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Capacity-Building to Meet International Standards as Public Goods



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Capacity-Building to Meet International Standards as Public Goods

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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Abstract

As the world becomes increasingly globalized, the role of national borders is changing and the governance of markets can no longer be seen as a local matter. This paper looks at one aspect of market governance, the provision of standards and the capacity to deal with standards for the global market, with particular reference to sanitary and phytosanitary (SPS) measures, which deal with food safety, animal health and plant protection. Standards are part of the architecture within which markets operate. On the face of it, they are quintessentially “public goods”. According to economic theory, they may be undersupplied, especially if the costs of provision are borne in one market and some of the benefits fall elsewhere. This paper seeks to analyse the role played by standards and standards-related activities both in the world economy and in the process of economic development.

Although there is a strong public-goods aspect related to standards definition and compliance, there is also an element that is supplied through the market. The paper tries to analyse whether the balance between the public and private aspects of standards is likely to be correct, and where the scope for public-goods provision at an international level might be most in need of development. Based on some concrete case studies, the paper focuses on capacity-building-related activities and analyses the supply of and demand for capacity building based on proxies developed specifically for this study. The paper also gives a preliminary measure of the shortfall in developing countries’ capacity to cope with developed country SPS measures, which might affect their sales. The paper uses a variety of indicators as proxies of “demand” for the public good of standards assistance. The “supply” of public goods provisions and related technical assistance programmes is proxied by the funds recorded by the online database of the Standards and Trade Development Facility (STDF), which assists developing countries in complying with SPS and related issues.

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1 ■ Introduction

As the world becomes increasingly globalized, the role of national borders is changing and the governance of markets can no longer be seen as a local matter. This paper looks at one aspect of market governance, the provision of standards and the capacity to deal with standards for the global market, with particular reference to sanitary and phytosanitary (SPS) measures, which deal with food safety, animal health and plant protection. Standards are part of the architecture within which markets operate. On the face of it, they are quintessentially “public goods”. According to economic theory, they may be undersupplied, especially if the costs of provision are borne in one market and some of the benefits fall elsewhere. This paper seeks to analyse the role played by standards and standards-related activities both in the world economy and in the process of economic development.

Although there is a strong public-goods aspect related to standards definition and compliance, there is also an element that is supplied through the market. This paper tries to analyse whether the balance between the public and private aspects of standards is likely to be correct, and where the scope for public-goods provision at an international level might be most in need of development. As Kaul et al. (2003) observed, the boundary between public and private goods has shifted over time. Having looked at some concrete case studies, this paper focuses on capacity-building-related activities and analyses the supply of and demand for them based on proxies developed specifically for this study. In an extended annex, it attempts a preliminary measure of the shortfall in developing countries’ capacity to cope with developed-country SPS measures, which might affect these countries’ sales. The annex uses a variety of indicators as proxies of “demand” for the public good of standards assistance. The “supply” of public-goods provisions and related technical assistance programmes is proxied by the funds recorded by the online database of the Standards and Trade Development Facility (STDF), which assists developing countries in complying with SPS and related issues.

Advanced logistics and transportation systems allow more efficient movement of raw materials, intermediate and finished goods within and between countries, thus facilitating trade. Also, the outcome of the various GATT (General Agreement on Tariffs and Trade) and WTO (World Trade Organization) negotiating rounds has substantially decreased the weight of tariffs charged at the border. Governments, as well as

non-governmental bodies, have responded to growing globalization by introducing rules that regulate the movement of goods and services at borders and their consumption and use within borders, but the cross-border nature of economic activity means that public interventions can no longer have a purely national perspective.¹ Such rules can take the form of standards or regulations: for convenience, the term “standards” is used to cover them both even though this is not strictly accurate.² The growing importance of standards and regulations is also related to increased consumer demand for various quality standards, as public goods that reduce the costs of screening and guarantee a certain quality.³ The demand for standards is a result of positive rising income and increasing demand is likely as long as countries become richer. Standards play an important role in assessing a product or service in terms of technical and physical characteristics, and in terms of the conditions under which it has been produced or delivered, as they are used as “external points of reference” (Hawkins, 1995: p. 1). The pervasiveness of these measures is such that the OECD has estimated that up to 80 per cent of all world trade is affected by standards and regulations of some kind (Hufbauer et al., 2002).

The role of standards

Nadvi and Wältring (2004: pp. 52-55) sought to classify the role of standards as follows:

- Firstly, by providing a set of common rules and increasing the efficiency of information exchange (i.e. reducing transaction costs, minimizing market failures due to asymmetric information), standards promote economic efficiency and international trade;
- Secondly, standards underline the importance attached to the social and ecological dimensions of international trade. Today, standards include not only the technical specification of products and/or related production processes but also environmental concerns, human rights and social and ethical values. Importantly, this leads to a debate between those (especially from developing countries) who view this as a possible way of using standards as a trade barrier, and those (from developed countries) who argue that the use of stringent standards helps to avert a “race to the bottom”;
- Thirdly, standards provide a basis from which markets can be differentiated and competitive niches created. By using or implementing particular standards, producers and exporters could gain a competitive position;
- Fourthly, standards create new forms of governance at both local and global levels. For instance, the growing influence of global standards in global markets is likely to weaken national standards. In addition, global standards are increasingly being established by private and public-private initiatives, and could be influenced by conflicts of interest.

¹Some authors have argued that even if the use of standards and regulations had not increased, the simple expansion of globalization was likely to have had a “magnification effect”. They argue that increased globalization increases the importance of remaining barriers, and the highly integrated and globalized world has a low tolerance for “system frictions” (Trebilcock and Howse, 2001).

²According to the WTO Technical Barriers to Trade agreement: “The difference between a standard and a technical regulation lies in compliance. While conformity with standards is voluntary, technical regulations are by nature mandatory.”

³Increasingly, standards tend not only to address issues related to consumer safety, animal health, plant protection but also social and environmental issues in producing countries.

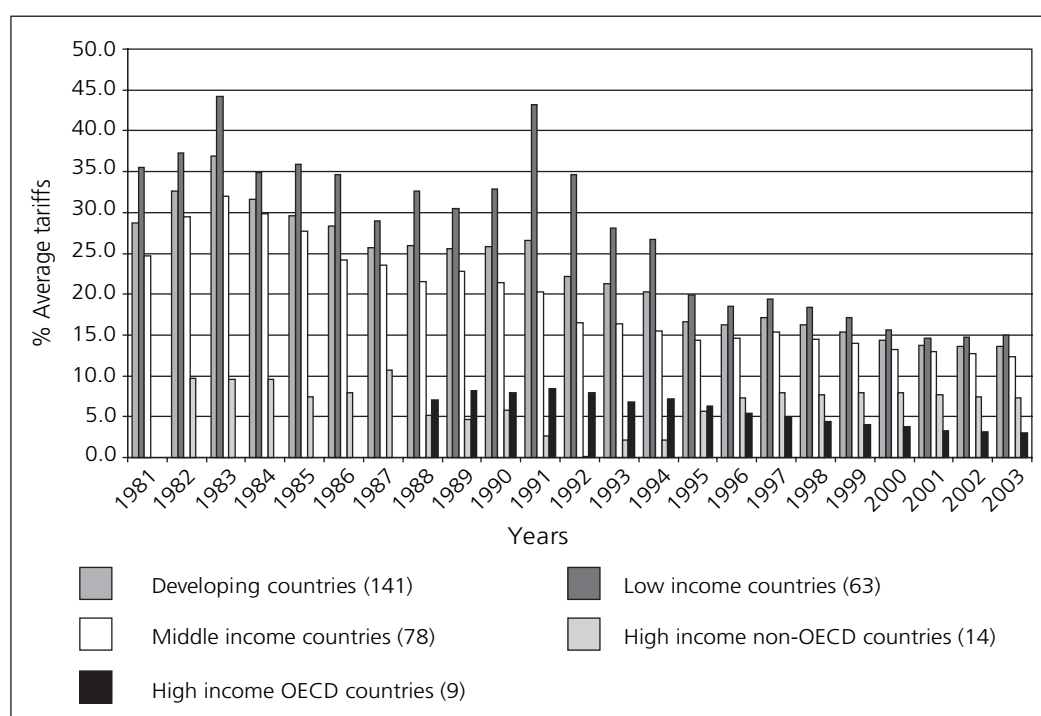
As the role of standards is large in both scope and scale, the growing importance of standards and technical regulations affecting international trade is of interest not only to producers and exporters, but also to governments, consumers and interested parties (e.g. NGOs).

Historical aspects of standards and regulations in international trade

In the 1970s, the topic of technical barriers to trade (TBT) assumed greater visibility when it was included in the General Agreement on Tariffs and Trade (GATT). Since then, there have been several attempts to create rules and principles that prevent the creation of technical barriers—whether deliberate or involuntary. One example is the principle of transparency, according to which member countries are required to inform other members of forthcoming changes in standards and technical regulations and associated conformity-assessment procedures, thus giving interested and affected parties the opportunity to comment on, or identify any particular concerns relating to, the changes.

