencies provided guidance for more precise descriptions of each identified measure.

Next, ERS distributed this revised list of foreign technical barriers, sorted by country, to each overseas FAS post. FAS attachés were asked to identify additional issues that had been brought to their attention by U.S. firms that wanted to export to the markets they monitored. They were also asked to delete measures identified on the preliminary list if the measures had been unilaterally revised or rescinded by the foreign government. The revised list, sorted by commodity, was simultaneously distributed to the producer groups that participate in the FAS cooperator program. Fifteen responses were received from groups spanning every major sector of U.S. agriculture.

FAS attachés were also asked to estimate changes in U.S. export revenues associated with resolution of each identified issue. In a few instances, the posts had insufficient information to provide estimates. Typically these issues involved measures that affected large volumes of multiple products or broad categories of products, such as "snack foods," or measures that affected relatively small amounts of minor commodities. Economists from the commodity divisions in the Commodity and Marketing Programs of FAS provided the estimates of export revenue losses for these issues.

In the final stage, the issues identified by the posts and the producer organizations were vetted by experts in USDA's regulatory agencies. Again, these individuals aided in improving the precision of the description of each identified measure, clarifying, for example, whether foreign regulatory authorities banned U.S. poultry products because of their alleged concerns about Newcastle's disease or a particular strain of avian influenza. Additionally, regulatory officials deleted measures from the list that emerged from the third stage of the survey that were judged to be potentially scientifically justifiable (in the case of SPS measures) or otherwise in conformity with the new trade agreement disciplines (for other technical measures).

The final survey results represent a "snapshot" of questionable foreign technical barriers facing U.S. agricultural exports in June 1996.[5] This survey design permitted sharp focus on foreign measures that affected U.S. commercial interests and for which provisions of recent trade agreements potentially offered some prospect of resolution in favor of greater access for U.S. exports to foreign markets. However, this focus limits the inferences that can be drawn from the survey results. Most obviously, the final survey results do not include measures in countries that are not covered by overseas FAS posts. More important, perhaps, is the fact that the survey results provide very limited evidence about the potential gains that could be realized from the much broader issue of "regulatory reform" initiatives. Sizable trade and welfare gains would likely be realized by further alignment, unilateral modification, or even elimination of some

[5] Issues that were resolved before completion of the survey, such as proposed Russian import regulations for U.S. poultry products, as well as issues that emerged in the latter half of 1996 after the survey was completed were not included in this snapshot.

measures that are nonetheless viewed as legitimate under the provisions of the Uruguay Round and NAFTA.

Survey Definitions

Definitions of terms used in the following overview of technical barriers are necessary in order to interpret the results of the survey.

Estimated Trade Impact (ETI) is the estimated annual value of U.S. export revenue gains (for expansion or access issues) or the estimated annual value of export revenue losses that were prevented (for retention issues), *if* the issue of concern were resolved. The ETI is a comparative static estimate, where everything but the technical measure is assumed to remain constant. Categorization of the ETI in the survey depends on whether the measure is threatening future U.S. exports (retention), curtailing current exports (expansion), or blocking the U.S. commodity completely (access) from the foreign country's market.

Issues are defined by both the commodity and the trade measures imposed by a foreign government. A commodity in one issue may be as narrowly defined as "oranges." If a particular foreign measure affects all citrus, the commodity is defined as "citrus," and the trade measure's impact on four fruits would still be considered a single issue. Some "horizontal" issues cut across many agricultural products and involve only a single measure. Thus the number of products affected by trade measures included in the survey is larger than the number of issues in the survey. The different types of issues are defined as retention, expansion, or access issues.

Retention issues are those measures under consideration by a foreign government which threaten all or a part of the established trade flows of a commodity. Proposed legislation in a foreign country requiring eco-labeling of agricultural products is an example of a retention issue. A retention issue will become an access or expansion issue in following years if the foreign government implements the measure.