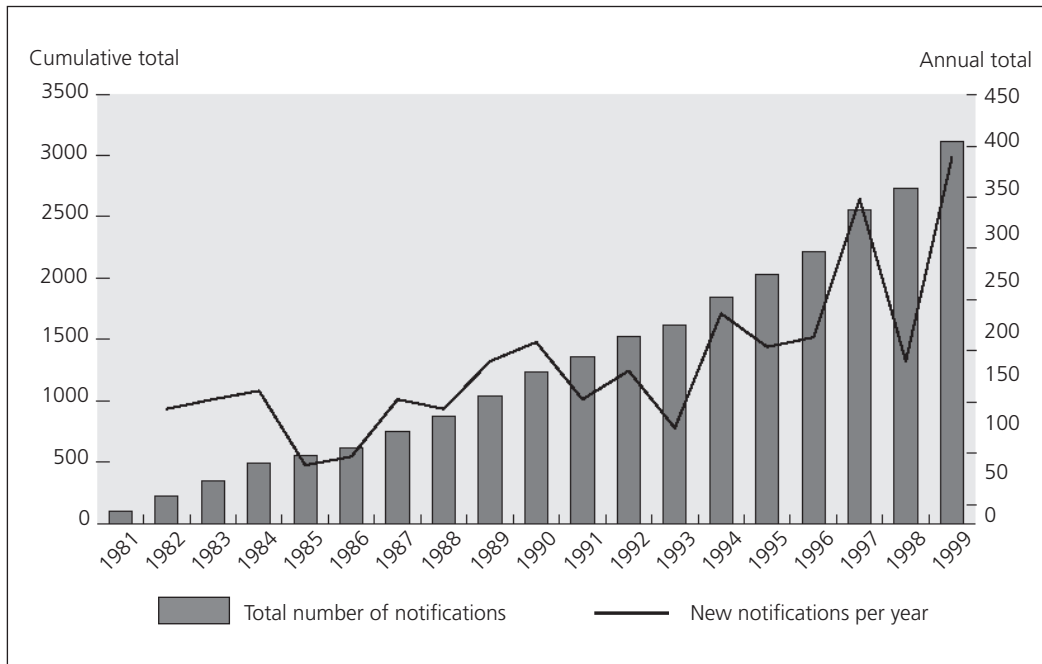
As trade liberalization increased between 1979 and 1995, it eliminated many traditional tariff barriers. However, slower progress by developing countries, especially in the agricultural sector, meant that the process was uneven.

Figure 1. Unweighted average tariffs by country groups



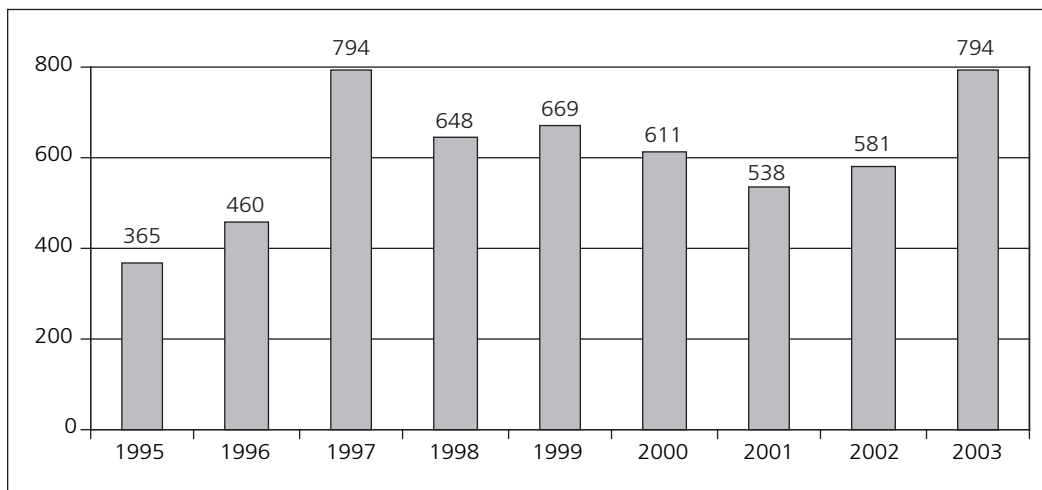
Source: WTO.

However, with the progressive reduction in tariff levels, the focus of debate has moved to non-tariff protection (see figures 1 and 2), and there are fears in some sectors that, as this trend continues, non-tariff barriers, in particular technical regulations, may be applied as trade protection mechanisms. More advanced countries (see figure 2) are more likely to impose technical barriers (Menezes and Antunes, 2005).

Figure 2. Notifications of technical measures to GATT-WTO, 1981-1999

Source: IMF and OECD.

These concerns led GATT negotiators to conclude the Standards Code during the Tokyo Round (1973-1979). This was succeeded in 1994 by the Uruguay Round Technical Barriers to Trade Agreement (TBT Agreement) and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The TBT Agreement is concerned with the use of standards and technical regulations in general, whereas the SPS Agreement governs the application of food safety and animal and plant health regulations.

Figure 3. Number of TBT notified measures

Source: WTO Secretariat.

Box 1. Standards, regulations and the WTO

Before the Tokyo Round, the measures enacted to protect human, animal and plant health were covered only by Articles III and XX of GATT. Within the WTO there is a rule of National Treatment banning de facto discrimination between “like products” (Article III), although here the burden of proof falls more heavily on the accuser (Article XX).

Article III of GATT 1947 states that::

1. “The contracting parties recognize that internal taxes and other internal charges, and laws, regulations and requirements affecting the internal sale, offering for sale, purchase, transportation, distribution or use of products, and internal quantitative regulations requiring the mixture, processing or use of products in specified amounts or proportions, should not be applied to imported or domestic products so as to afford protection to domestic production.”

2. “The products of the territory of any contracting party imported into the territory of any other contracting party shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products. Moreover, no contracting party shall otherwise apply internal taxes or other internal charges to imported or domestic products in a manner contrary to the principles set forth in paragraph 1.”

There is an exception clause in article XX, which tolerates the possibility of discrimination in certain circumstances but these are outlined in very general terms, and “no less distortive measure” should be available to achieve the desired end. The jurisprudence of the dispute settlement body has established that even the absence of de jure discrimination is not enough to ensure de facto national treatment.

This problem led to the creation of the Uruguay Round agreements on Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) measures. These agreements enjoined WTO members to base their own technical regulations on international standards whenever their regulatory aims could be achieved. They allowed countries to set different mandatory standards when their national objectives could not be reached by international standards, but allowed importers who might be excluded as a result to challenge standards that differed arbitrarily from those associated with international standards.

Source: Based on Ghoneim, Holmes and Iacovone (forthcoming; Iacovone, 2005).

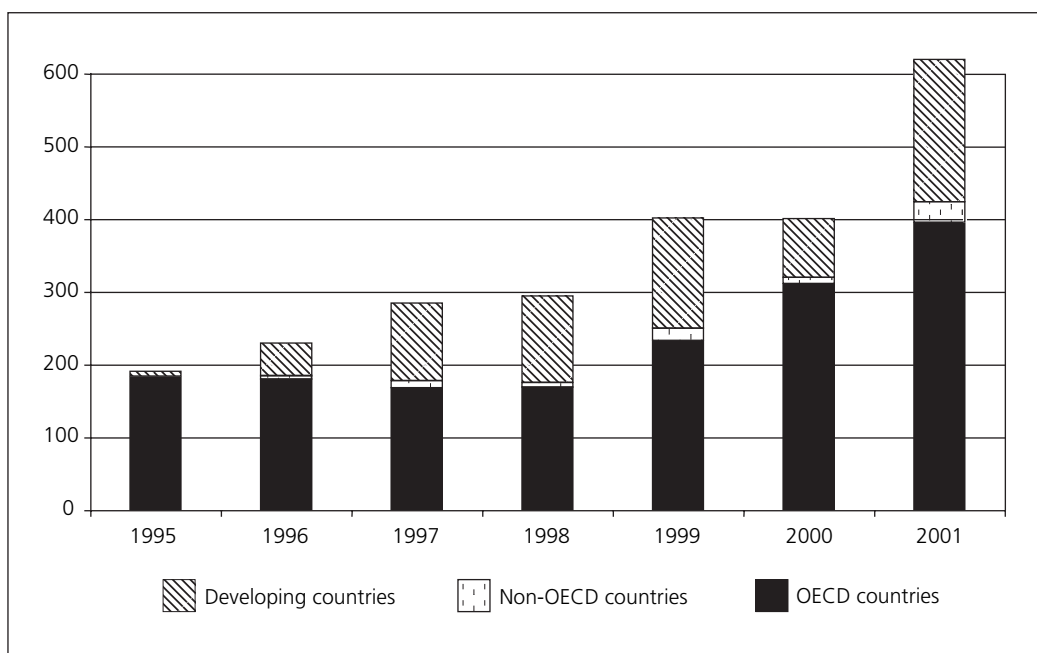
In pursuing transparency procedures, both the TBT and SPS Agreements mandate member countries to establish national enquiry centres, which can be consulted by interested public and trading partners. They must notify the WTO Secretariat of a proposed new regulation (or the modification of an existing one), which will then circulate it to other member countries (WTO, 1998). Although the TBT and SPS Agreements have some common elements, including transparency requirements and basic obligations for non-discrimination, there are differences. In particular, under the SPS Agreement the only justification for not using internationally recognized standards (e.g. Codex Alimentarius standards) for food safety are scientific arguments resulting from an assessment of the potential health risks. In contrast, under the TBT Agreement, member

countries may decide that international standards are not appropriate for other reasons, including fundamental technological problems or geographical factors (WTO, 1998).

Quantitative and qualitative importance of SPS standards and regulations

Several indicators show the increasing proliferation of standards and regulations. Firstly, since 1995, the number of notified new or amended regulations and measures submitted to the WTO Secretariat has increased both continuously and progressively. For instance, more than 2,400 changes in SPS measures were notified in the period 1995-2001, of which more than 600 were issued in 2001, three times more than were made in 1995 (OECD, 2002).⁴ And more than two-thirds of all notifications were submitted by OECD countries (OECD, 2002). This trend is shown in figure 4.

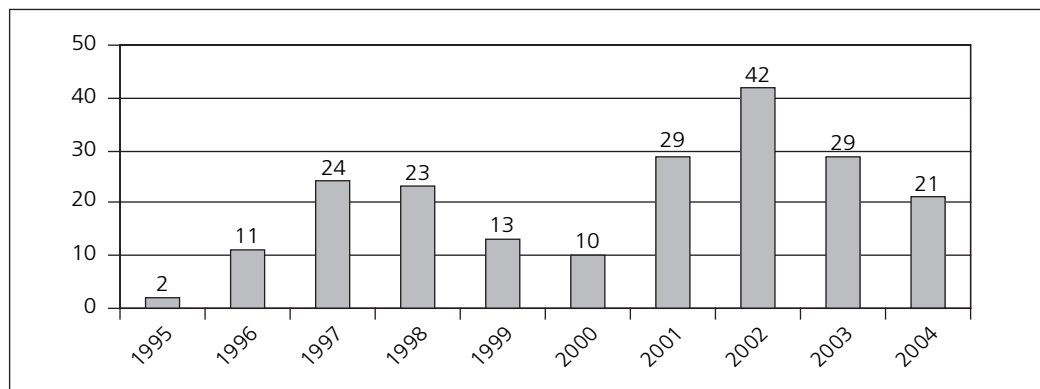
Figure 4. Number of notified SPS measures, 1995-2001



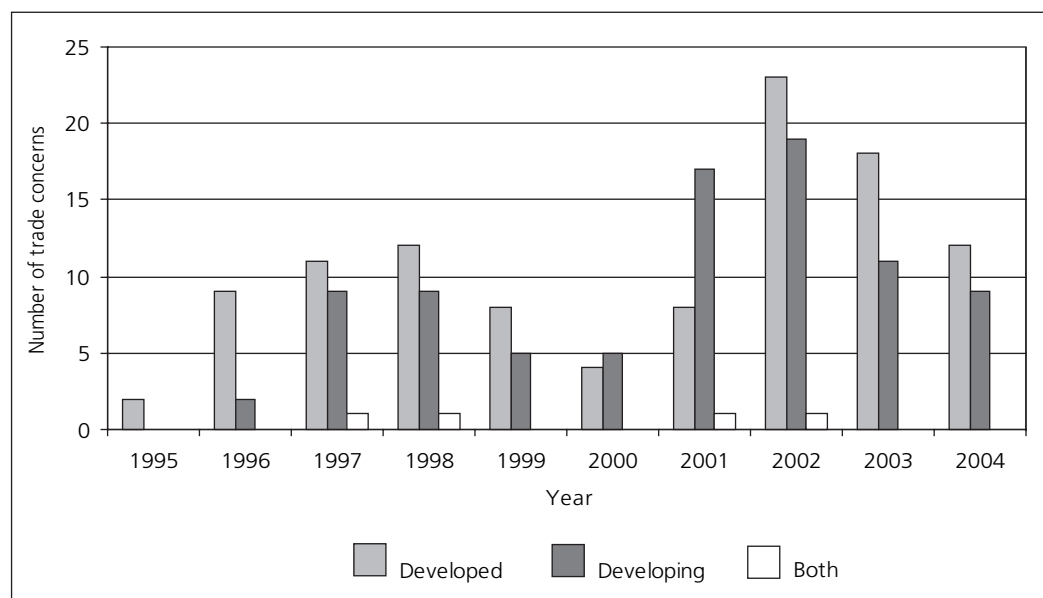
Note: Corrections, revisions, and addenda to previous notifications of SPS measures are not included.
Source: OECD Secretariat based on WTO information (documents G/SPS/N).

SPS measures are increasingly seen as potential problems. Countries have been raising this with the WTO, where issues can be aired and discussed at the SPS Committee, without having to go directly to the more formal and expensive “dispute settlement mechanism”. This trend is highlighted in figures 5 and 6.

⁴This number does not take into account more than 300 corrections, revisions and addenda to previous notifications.

Figure 5. Trade concerns raised during SPS Committee Meetings

Source: WTO.

Figure 6. Trade concerns raised during SPS Committee Meetings

Source: WTO.

Box 2. What are trade concerns?

Both the TBT and SPS Agreements established committees that meet periodically (normally quarterly) and discuss issues related to the implementation of the Agreements. At these meetings, the representatives of the various members can raise specific trade concerns relating to the lack of proper implementation by another member. This forum enables concerns to be aired in a multilateral setting (i.e. normally this public discussion is preceded by bilateral talks) without the need to go through the dispute-settlement mechanism. The country named by the complainant has to explain its actions to the Committee. Minutes are taken of the meetings.

In this sense, trade concerns, sometimes referred to as "cross notifications", enable the level of concerns about TBT measures to be gauged, and some specific measures which emerge as "problematic" to be identified.

Secondly, there is a quite substantial body of research about the actual or potential trade losses arising from SPS standards and regulations.⁵ The research has covered a broad spectrum, including: fish exports from Kenya to the European Union (EU) (Henson, Brouder and Mitullah, 2000); fruit and nut exports from African countries to the EU (Otsuki et al., 2001); shrimp exports from Bangladesh to the EU (Cato and Santos, 1998); and horticulture exports from Guatemala to the United States of America (Julian et al., 2000). Case studies by the United Nations Conference on Trade and Development (UNCTAD), the United Nations Environment Programme (UNEP) and the World Bank have provided further evidence about the possibility of trade losses. Such studies have, in effect, indicated that considerable trade-loss costs might be incurred if no response is made.

Thirdly, in qualitative terms, policymakers in both the public and private sectors, producers and exporters, academics and researchers as well as consumers and interested communities are showing growing interest in standards and regulations as their impact on trade and economic development becomes more evident. The decline of traditional trade barriers (e.g. tariffs and quotas) has increased awareness of standards and regulations, which could be used as non-tariff barriers. On the one hand, natural heterogeneity of economic and historical circumstances, e.g., the BSE (Bovine Spongiform Encephalopathy) crisis in Europe, as well as differences in consumer and communities' interests could result in different standards and regulations.⁶ This makes it difficult in some circumstances to differentiate between protectionist standards and regulations and those aimed at protecting public health and serving local interests.⁷ Vested interests may inherently take part in the process of standard setting and may even "capture" the regulatory process.⁸ On the other hand, although related, advances in analytical methods or improvements in the capability to detect substances with low levels of residues have allowed previously non-detectable residues to become detectable and reportable. This may result in standards and regulations being increasingly established at the level of testing capacity, especially for chemical residues whose allowable maximum residues level (MRL) cannot be established.⁹ The implication is that exporters need to buy sophisticated, up-to-date and expensive machines for testing their products and ensuring that they will be allowed to enter the markets.

Differences in standards can cause problems

Furthermore, differences in standards across countries, as well as differences in testing, certification and conformity-assessment procedures, can be a burden for exporters,

⁵However, the value of estimated or potential trade losses is questioned by some commentators (e.g. Jaffee and Henson (2004)), who believe that they are overestimated.

⁶There are at least two substantial sources of heterogeneity that suggest that it would be irrational to argue for a complete harmonization of standards at a global level. They are differences in risk factors and differences in degree of uncertainty or ambiguity about risk factors (Antle, 1999).

⁷Interest group theory suggests that the regulations chosen can be considered as the products of relationships between different societal groups and between such groups and the state (Baldwin and Cave, 1999).

⁸Capture happens when relationships between the regulators and the regulated become too close and leads to the pursuit of the regulated enterprises' interests rather than those of the public at large (Baldwin and Cave, 1999).

⁹Known as level of detection (LOD).

particularly from developing countries. Clearly, producing goods to two types of specification in order to meet two market standards and regulations is more expensive than producing one product which can be sold in both markets. This becomes even more costly and complex when the conformity-assessment procedures have to meet those of the importing country.¹⁰

Not only did the number of trade concerns raised during the SPS Committee Meetings increase between 1995 and 2004 (figure 6) but also the evidence from developing countries showed the impact of standards and regulations on their exports. For example, a recent study (Nidhiprabha et al., 2005) argues that Thailand has been severely affected by strict EU regulations, which were introduced in 2002, on antibiotic residues in imports of shrimps from Thailand and other Asian countries. Imports of fruit, vegetable and seafood products from Egypt and Morocco also appear to have been affected by EU SPS measures.¹¹

In short, the spread of standards and regulations across countries and their impact on international trade has become increasingly significant.

¹⁰This usually happens when markets do not trust the certificate issued by the foreign testing agency.

¹¹See Ghoneim, Holmes and Iacovone (2004).

2. Standards and regulations: threats or opportunities?

Standards and regulations can be seen as trade barriers. Supporters of this view suggest that standards and regulations are established and abused for the intention of protecting domestic markets from imports (Athukorala and Jayasuriya, 2003). The costs of compliance with those standards and associated conformity-assessment procedures are exorbitant and unrealistic for both producers and exporters, especially in developing countries. Even when standards (e.g. SPS standards) are imposed on health and safety requirements, they can still impede trade because of additional compliance costs. In fact, even non-discriminatory measures can be discriminatory when set at a level which foreign producers cannot profitably meet, allowing domestic producers to monopolize the domestic market (Mattoo, 2001). As a result, it seems that developing countries do not necessarily benefit from trade liberalization. Not only may they not be able to enter new markets, they may also have difficulty in maintaining their existing ones (Wilson, 2002; Unnevehr, 2003).