Expansion issues include those measures that limit the amount of a U.S. product currently exported to a country. These issues could include *limited import bans*, in which only products of a particular type meeting certain specifications have access to a market, or *technical requirements*, in which a specific procedure limits the amount of a U.S. product entering a country due to the resultant increased production or handling cost. A common type of limited import ban includes varietal issues where regulations list the specific type of a particular fruit that can enter a market. Varietal issues currently affect a host of fruits, including apples, cherries and nectarines. Regional specifications are another example of a type of limited import ban. There are several cases of products allowed only from particular States. For example, fruits and vegetables are allowed into a market only if they are from a particular region in the United States, such as the Pacific Northwest. Limitations also exclude particular States such as California or Florida or a region like the Northeast. The other class of expansion issues, technical requirements, includes procedural or processing specifications increasing both the time and cost

of exporting a product. For example, a commodity might be delayed in the foreign country's port while individual shipment inspection procedures are completed when an alternative means of screening for phytosanitary pests would be as scientifically effective as the shipment by shipment inspection, and would lower the cost to the exporter.

Access issues prevent any U.S. exports of a particular commodity to enter a country. Most access issues have a small ETI and affect a specific product or a very narrow group of products, such as just oranges or citrus.

Survey Results

There were 315 issues in 63 countries listed and described in the 1996 survey, although many more than 315 products are affected by technical barriers because of horizontal measures. The sum of the estimated trade impact for all issues in the survey is $4.97 billion. The value of total U.S. agricultural, forestry and fishery exports in 1996 was $69.7 billion (BICO[6]). If all the market access and expansion barriers were removed, U.S. agricultural exports would increase 5 percent from the 1996 value. If the market retention technical barriers were implemented, U.S. agricultural exports would contract approximately 1.5 percent from the 1996 value.

Based on the examples noted previously in this report, it is evident that the survey contains a very wide breadth of issues. The ETIs in the database are found in equally as broad a range. Three issues have estimated trade impacts of approximately $10,000 annually, the smallest ETI found in the survey. The "largest" issue in the survey, with an ETI of greater than $500 million, affects all the processed products to one market, because the country has not approved use of some food additives that are widely used by the U.S. processed food industry.

The histogram in figure 2 illustrates the number of issues having an ETI in defined dollar ranges. A single issue may have both a retention component, if it threatens existing exports, and an expansion component, if it also limits the current amount of U.S. exports to a country. The total number of issues in the histogram is slightly higher than 315, reflecting those issues with both an expansion and retention component. The average ETI from each issue is $15.35 million. There are very few large or horizontal issues identified in the survey. Over 50 percent of the issues have an ETI of less than $4 million, and 70 percent of the issues have an ETI of less than $10 million.[7]

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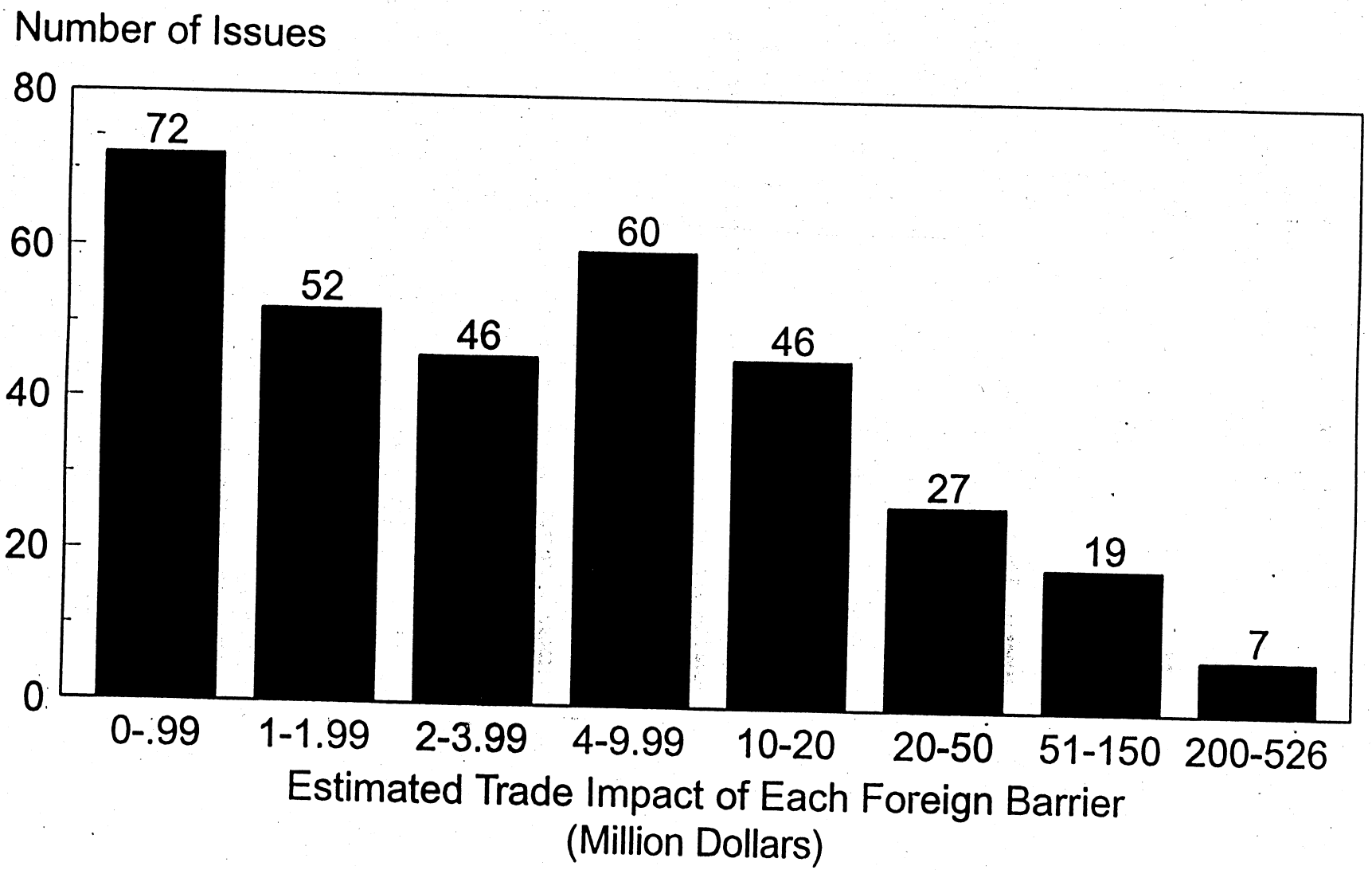
[6] The BICO (Bulk, Intermediate, and Consumer Oriented) report provides U.S. agricultural trade data. The database is maintained by the Foreign Agricultural Service, USDA.

[7] Four issues identified in the survey have no trade impact. These are cases where the trade barrier is in place but did not effectively constrain U.S. exports in 1996 because of large domestic harvests.

Figure 2

The estimated trade impact (ETI) of most foreign technical barrier issues is under $10 million



Many of these smaller issues address just one product, such as apples., The larger issues, particularly those with an estimated trade impact between $200 million and $526 million are *horizontal* issues. Horizontal issues affect a very broad range of U.S. agricultural products entering a country and cannot be subdivided by a specific product type, such as inspection measures that apply to a wide range of unprocessed and processed goods.

Figure 3 indicates the estimated dollar impact of all retention, expansion, and access issues. Market expansion issues are the most common and have the highest trade impact. An estimated $3 billion in U.S. exports could result from resolving issues that currently limit U.S. product flow into foreign markets. Table 2 provides a comparison between the number of issues and their dollar value by type.

Table 2--How trade is affected by issues in the 1996 survey

Type of issue	Number of issues*	Estimated trade impact
		($million)
Market expansion	172	3071
Market access	111	723
Market retention	43	1176

*The sum of issues is greater than 315 because some issues have both an expansion and retention component.

Technical barriers in the East Asian region have the largest dollar impact on U.S. agricultural exports, as illustrated in the regional comparison provided in Figure 4. Mexico, Canada, and Latin America's technical barrier issues have the second largest impact on agricultural exports. There are some horizontal issues in East Asian countries that have large ETIs. Over 85 percent of the value of issues in East Asia address products that fall into the expansion category. In the Americas, approximately half of the issues are retention issues that threaten trade but do not currently block or curtail exports. The region of the Americas has the largest number of issues, but the individual ETI's are small because the foreign measures or regulations in the Americas primarily affect specific commodities, such as one horticultural product. East Asia has a fewer number of issues than the Americas, but the ETI for each issue is larger.