On the other hand, standards and regulations are seen as “trade facilitators”. Recently, this view has been gaining ground as some empirical evidence suggests there is potential for “upgrading” and “integrating” producers and exporters in developing countries in global value chains (GVCs). Standards and regulations are designed and set in order to support market development and facilitate transactions. By establishing a clear set of rules and requirements, firms can reduce the risks associated with R&D activities. The standardization allows firms to reduce “market uncertainty” by setting clear and common requirements. In addition, the adoption of standards and regulations can expedite the diffusion of technical knowledge codified in the specific process or product specifications.¹² For instance, individual firms may have the incentive to upgrade their products and processes, with a consequent impact on productivity (Hufbauer et al, 2002).

A study by the OECD highlights the balance of these two views. It states:

Although often viewed predominantly from a domestic perspective, food safety and biosecurity regulations can have significant trans-boundary implications. Technical regulations, rules and procedures can facilitate and enhance trade, if they reduce

¹²This paper assumes that by facilitating the diffusion of knowledge and turning tacit knowledge into a codified set of standards, these facilitate the process of upgrading. Obviously, the process of upgrading and innovation dynamics is subject to a number of other constraints and incentives which are not limited to the availability of standards (e.g. the availability of finance to invest in technological upgrading).

the risk for consumers that they might purchase unsafe food and thereby increase confidence in imported products. On the other hand, such regulations can become barriers to trade, in particular if they place demands on importers that are more costly to meet than the requirements applied to domestic producers. For example, many developing country exporters encounter difficulties entering the food markets of OECD countries not necessarily because of insufficiently safe products but often due to the lack of monitoring, testing, and certification infrastructure that would make it possible for them to demonstrate compliance with existing import requirements (OECD, 2002: p. 6).

More recently, Jaffee and Henson (2004) provided empirical evidence suggesting a less-pessimistic view than that presented in previous work on the impact of SPS-related standards and regulations on international trade (e.g. Otsuki et al., 2001). In essence, Jaffee and Henson say that rising standards serve to accentuate underlying supply-chain strengths and weaknesses and thereby affect the competitive positions of countries and certain market participants (p. 37). Furthermore, they note that a few developing countries have managed to gain access to high-value markets in industrialized countries despite the existence of exacting standards. This suggests that it cannot be definitively concluded that standards and regulations are either “barriers” or “facilitators”. In fact, they may be somewhere in between, depending on a country’s capacity to meet them. It is thus more important to consider the effects of SPS-related standards in the context of wider capacity constraints and underlying supply-chain trends and issues (*ibid*, p. 37).

The role of government

In many cases, especially in developing countries, public intervention is necessary for the provision of technical assistance to producers and exporters since typically markets operate imperfectly in areas concerned with the diffusion and application of new technology, and this is even more so when small firms are involved. Also, there are often requirements to prove compliance to ensure that such standards are met and, at least initially, this is likely to be provided most effectively by public organizations. Governments should therefore play an active role in supporting efforts by businesses to comply with standards and associated conformity requirements.

Governments may also have a role to play in facilitating collective action among stakeholders in addressing SPS standards. Collaboration between industries, governments, and universities and research organizations is needed to obtain “collective efficiency” and upgrading (Humphrey and Schmitz, 2000, 2002). Moreover, public intervention through improvement and enforcement of local SPS-related standards could lead domestic producers to improve their product quality and production methods. In the long run, this could make producers more aware of changing standards and regulations, and therefore more proactive.

Nevertheless, despite their own efforts to strengthen SPS-related capacity, developing countries still need technical assistance from industrialized countries and other donor organizations to expedite technological and organizational upgrading.

3. Theoretical framework: standards; regulations; trade-led productivity growth?

A challenge and an opportunity

The ability to meet high standards allows some developing-country exporters to become part of integrated global value chains (GVCs) that divide processes traditionally undertaken in one production unit and allow them to be relocated anywhere in the world. The ability to take part in this disintegration and reallocation of the production chain depends on a guaranteed quality of output, which is compatible with the buyer's requirements. A recent WTO report (2005: p. 69), citing Jaffee and Henson (2004), recognizes the potential importance of this. Alternatively, an inability to meet standards may make entry into a market impossible at any price. This was highlighted in the case of the EU requirement that producers make provisions for the eventual recycling of electrical and electronic goods (UNCTAD, 2005).

International trade is increasingly based on quality and technology rather than price. Technical standards and quality norms are imposing requirements for market access that create threshold effects. For a growing number of commodities, public and private standards (in the broad sense) are creating a situation in which the idea of a trade-off between price and quality only applies once certain minimum standards have been met. For example, peanut butter cannot be sold in the EU at any price if it does not meet EU aflatoxin standards. More generally, commoditized markets allow no rent to be earned unless a specific niche can be created (e.g. organic products which command a premium). This means that in such markets there is no positive price at which certain low-quality items below the threshold can be sold. Such a concept goes against the orthodox precepts of neo-classical economics, but is immediately intelligible when uncertainty and transaction costs are taken into account. In a world of perfect information and no transaction costs, standards would be unnecessary. Buyers would be able to assess the quality of goods and services without cost, and evaluate and predict the price of lower quality. In real life, consumers do not know the consequences of certain health or breakdown risks and are willing to pay a premium for standardized commodities. Of course, externalities and increasing returns to scale from common standards may make the marginal cost of standardization negative.

Different approaches

It is possible to identify what might be termed “Smithian” as opposed to “Ricardian” trade models. In the Ricardian trade model, commodities are homogenous, or the quality is instantly recognizable and differs only in a non-stochastic, quantitative way, such as in the content percentage of a certain material. In this model, no supplier can ever command a quality premium and comparative advantage is based on the cost of inputs and cost efficiency alone.

In the Smithian model, the assumption is that there are great economies of scale and the benefits of specialization come from specializing in one part of the process chain, e.g., making individual components in different workshops. But as the processes are separated, and the output of one process becomes the input to another, some sort of coordination mechanism between suppliers and users/consumers is called for. Extensive literature (including Williamson, 1975) has argued that the consequent increase in transaction costs was overcome by “internalizing” them through vertical integration or through reinforced and cross-ownership structures with a consequent expansion of intra-firm “trade”. Williamson argued that even between firms in the same town, the problems of monitoring quality were likely to be so great that only hierarchical control of production processes could ensure quality. According to Williamson the “factory system” arose not from technological economies of scale but from the need for monitoring of quality. For example, if a clothing manufacturer could only see the outside of bales of cloth he would not know what they were like throughout: he would therefore prefer to have control over the workplace where they were made. External producers were marginalized. Dunning used the Williamson model in his Ownership, Location, Internalization (OLI)¹³ framework to explain why multinational firms rather than international contracting and subcontracting became the predominant mode of business.¹⁴

Best (1990) took a different approach, arguing that the US economy was transformed in the nineteenth century by the insistence of the army that all parts and components of rifles and other equipment should be interchangeable. The result was that firms and workshops could specialize in very fine lines of activity and gain economies of scale and learning effects. A viable standards system is a way to reduce the transaction costs arising from unreliable and potentially incompatible components. However, standards without guarantee of quality are not adequate. The entire “outsourcing” movement is based on the need to find ways round the Williamson monitoring problem.

The need for quality assurance

The Japanese car industry has often been seen as a model in two respects, the striving for zero defects and the extensive use of external supply chains. Enthusiasts

¹³See Gray (2003).

¹⁴For a firm to invest abroad it must possess a specific ownership-related advantage. The foreign location must be advantageous and there must be a reason why internalizing a foreign operation is more efficient than licensing or subcontracting.

for the “Toyota model”—originally based on the quality-assurance ideas of the United States engineer Deming—showed that there is no trade-off between physical productivity and production quality. High productivity is best achieved by ensuring that all output coming off the production line can be sold without further modification.

John Sutton’s work has vividly illustrated the role of quality standards. In an investigation of how the Indian and Chinese car-component industries developed, he shows that firms which have become successful subcontractors have done so by reducing the rejection rates of faulty products to levels comparable with those of the United States, EU or Japanese suppliers. Those which failed to do so have not been able to enter the value chains. The reason why it is necessary to use sophisticated quality-assurance processes rather than simply relying on monitoring output quality is that defects in the intermediate output may not be easily visible. One defective component could damage an entire production line. Similar considerations apply to consumer goods, especially food products, which are increasingly bought and sold in a similar way to intermediate industrial products, i.e., supermarkets are imposing tight quality standards and treating the products as inputs into a production process.

Two types of intra-industry trade

“Horizontal Smithian trade” and “vertical Smithian trade” are two well-known types of intra-industry trade. In the first, producers market a finished product that fits into a highly differentiated niche where reputation, brand and quality allow a price premium that cannot be eroded by new entry. In this type of trade, standards work as “amplifiers” and “catalysts” by allowing the creation of recognizable brands and types, developing new niches that consumers can identify without incurring screening and search costs. Consider, for example, the expansion of the organic market and related standards or the fair-trade market.

The second type of vertical intra-industry trade is where the value chain is broken up. In Adam Smith’s example, different parts of the pin-production process are located around the world. For this to happen, a mechanism is needed for contracts between upstream and downstream producers to be carefully and reliably monitored and enforced. This depends on producers’ capacity to guarantee quality, which depends both on the market and on national and global public and private provision of standards facilities. In such markets, low wages cannot offer an alternative to compliance (Jaffee and Henson, 2004).