Processed products is the product group most affected by technical barriers to trade, as shown in Figure 5. Barriers arise from labeling, packaging and product additives issues. As stated above, all processed products are sometimes affected by one rule. Most of the issues affecting the category of "Grains and Oilseeds" are plant health concerns not affecting oilseeds, but a specific type of grain like wheat or barley. Other issues such as grain quality and weed seed issues have an impact on both oilseeds and grains. Although the number of horticultural issues is relatively large, the individual ETI for many of these issues is relatively small. The multiple products category includes horizontal issues that span the listed product groupings. For example,

Figure 3

Technical barriers threaten, constrain, and block U.S. agricultural exports

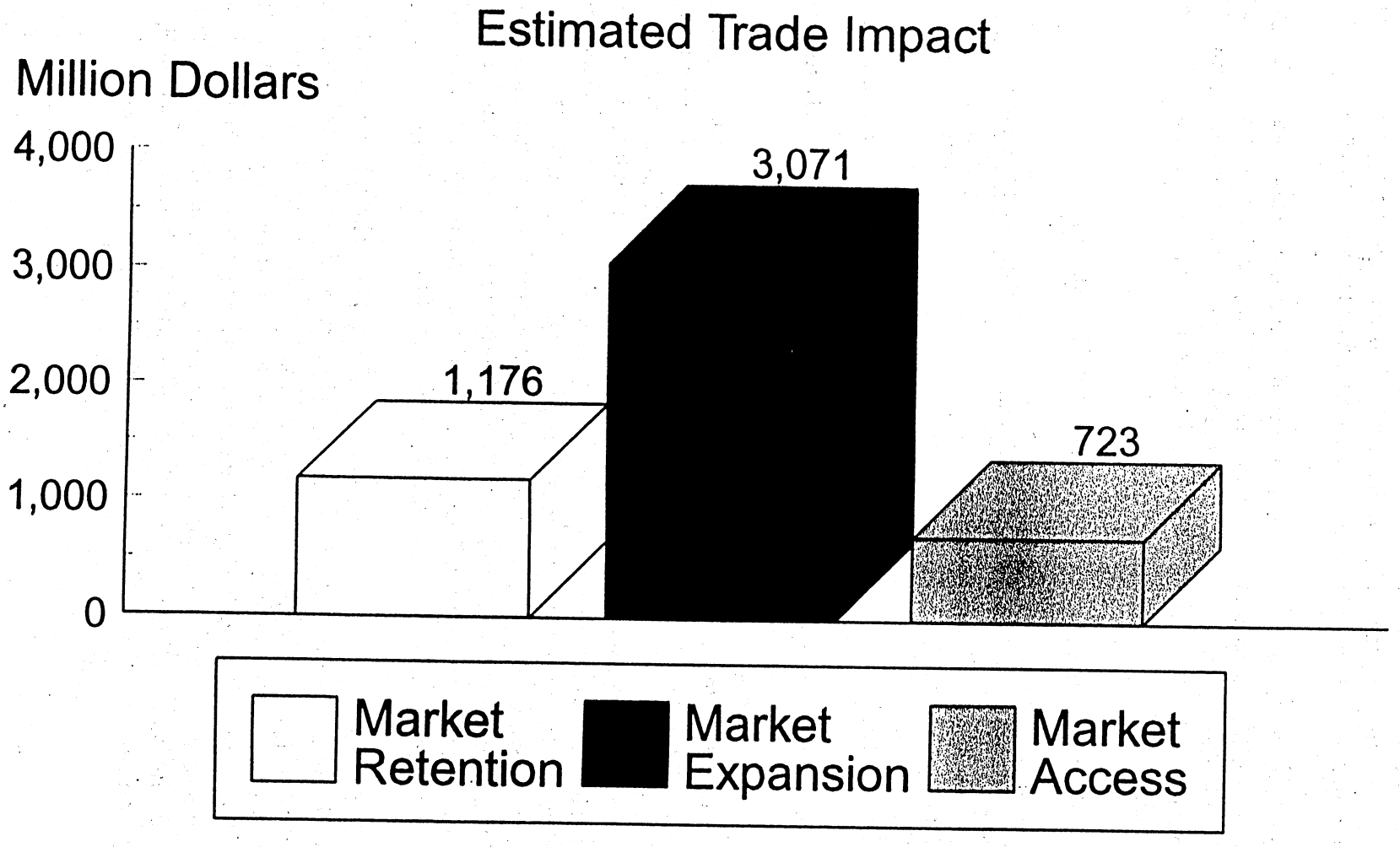
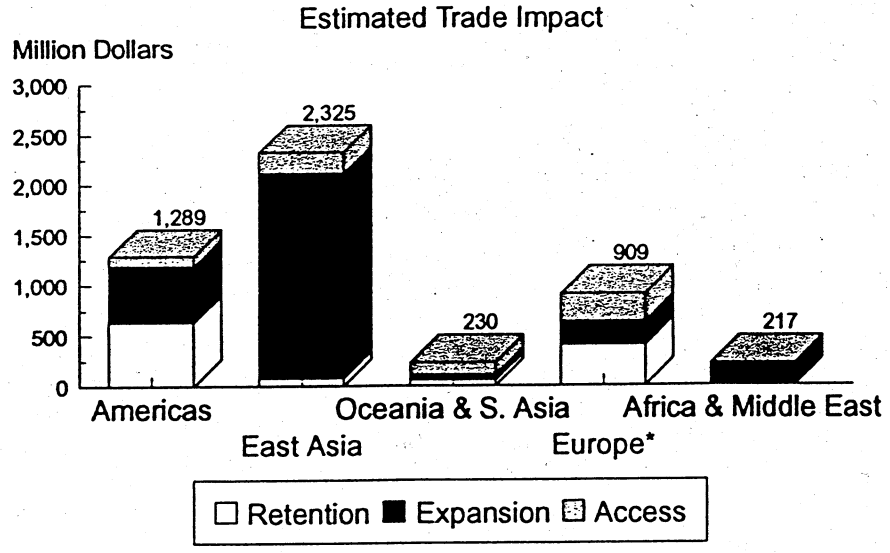