The role of standards

Table 1 summarizes the role of standards in intra-industry trade. Both types of “intra-industry trade” allow producers to specialize in a particular product or process for which a premium price can be extracted and specific expertise gained. A distinction is made between traditional, so-called Ricardian gains, and two types of intra-industry Smithian gains. The second row of the table identifies the different products that are traded, and

reflects the assumptions of the different theoretical models used to analyse these different types of trade. Traditional trade models assume homogenous goods, leaving no scope for intra-industry trade. More advanced models assume heterogeneous goods. Horizontal intra-industry trade tends to be in final goods, which are differentiated by brands or quality attributes, including “food niche products” and some special high-added-value horticultural products. Examples of vertical intra-industry trade are intermediate goods and outsourcing.

Even if most trade models focus on countries as their unit of analysis, in reality it is firms which trade, not countries.¹⁵ Therefore, it is important to identify the types of firms involved in these different types of trade. Ricardian trade can, in theory, involve any firm. However, the traditional trade models are characterized by two important assumptions: perfect competition and no economies of scale, either internal or external. The firms involved in horizontal intra-industry trade are not necessarily internationally integrated while those involved in vertical intra-industry trade will normally be linked to foreign firms through long-term affiliations or because they are part of a GVC (Humphrey and Schmitz, 2000). These firms are characterized by economies of scale and learning processes which bring increasing returns and the possibility of specialization.

The fourth row of table 1 focuses on relevant policy instruments. When considering Ricardian trade, the focus is typically on tariffs and tariff-like barriers (e.g. quotas), which can include standards and regulations inasmuch as they act as a tariff and therefore their tariff equivalent can be calculated. But for intra-industry trade, the relevant policy instruments are standards, regulations, testing and conformity assessment. Due to their differentiated nature, it is important to be able to assess their particular characteristics. In some cases, these are information-diffusion devices imposed in a production chain, as in the case of GVCs.

It is necessary to consider what externalities and market failures are associated with these kinds of trade. This is important to link the concept of Smithian trade gains to the relationships between standards and public goods. When considering traditional trade gains and Ricardian trade, it is often assumed that there are no market failures or externalities. When considering the Smithian type of trade, these are much more diffused. In particular, horizontal intra-industry trade is clearly affected by:

- Information externalities (e.g. if one potato is affected by brown rot all the shipment is destroyed);
- Reputation mechanisms (e.g. the value of a brand is given by the collective effort of maintaining constant quality), where one bad batch and a reputation can be destroyed forever as was illustrated by the case of Guatemalan raspberries);¹⁶
- Learning effects (e.g. farmers can learn from a neighbour how to deal with certain pests) and so on.

¹⁵A number of recent theoretical models have shifted their attention from countries to firms (cf. Melitz, 2003; Melitz, Helpman and Yeaple, 2004).

¹⁶For details of this case, see ‘Innovation in Technical Assistance’, Submission from the Inter-American Institute For Cooperation On Agriculture (IICA) WTO Paper G/SPS/GEN/255, 25 June 2001. [http:// www.ipfsaph.org/servlet/BinaryDownloaderServlet?filename=kopool_data/WTOSPSDOC_0/en_gen255.doc](http://www.ipfsaph.org/servlet/BinaryDownloaderServlet?filename=kopool_data/WTOSPSDOC_0/en_gen255.doc)

Table 1. Summary of standards in intra-industry trade

	<i>Traditional trade gains and losses from wrong trade policies</i>	<i>Smithian productivity-enhancing gains from trade</i>	
		<i>Horizontal intra-industry trade</i>	<i>Vertical intra-industry trade</i>
Driving forces (economic determinants)	Comparative advantage: factor endowments, income, factor costs	Productivity gains driven by product innovation and specialization (including advertisement)	Productivity gains driven by process innovation and thinner division of labour (slicing-up production chain, e.g., Mexico-United States)
Type of product affected	Homogeneous (either final or intermediate)	Mostly final, differentiated by variety and by quality Includes more agricultural niche products. (process of “de-commodification” of commodities)	Trade growth is in intermediate goods—may be homogenous/interchangeable but quality needs monitoring and differentiation along production chain; mostly industrial but not only Services outsourcing
Type of firms involved in this type of trade	Any firm	May be internationally integrated or subcontracting	More likely to be integrated; long-term affiliation or subcontracting likely
Relevant policy instruments	Tariffs Quantitative Restrictions etc. Any standards, regulations that are purely tariff-equivalents (especially time consuming controls done at port of import)	Standards, regulations, conformity assessment Monitoring can be done on import but potentially very costly	Standards mostly Monitoring must be done along the whole production chain
Market failures/ externalities associated with this type of trade	Any	Reputation, health, learning effects,	Lack of quality-assurance systems, standardization, general issues of business environment
Action needed to remove barriers: public vs. private	Public policy measures need to be addressed	More scope for public intervention (especially in the case of market failures: e.g. health issues that individual consumers cannot detect—these interests may require public intervention, i.e., driven by public welfare); NB avoid raising rivals’ costs standards	Much scope for intra-firm resolution and private coordination; public policies needed for favourable environment;

Similarly, a number of spillovers also affect vertical intra-industry trade, in particular the establishment of quality-assurance systems, the fixed costs involved in setting up a system of standardization and coordination among trading partners.

What lessons can be learned regarding necessary public policies and collective action from the distinction between the Ricardian and Smithian types of trade? When considering Ricardian trade, we are left with traditional public-policy measures involving

the elimination of barriers or the so-called “negative integration”, the main achievement of the various GATT rounds. When considering Smithian trade, a much wider and more complex set of policies needs to be taken into account. With horizontal intra-industry trade, the scope of public intervention is a consequence of the market failures and externalities described above. However, when dealing with vertical intra-industry trade, private-sector mechanisms of coordination tend to work well. Although there is scope for public policies to improve the business environment and “facilitate trade”, it can be argued that the government should not be involved in setting mechanisms for intra-firm coordination as it probably lacks the right information and possibly the right incentives.

Concrete examples

In order to complement the theoretical discussion of this section, some concrete examples are given where standards act as market integrators and foster the “Smithian gains” as important determinants of productivity growth:

- Consider a simple example of an industry standard, for example the introduction of a single standard for nuts and bolts. With such a standard, businesses making either nuts or bolts, or using them, can assume that everything will fit together. The case of screws was used by Best (1990) to illustrate the need to set standards in order to achieve market integration in the United States in the nineteenth century. Setting a standard for screws was a precondition for producing interchangeable rifle parts, made in unrelated workshops, and then assembled in another plant. Such standardization is an essential part of the process of achieving Smithian gains from regional and national segmentation of production processes, allowing vertical and horizontal specialization;¹⁷
- The role of private versus government intervention is illustrated by the case of the government of Taiwan Province of China intervening to upgrade standards for export promotion. Exporters were predominantly small firms. Government coordination enabled them to internalize externalities such as the need for consistent quality for reputational purposes. In contrast, the government of the Republic of Korea did not need to intervene to upgrade standards for export promotion as the exporting firms were large enough to be able to internalize the externalities: they had reputations to uphold and created effective internal-supply networks.
- Achievement of phytosanitary standards in agriculture is crucial for entering export markets, and these standards often involve externalities. For example, Egypt expanded its exports of new potatoes to the EU at the end of the 1980s. Such potato exports had to meet EU standards for brown rot, which can infect potatoes in the ground. If a single Egyptian farmer ignores EU rules and a consignment of potatoes is contaminated, the entire Egyptian potato crop may be banned from export. The potato industry and the Egyptian government have a great incentive to

¹⁷These kinds of Smithian gains have long been appreciated, but the link to regional integration and external effects is more recent (see Evans et al, 2005).

ensure that standards are met by all potato farmers. Government action was a necessary part of the process of establishing and enforcing standards.¹⁸ The new EU traceability regime is intended to assist compliance with these rules but is itself likely to be costly. This is dealt with in more detail later.

Potential problems and costs

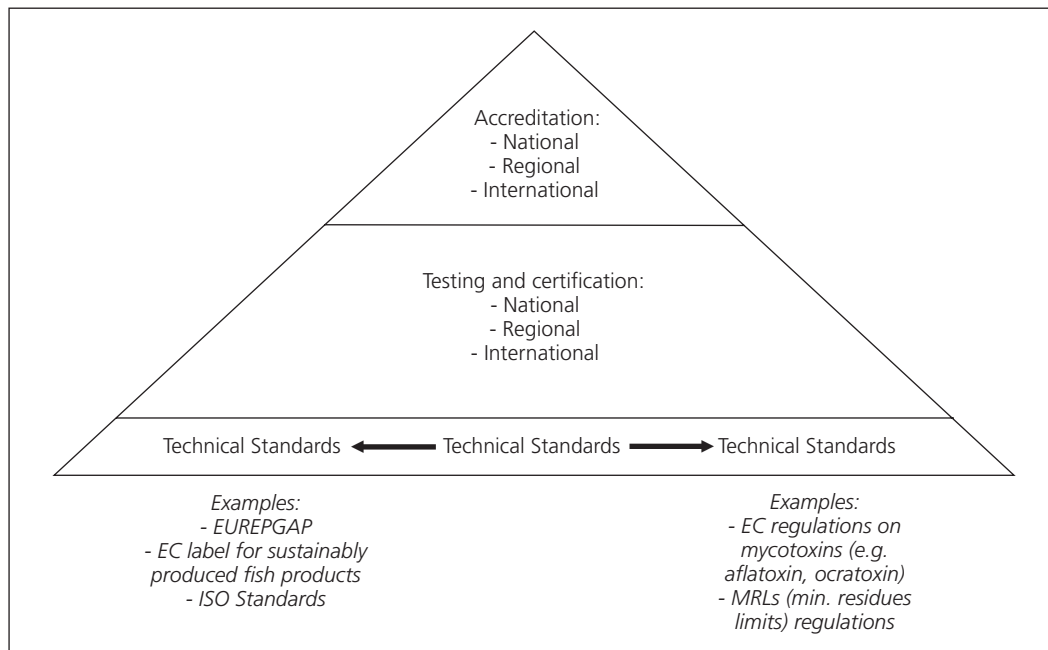
There are also potential problems and costs associated with setting standards. For example, EU requirements for upgrading water quality in Egypt under the EU-Egypt free-trade agreement may involve setting environmental standards in Egypt, unrelated to trade, that are more stringent than Egyptian taxpayers feel are necessary or desirable. This means that there are instances where instead of generating positive externalities, the impact of inappropriate standards application is a negative spillover. A similar example could be the introduction of domestic quality standards on the same lines of export standards, where the price of food products is increased but consumers are unwilling to pay for “extra quality” because of their income level (i.e. a situation possible in developing or least-developed countries).