Figure 4

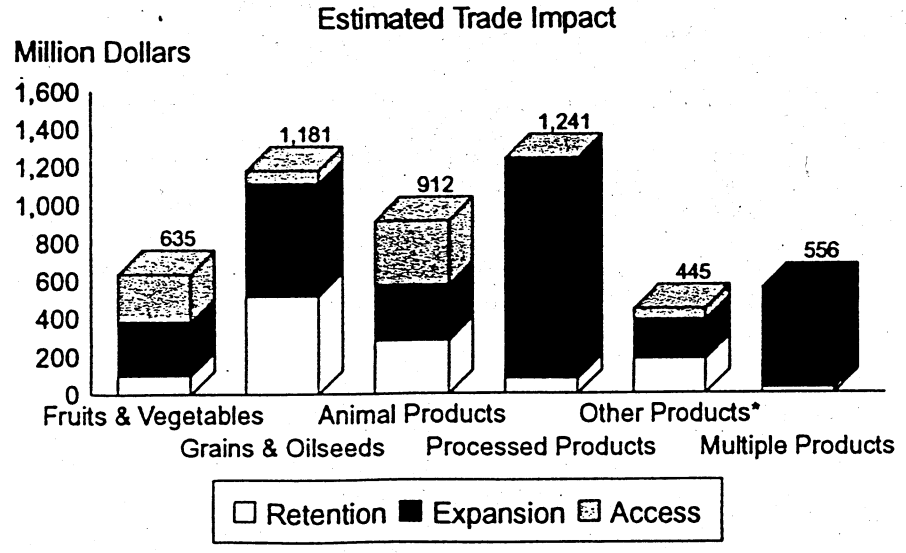
U.S. agricultural exports face more technical barriers in East Asia than in any other region



*Includes Russia

Figure 5

Technical barriers constrain U.S. agricultural exports of processed products more than any other category



*Includes cotton, seeds, nuts, fish and forestry products

inspection requirements for all agricultural products that lead to port delays could affect all of the categories listed.

Figure 6 divides the identified technical barriers into SPS measures and other technical barriers. Over 90 percent of the issues identified in the survey are SPS measures. The other 10 percent are other technical barriers that address non-health related concerns, principally food quality standards.

Approximately half of the issues listed in the survey are plant health measures. A foreign country's plant health protection importation measures are included in the survey if an alternate, less expensive treatment or procedure with equal effectiveness might be available, or if the listed pest or disease might not be a legitimate quarantine concern for the foreign country.

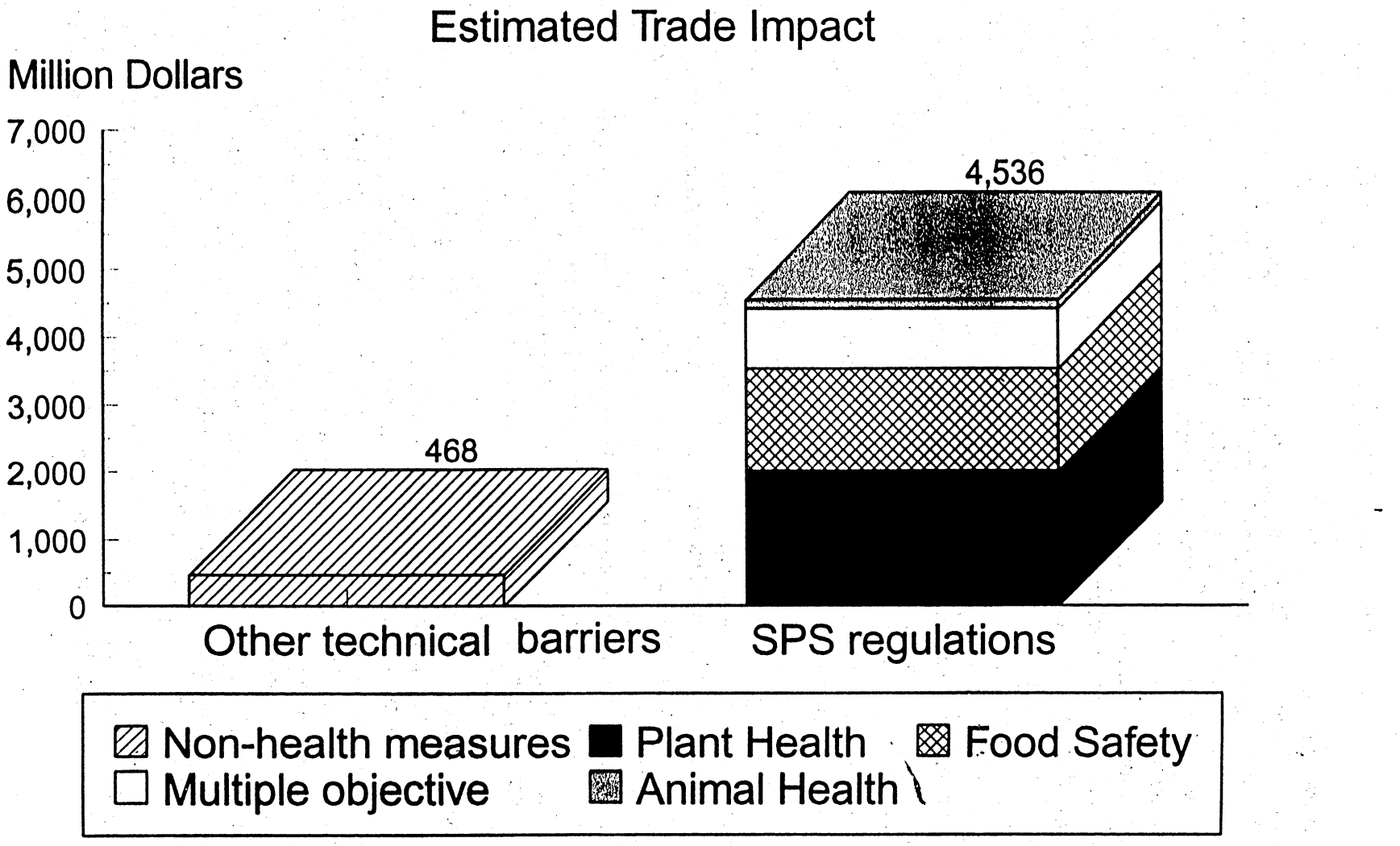
Measures imposed under the rationale of food safety account for about 20 percent of the issues in the survey. Food safety concerns include pathogens in meat, additives, naturally occurring toxins, and issues relating to technology used in production. Pathogen concerns dominate the food safety issues.

Approximately 12 percent of the issues in the survey concern animal health. Many of the issues involve quarantine diseases. One reason for the small number of animal health issues relative to other SPS categories is that trade in live animals is relatively small. Often, animal product regulations are food safety, not animal health, regulations. A small number of very general animal product regulations have the rationale of both animal health and food safety.