¹⁸See Ghoneim et al., (2004).

4. Theoretical framework: standards, regulations and public goods

The term “standards” is sometimes used to cover a broader range of concepts. It is necessary to separate technical regulations, standards, conformity assessment through testing and certification, and accreditation. Technical standards are essentially voluntary (although there may sometimes be de facto compulsion to comply), but technical regulations have the force of law. Conformity assessment is the process whereby compliance with standards or regulations is verified, normally through appropriate testing and certification, and accreditation is the procedure whereby the quality of conformity assessment is judged. The term “norms” may be used to refer to the whole system.

Figure 7. The various levels of technical norms: standards, regulations, conformity assessment and accreditation



It is clear that there is a significant public-goods element in the standards and norms infrastructure. However, the distinction between public and private goods (and services) is complex and while much economic activity in the standards arena is undertaken by private profit-making organizations, this is likely to generate major externalities or

spillovers, at inter-firm, regional, national or international levels. This is likely to result in two questions: when the market is operating how can the spillover element be addressed and what is the correct level at which to do this? The sum of these components makes up the SPS infrastructure of a country and, as can be seen from figure 8, there are overlaps between domestic, regional and international SPS infrastructure.¹⁹

Private and public goods

Public goods are defined in the economic literature according to two characteristics (UNIDO, 2005):²⁰

- Non-rivalness: a good or service once provided can be made available to additional users at no additional cost. The marginal cost of allowing an additional viewer to watch TV once they have a set is zero as the signal strength is not reduced by extra viewers. On the other hand, access can be slowed down slightly by each extra user and by more if many new users join.
- Non-excludability: it is not possible to prevent additional users accessing the facility or “consuming” a good once it is created. The extreme, and perfect, example would be clean air or a national army.

Charging for public goods

Historically it has been argued that there will be under-provision of public goods because users cannot be charged. However, the market is increasingly finding ways of charging people for the use of things that were once regarded as public goods. Sometimes this is efficient as it both gives an incentive to create the facility and it discourages over-use, as in the case of road pricing. However, user charges can lead to underutilization of what is actually a non-rival resource. Increasingly, new technologies and legal regimes are being developed to ensure that charges can be made for public goods and analysts are developing arguments as to why public goods impose user costs and are therefore not really non-rival. Roads are a classic case. However, pay-per-view television poses an efficiency dilemma: once made the programmes can be watched by anyone at zero marginal cost, but if users cannot be charged the programmes cannot be made profitably.

The theoretical notion of a public good in either of the ways defined above is not a binary distinction when applied to real cases. There are likely to be externalities when standards-related activity is conducted through the market. Externalities occur when there is a spillover impact from one actor’s economic decisions to another, which is not mediated through the market and for which no price is charged or compensation paid. They represent a public good (or bad) element in a private transaction. Even

¹⁹In figure 7, there are only three layers as standards and regulations are together as they both lay down product or process specifications, while the other two layers deal with different aspects of compliance.

²⁰“Demand and Supply of Specific Public Goods for Economic Development: With a focus on market efficiency and integration”, UNIDO 2005, Part 2.

where there is a positive marginal cost of providing each extra good or service there may be a benefit to those who are not direct beneficiaries.

An example could be knowledge about compliance with a particular standard. If some producers invest in “researching” a convenient manner of complying with certain standards, their findings could spill over to producers that have not participated in the investment.

Geographical dimensions

The geographical dimension of public goods and spillovers is clearly very important. The creation of a standard in one country takes the form of codification of technological know-how and can be transferred to other countries at relatively low cost—although the cost of learning compliance and of conformity assessment (CA) must still be borne by individual users. It is increasingly the case that standards are set by international bodies and they are supplying public goods to their members across the world.

The EU single-market programme began with an exploration of the role of regional standards but it seems to have moved more towards fostering EU interests in international standards. Developing countries do not have an interest in creating their own national or regional standards, but to the extent that standards infrastructure relates to absorptive capacity and has economies of scale there may be room for regional agencies and laboratories.

Technical regulations

Technical regulations can act both as useful devices to regulate the economy and as barriers to trade—often at the same time. They make certain technical or performance specifications compulsory, although it has not always been the case that regulations take the form of requiring conformity with a particular standard. An economy where everyone can rely on everyone else to conform to norms will clearly function better and regulations of this sort can be seen as “market augmenting” (UNIDO, 2003).

Regulations can, however, be captured. Technical standards can be designed to be harder for some firms to meet than others, which is one way technical regulations can become barriers to trade. Technical norms may therefore sometimes have the characteristics of private strategic devices. The mixed public/private character of norms rests on the fact that what makes coordination easier for some firms may create entry barriers for others. This may occur within economies and can be particularly burdensome internationally (see Mattoo, 2001).

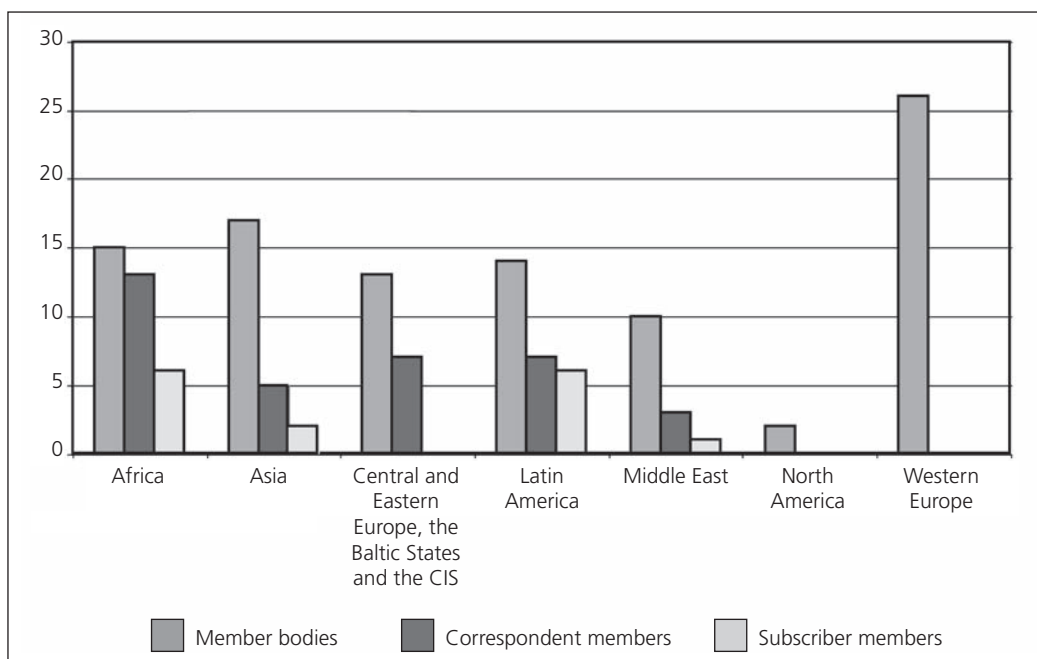
Technical regulations are normally set by governments but increasingly they are also set at regional and international levels where private-sector and other interested stakeholders can participate (i.e. Codex, Integrated Pollution and Prevention Control (IPPC), World Organization for Animal Health (OIE)). One important market-enhancing public good therefore is the creation of a rules framework that reduces the chance of regulatory capture.

Technical standards

Technical standards, which in principle are standardized technical specifications, are intended to facilitate business. Standardization within a country should make trade within that country easier. Standards that codify knowledge are a powerful device for facilitating technological transfer (UNIDO, 2005).²¹ Although differences between technical standards can be a problem, in general they are a voluntary norm and usually only become a problem when they are associated with some form of binding compliance requirement.

Most countries have their own standards organization, which may be public or private. They operate internationally at the International Organization for Standardization (ISO), which increasingly is the forum where standards are promulgated. The ISO is the world's principal standards-setting body and the scope of its standardization activities includes all fields except electrical and electronic engineering and telecommunications, which are covered by two other international bodies, the International Electrotechnical Commission (IEC) and the International Telecommunications Union (ITU). In 2004, the ISO had 99 full member bodies, which are national standards agencies in countries with full standards infrastructure. It also had 36 correspondent members, defined as an "organization from a country that does not yet have fully developed national standardization activities". There were also 11 subscriber members from small economies, who attend ISO meetings as observers.²² Figure 8 shows the number of each type of member by country region. In 2005, there were 100 full members, 46 correspondent members and 10 subscriber members.

Figure 8. Number of ISO members by categories and by region



Source: WTO, 2005, ISO Members Directory 2003.

²¹The softer "tacit" knowledge of how to use the standards is harder to codify. Process standards can only go part of the way towards this.

²²Source: <http://www.iso.org/iso/en/aboutiso/isoinfigures/January2005-p1.html>.

The privatization of standards

There is a spectrum of standards, some of which are pure public goods in all senses, such as basic weights and measures, while at the other extreme are private proprietary standards. It is a matter of fact that many standards-setting bodies, even ones thought of as national institutions, are in fact private bodies. For example, the American National Standards Institute (ANSI), formerly ASA, describes itself as a “private, non-profit organization...that administers and coordinates the US voluntary standardization and conformity assessment system”.²³ Like most other standards bodies, revenue comes from selling standards and a variety of other standards-related services. A standard once issued cannot simply be used by any private firm: it is copyrighted and must be paid for.

Many new standards are private products in an even stronger sense: they are proprietary standards. That is to say they are the creation of for-profit organizations, which can decide to whom they wish to license them. In many cases, the public is unaware of this: the technology for making DVD players relies on decryption software, the intellectual property of which is owned by a consortium which makes it available freely to equipment manufacturers, but only on certain terms. The EurepGAP standards imposed by European supermarkets are in fact proprietary in the sense of being sold and they are private in the sense that they are set by private firms, which can impose the compliance costs in such a way that the burden falls mainly on suppliers. From a market point of view, new technologies that can be patented or copyrighted do not have the characteristic of non-excludable public goods. It does not follow, however, that it is efficient to charge for things where there is a zero marginal cost of extra users.

Standards therefore have the characteristic of a product that can be supplied through the market but which may be under-supplied if funded only by user charges. Increasingly, countries do not have the choice of setting up whatever standards regime they wish: standards are international and the choice for developing countries lies in whether to invest in them. There is a clearly positive developmental externality from the purchase and acquisition of know-how about international standards. The WTO (2005) notes that many of the least-developed countries are falling further behind in their involvement in the international standards system than they are in the issuing of national, mandatory standards, which may not be compatible with the former.

The new EU Food and Feed Directive adds an extra dimension. Even if suppliers to the EU privately conform to all its standards, they must be located in jurisdictions with effective regulatory enforcement regimes. “Regulation” encompasses not only specific product characteristics but also the institutions in charge of conformity assessment and accreditation, which add an extra possible “public” or “semi-public” dimension to compliance with this regulation.²⁴

²³http://www.ansi.org/about_ansi/organization_chart/chart_text.aspx?menuid=1

²⁴Another example of the move towards systemic standards is that the ISO has recently joined the Codex Alimentarius to develop a standard ISO 22,000 for the implementation of the Codex HACCP (Hazard Analysis and Critical Control Point) system.

Conformity assessment: testing and certification

Testing and certification procedures are the least well-documented aspect of the four types of standards. For buyers to be sure that a product conforms to a standard, they need to know that the individual product or one known to be identical has been tested in a certain way and certified to satisfy the norm. Increasingly, these tests are applied not to products but to processes. Factories or other work sites such as shops are potentially subject to quality-assurance norms, based on the ISO 9000 family of standards. Standards thus form the basis of conformity assessment (CA), and if such standards are in the public domain, this aspect of the CA process can be supported by the provision of public goods. But conformity assessment as a process involves substantial private investment in know-how and equipment.

Even if a product or process satisfies a particular norm, it may only be possible to sell it if there is a certificate issued by a recognized testing authority. In principle, certification can be done by first, second or third parties, i.e., by the producer, the buyer or an independent party. The EU's proof of conformity (CE) mark is a declaration by producers that they have conformed to EU standards, but in the case of an imported good "it is the responsibility of the importer/person placing the product on the market to ensure that the product is correctly CE-marked."²⁵ The importer may not be satisfied with a mere declaration. Compliance with standards is a necessary but insufficient condition for market access and this aspect is often overlooked. In particular, testing is subject to important economies of scale because of fixed costs and "learning by doing" which can put smaller and less-advanced developing countries at a competitive disadvantage even assuming their producers are "perfectly competitive".

A significant private element

Conformity assessment (CA) contains a much more significant private element. It is likely to be an activity with considerable fixed costs, with increasing returns to scale and with considerable externalities. There will be social as well as private learning effects, but despite its creation of spillover effects CA is not a "public good". Unlike standards and technical regulations, conformity assessment is characterized by rivalry (or at least to some extent "congestion"): the number of inspectors is limited and inspectors on one farm cannot be on another. However, there may be very large spillover effects and for certain health and safety certifications it may be that whole geographical regions are certified. More usually, it is product batches or individual processes. But pest-risk assessment and the definition of pest-free areas involve wider units. They may be "private" if the unit of analysis is the region, but they are "public" for the individual producers within the area.

Conformity assessment can be carried out in a number of ways: self-certification, second-party certification, where the buyer carries out inspections, and third-party certification. Although standards are often provided on a semi-public basis, conformity assessment

²⁵UK DTI guidelines, <http://www.dti.gov.uk/strd/cemark.html>

is generally a commercial activity done by firms for profit, or by a purely commercial arm of a standards agency. In Africa, although many countries have agencies that are members of the ISO, few are able to carry out certification. In the absence of domestic certification bodies accredited by an internationally recognized accreditation institution, firms wishing to export must use a foreign certification agency. There are about 20 bodies that operate multinationally to carry out certification. These include a mix of semi-public bodies, which charge for their services, and private firms.

Accreditation

Even if a country has an adequate conformity-assessment infrastructure, it is not enough to ensure international recognition of its standards regime and equivalence of products and processes. In addition, there need to be mutual recognition agreements to ensure equivalence and acceptance in all countries. The competence of conformity-assessment bodies needs to be assured via impartial verification by authoritative, non-profit accreditation bodies. Both accreditation and conformity-assessment bodies need to operate according to universal requirements. An accreditation body should be peer-evaluated at a regional and international level in accordance with the ISO/IEC 17011 standard. Once it has achieved this standard, it can become a member of mutual recognition agreements. Accreditation bodies can also accredit laboratories for competence against the ISO/IEC 17025 standard.

Developing countries that have standards agencies belonging to the ISO do not necessarily also have accreditation capacity. This is due both to inherent capacity constraints and the need for a significant demand for the accreditation system from conformity assessment bodies in order to justify the necessary investment.

The existence of an effective supply and demand for conformity assessment as well as accreditation services is likely to have major externalities but there is a question about how to allow these markets to develop. ILAC-UNIDO (2003) argues that the market for accreditation and certification bodies in many developing countries may be too small to justify an economically viable national accreditation framework. But the report notes that even where these activities are carried out by external accreditation or certification bodies, equivalence should be assured by implementing the new International Accreditation Forum (IAF) cross-frontier agreement.

There are two bodies that bring together recognized accreditation agencies. The IAF unites accreditation agencies. Unlike the ISO, it does not have members all over the world. The larger Latin American and most Asian countries have an accreditation agency, but the IAF website lists few African members; only Mauritius, South Africa and Tunisia. A related body, the International Laboratory Accreditation Cooperation (ILAC), has established the ILAC Arrangement which oversees mutual recognition arrangements in order to “develop a global network of accredited testing and calibration laboratories that can be relied on to provide accurate results.”²⁶ ILAC has

²⁶<http://www.ilac.org/>

members in Egypt, Mauritius, Morocco, South Africa and Tunisia. This means that even those countries with certification bodies must rely on external bodies to accredit them in cases where they do not have their own accreditation body (see WTO, 2005). No least-developed country is a full member of the IAF or the ILAC, although a South African Development Community (SADC) agency based in South Africa has the status of a “regional body” in the ILAC (Pattaconi, 2005).

Accreditation is a means of ensuring public trust in products or processes via competency assurance, and the existence of an accreditation system will probably have positive externalities, but the actual accreditation service is supplied to individual laboratories, which must be able to pay for it. So there is mix of public goods and publicly provided market services.

Market failure

A producer who wishes to comply with a standard must first purchase it, then incur compliance costs and undergo regular and repeated testing and certification. The cost of this is likely to increase with the reputation of the certifier, which must itself incur accreditation costs. For the individual producer of goods or services, purchase of the standard is likely to be a small fraction of the marginal cost of compliance. Also, the fixed costs involved in setting up conformity-assessment institutions and accreditation systems are too great for an individual producer, or even a small group of clients for a CA company, to sustain. Despite the fact that the market can and does provide standards-related activities, there are very extensive spillover effects, whether through the environment or via learning or reputation effects, so there is likely to be an underutilization of CA via market forces alone. This is illustrated in figure 9.

Figure 9. Public-goods nature of standards compliance, certification and conformity assessment, development and definition of standards

Individual compliance	Individual compliance + Spillovers	Certification and conformity assessment	Definition of standards
<i>Private good</i>			<i>Public good</i>
<ul style="list-style-type: none"> Firm derives all benefits from enhanced quality 	<ul style="list-style-type: none"> Marketing Reputation effects Regional compliance rules Learning effects 	<ul style="list-style-type: none"> Spillovers Economies of scale in accreditation 	<ul style="list-style-type: none"> Largely public good effects, e.g. creation of laws and operation of diplomacy
Costs: <ul style="list-style-type: none"> Part fixed, part variable 		Costs: <ul style="list-style-type: none"> Set up cost public good element Conformity assessment, high variable cost but with spillovers 	

Market failures are caused by the following:

- Asymmetric information;
- Learning spillovers;
- Reputational spillovers;
- Economies of scale;
- Compatibility externalities;
- Collective action and coordination failures.