Plant health issues are the most significant SPS issue in the survey, accounting for 43 percent of the value of all health measures. Food safety issues account for just over 35 percent of the value of SPS issues. The third largest component are issues that have the stated purpose of protecting more than one type of entity. For example, a measure may have the intended purpose of protecting both human health and animal health. Some horizontal issues may intend to protect human, animal, and plant health, such as a measure inspecting all imported products at the border. Animal health measures account for less than 5 percent of the total value of SPS issues.

As stated above, approximately 10 percent of the issues in the survey do not involve health or food concerns, but address other technical barriers. All of the conformity standards in the survey were packaging requirements. Mandatory packaging specifications were found for both consumer-ready products and bulk commodities destined to wholesalers. Most of the remaining issues in the other technical barrier category addressed food quality issues involving grading requirements and implementation of these requirements.

Technical barriers to trade are dominated by measures to protect animal, plant, and human health



The sum of both columns is slightly higher than TBT/SPS total value due to overlapping issues

Generalizations and Extensions for Further Research

Several hypotheses or generalizations can be drawn from these descriptive statistics. First, the estimated trade value for the majority of the issues is quite small; thus resolution of a single issue will not have a large impact on U.S. agricultural exports. However, resolution of a small issue in one country may have a large indirect impact on U.S. agricultural trade due to its precedent for resolving similar issues in other countries. Although the benefits of resolving the larger horizontal issues that cover many products are high, the complexity and political nature of these issues makes them more difficult and time consuming to resolve. Second, although the East Asia region has a large number of agricultural technical barriers, the numbers in the survey are not normalized by the actual value of U.S. trade to that region, so additional analysis is needed to certify the importance of technical barriers relative to the rest of the world. Third, among product groups, processed products have the largest total value of estimated trade impact on U.S. agricultural exports. The largest value of technical barriers to trade for a country and product type combination are exports of processed products in the East Asian region. Considering the combination of the growth of this market and the growth in the processing sector of agriculture, it could be surmised that technical barrier issues surrounding processed products in East Asia (and presumably in other regions) may grow, increasing the number of issues and value of technical barriers to trade.

Extension of research using data in this survey or similar databases, supplemented by additional information and measurements, will be important to answer many specific economic questions surrounding technical barriers to trade. For example, the quantification of technical barriers can be compared with the measurements of other traditional trade barriers (such as PSEs) over time to determine if, in fact, technical barriers are gaining in relative or absolute importance. Results can be used to test the hypothesis that increased restrictions on tariffs due to international agreements have simply shifted the trade-distorting impacts from traditional policies to technical barriers. Models could be constructed analyzing the incidence of technical barriers evaluating the relative weights of scientific evidence on policy determination. Specific questions about technical barriers in agriculture have been posed by Hooker and Caswell. For example, they have preliminarily explored the relationship between Foreign Direct Investment (FDI) and technical barriers and hypothesize that technical barriers have an important impact on FDI choices of firms. If the principles of harmonization or mutual recognition come to fruition shouldn't these measures have a decreasing impact on firms' FDI choices? Finally, comparing technical barriers in agriculture to technical barriers in other industries may show that general conclusions can be drawn about technical barriers regardless of the industry. For example, Tyers and Anderson found that tariffs in Western Europe on manufactures fell from a 12-percent average in 1958 to 7 percent in 1972, and they fell further during Tokyo round. Non-tariff import measures on manufactured goods increased during that same period. Many analysts have surmised the same: that a trade-off of one type of barrier for another is occurring in agriculture.

Studies to investigate more general questions regarding technical barriers could also yield significant results. In a study of traditional barriers completed by Roningen and Dixit, they point

out that to analyze cases of agricultural protection or policies it is important to see how levels and benefits of these barriers compare across commodities: what countries use these barriers most often? Who benefits from the barriers? And how much do they benefit? These same questions are relevant to technical barriers. However it must be recognized that technical barriers are unusual because their legitimate use for food safety, animal and plant health protection, and consumer information and quality concerns justify a closer look at the benefits of such measures. Josling and Tangermann, comparing levels of protection in agriculture and trade, conclude that economists must push for new ways of capturing policy effects, both costs and *benefits*. Analysis of technical barriers demands just such a new approach to capture both the costs and the benefits they provide to producers and consumers.

Concluding Remarks

This first interagency, multi-disciplinary effort to systematically collect information on the incidence and impact of questionable technical barriers to U.S. agricultural exports in 1996 has yielded a number of useful insights for USDA's program agencies as well as for its research agencies. First, the identification of the issues provided evidence about the wide scope of these measures, which range from complex scientific issues to the simple failure to officially notify trading partners of a new regulatory regime, a basic obligation under the terms of the new international trade agreements. The identification of the issues in the survey also indicated that these barriers emerge in countries throughout the world, and affect all product categories. Survey respondents also identified sanitary and phytosanitary barriers much more often than other technical barriers.

The second part of the exercise, the estimates provided by the respondents of actual or potential U.S. trade losses resulting from these barriers, has contributed to a greater understanding of the relative importance of questionable technical barriers. Although these estimates are not derived from formal empirical trade models--a difficult task in view of products ranging from grass seed to goats in the sample-- the survey estimates provide an order-of-magnitude indication of the economic significance to U.S. agricultural exporters of each identified issue. The broad aggregates of these individual estimates allow technical barriers to be viewed in proper perspective, both in relation to the total value of U.S. agricultural exports and to the estimated impacts of other trade barriers. These estimates also permit an ordinal ranking of issues for each country, region, product category, and issue category.

The profile of technical barriers to U.S. agricultural exports that emerged from the collection and preliminary analysis of this information has been used by USDA's program agencies to identify priorities and allocate resources for resolution of technical barrier issues identified in the survey. The survey results have also informed a number of Departmental activities aimed at preventing the emergence of future questionable technical barriers. Among other things, the preliminary analysis has provided a starting point for strategic planning of USDA participation in international standards-setting organizations, including the regional subsidiary organizations.

The information has also been used by USDA agencies to target funding for technical assistance and technical exchange programs that inform counterparts in foreign countries about the new disciplines on the use of technical barriers. This overview has also aided in the development of proposals tabled by the U.S. delegation to the WTO's Committee on Sanitary and Phytosanitary Measures which aim to spur effective implementation of the SPS Agreement.

Further economic research on the incidence and impact of technical barriers by USDA is also, ultimately, aimed at preventing disputes over technical barriers. Broadly, the research agenda encompasses two principal elements: (1) developing a unified nomenclature and taxonomy for technical barriers; and (2) formally evaluating the trade and welfare effects of selected technical barriers. Progress on this agenda will likely be comprised of iterative steps. Initial definitions and categories will help structure analytic and empirical studies of the trade effects of given measures; results from several of these studies then generate stylized facts about classes or types of technical barriers, which in turn permit development of additional classification concepts. The emphasis on starting with the basic conceptual building blocks of definitions and taxonomies stems from the observation by experienced economists that the absence of a *lingua franca* has been an important impediment to systematic analysis of technical barriers. The emphasis on formally modeling the trade and welfare impacts of technical measures stems from the fact that to date there have been very few studies that have undertaken this task. As a consequence, there is at present only fragmentary evidence about the costs to the international economy associated with technical trade barriers.

The 1996 survey supports the research agenda by providing a primary data set with which to empirically test the usefulness of definitional and classification concepts. The data also provide information that aids in the research design of formal analytical or empirical studies. For example, the survey provides information on country/commodity/measure combinations that are thought to be very distortive; careful empirical study could corroborate or challenge the consensus view. The types of measures that are identified most frequently are good candidates for theoretical analysis of "prototypical" technical barriers.

The expectation is that as a result of research by USDA and other multilateral, governmental, and academic institutions, economists will be able to offer policymakers advice about which classes or types of technical measures are less trade distortive, analogous to the evaluation of other agricultural trade barriers available to negotiators during the Uruguay Round. Economists should also eventually be able to provide objective evaluations of various cooperative solutions, including mutual recognition agreements and harmonization schemes, for selected cases of international regulatory heterogeneity of interest to the trade and regulatory policy community. However substantive progress toward these goals will be conditional on the efforts of institutions around the world, including USDA, to systematically collect information on technical barriers. It is hoped that publication of this overview of technical barriers faced by the largest agricultural exporting nation will spur interest in making the necessary investments in primary data collection around the world.

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