Asymmetric information

It cannot be assumed that with imperfect information about the benefits of standards, firms will privately purchase the right amount of standards and quality assurance. There is an informational public good, which may need to be supplied.

Learning spillovers

Once firms do engage with international standards, there is learning by doing from the adoption of standards. This is not in itself a market failure, provided that firms anticipate this but with imperfect information the same asymmetric information issues arise. However, the experience gained can be transmitted to other firms. Circulation of experience and learning from competitors and customers are well-documented ways in which technological spillovers occur (von Hippel, 1986). But the transfer of knowledge is not without cost. Learning by doing and learning by imitation involve increasing returns and falling but not zero marginal costs.

Reputational spillovers

Probably one of the most important aspects of standards adoption is market signalling. For a large multi-product firm, investment in quality or “brand image” has spillover effects across its product range. This is less true for smaller firms. In the 1960s, “Made in Japan” meant low quality to many consumers but now it is the reverse. During their earlier periods of industrialization, a distinction between the Republic of Korea and Taiwan Province of China was that the former had a number of large firms with recognizable names while the latter’s engineering exports to US firms were largely from small subcontractors with no individual reputations.

Environmental spillovers

Normally one firm’s adoption of a quality norm has only a small direct effect on other, similar firms. However, there may be cases where the failure of one producer to conform to standards can actually damage output from other firms. The most obvious cases are bio and environmental norms. For example, if one agricultural producer allows chemical or biological contamination to take place, it can result in contamination of other producers. Where quality controls by importing countries are based on geographic regions, the failure of one producer to respect quality norms can affect a region’s entire crop.

Economies of scale

For much standards-related activity, private costs are significant but just as there are benefit spillovers there are also likely to be positive externalities on the cost side. The fact that the development of standards-related activity occurs in developed countries, where the demand is greatest, suggests that there may be a critical mass below which an indigenous certification or accreditation system cannot be profitable. It is much cheaper per unit to inspect all the farms in a region than just one.

Compatibility externalities

One of the most important aspects of technical norms is not merely to ensure that supposedly identical products really are so, but also that, if necessary, products are compatible with others. Within a value chain, the issues are similar to those of ensuring common standards. One important role of standards is to ensure, for example, that printers can be linked to any computer. Network externalities are an obvious example of this. The more people who use GSM phones in a country means the more people to whom existing users can potentially connect. Much of this activity is carried out by private firms, e.g. standardizing CD formats, but there is clearly room for public action in certain cases.

Collective action and coordination failures and network externalities

There are cases when market failures can arise because of lack of collective action and coordination among private individuals. In particular, whenever producers perform “joint marketing” or the quality of one has an impact on the price and market access of the others (e.g. brown rot), the intervention of the government may be required to support or enforce coordination. If standards compliance is a costly process, individual firms will have the incentive to avoid it when they can rely on others’ compliance and escape the negative consequence of their non-compliance. However, such behaviour by one single producer may put at risk the entire sales of all the producers. Government supervision or regulations may therefore be required to increase the costs of non-compliance and minimize free riding. In certain cases, government intervention only needs to address asymmetric information failures to allow private self-enforcement to be re-established.

Conclusion

Standards and other norms generate powerful spillover and market failure effects, which have important cross-border dimensions, some of which may be positive. Developing countries have long argued in favour of the use of scientific evidence as a basis for SPS measures. The positive impact on developing countries is that if developed countries codify their food-safety norms, developing countries can tell exactly what they need to do to meet them (see WTO, 2005). At the same time, it may be becoming harder to comply with such norms. There is no immediate a priori way to be sure exactly where the biggest shortfalls in standards-related public goods are.

5. Case studies

Case study 1: impact of EU SPS regulations on Egyptian potato exports

Brief background and history

In the late 1990s, the EU introduced a series of measures that affected Egypt's exports of potatoes, an important element in its trade. Egypt exports potatoes to 12 markets, five of which take 97 per cent of the total. Egypt exports "new potatoes" whereas its competitors supply "old potatoes". The price difference can be up to double, because of the quality of Egyptian exports. The average value of Egypt's potatoes is US\$364/ton, which is higher than the EU average imported potato value.

In 1995, brown rot, a potato disease, was identified in the Netherlands and measures were introduced to restrict the movement and export of Dutch potatoes. In 1996, the disease was found in Egypt and an EU directive was introduced. It was tightened in 1998 and again in 2000.

The details of the case: protection or protectionism?

Brown rot is a serious risk to plants (although not to humans) wherever contaminated water is used for irrigation.²⁷ But Egyptian exporters argue that the problems with the EU started as a political matter, as Egyptian potatoes threatened EU potato growers, and only then became a technical issue because of brown rot. Egyptian growers argued that while the outbreak of brown rot in Egypt is undeniable, the severity and timing with which EU import restrictions were imposed indicate protectionist intent. The EU denies this.

²⁷<http://www.potato.org.uk/upload/pdf/researchReports/report191.pdf>

The original EU regulations imposed very tough testing and certification rules on Egypt, demanding that potatoes must be shown to come from disease-free areas. In 1998, as a result of finding more potatoes with brown rot, the EU strengthened the rules. It banned Egyptian potatoes from entry into the EU unless they met stringent requirements that included identifying specific areas declared never to have had brown rot, in addition to several additional measures for testing and packaging. Further measures were applied later in the same year where the concept of “qualified areas” (those in which an outbreak of brown rot was not known to have occurred) was replaced by the concept of “pest-free” areas (areas in which such an outbreak was known not to have occurred). No imports of potatoes were allowed which did not come from these certified “pest-free areas”. Egyptian potatoes imported into the EU were also to be grown from potatoes directly of EU origin or “once grown from such potatoes, produced in an approved pest-free area tested for latent infection immediately prior to planting...”. Even imports from “pest-free areas” would be banned if more than five interceptions of brown rot were found in lots imported into the EU during the season. Article 1.3 of Decision 98/503 is the provision that provides for the cutting-off of shipments after five interceptions.

The Egyptian government responded with measures to improve the harvesting, handling and packing regime administered by the central administration for plant quarantine. The EU then re-allowed imports of Egyptian potatoes provided they met the conditions set in 1998. In the 1999/2000 season, only one interception was found and exports increased by 17 per cent between 1999 and 2000.

But during 2000/2001, there were more interceptions. The EU reintroduced its stringent conditions, reassessed its position and obtained new assurances from Egypt about strict control measures within “pest-free areas” and confirmation of measures against exporters who violated regulations on EU potato exports. In addition, Egypt submitted a detailed contingency plan explaining the measures applied when brown rot is found in Egypt or in consignments of Egyptian potatoes at EU entry points (see below). Based on this information, the EU allowed imports of potatoes in the 2001/2002 season from designated “pest-free areas” in Egypt on the same substantive terms as contained in Decision 2000/568/EC.

Lessons learned

Egypt has at times contested the legitimacy of the EU measures, accusing the EU of protectionism. This is an example of a developing country being part of a vertically disaggregated value chain; importing seed potatoes, re-exporting high-value new potatoes. But in order to ensure that the trade stays viable, Egypt needs substantially to upgrade its conformity assessment procedures to ensure no contaminated potatoes enter the supply chain. This illustrates the framework developed in section 4 and exemplifies the concept of Smithian gains from trade.

Secondly, this case is exemplary as it shows the limits of markets in dealing with standards and regulations because of the existence of externalities and market failures. Egypt has no indigenous accreditation infrastructure and without this its conformity-assessment system cannot easily develop further. Once it is in place, the certification of a disease-free area takes the form of a local public good for farmers in that district. This market is characterized by major externalities, both environmental and reputational. If one farmer seeks to save money on hygiene, the adverse impact can be devastating for the whole national crop. At the same time, there is a cross-border public-goods issue: the EU directives do not appear to be based on internationally agreed standards, especially with respect to the number of consignments that may trigger an import ban. This is clearly an example where some public intervention is appropriate and the EU does give technical assistance to Egypt on this. It is also a good example of a case where there is a clear demand for an international standards approach that has only partially been met.

Thirdly, the case shows how difficult it can be to ascertain if a specific regulation is purely protective or disguisedly protectionist. It highlights not only the complexity of assessing the SPS regulatory measures and but also how these measures, while often necessary, can also serve as opaque forms of protectionism.

Case study 2: impact of revised EU ochratoxins regulations

Background

Ochratoxin A (OTA) is a mycotoxin produced by several fungi (*Penicillium* and *Aspergillus* species). It occurs naturally in a variety of plant products such as cereals, coffee beans, beans, pulses and dried fruit and can also be found in products such as coffee, wine, beer and grape juice. Ochratoxin A has been known to cause kidney damage in animals and is a known carcinogen for both humans and animals. In 2001, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) reported that no cases of acute intoxication in humans had been reported; therefore, OTA studies tend to focus on its carcinogenic potential.²⁸

²⁸Cited in Duris, 2002.

In 2003, Germany introduced OTA standards for coffee in the absence of an EU standard. The maximum limit introduced for soluble coffee was 3 parts per billion (ppb) and for roasted coffee it was 6 ppb. In April 2005, the EU introduced new limits for the maximum levels of OTA found in cereals, rice, dried fruit, roasted²⁹ and soluble coffee,³⁰ wine, grape juice and baby foods. These limits replace national OTA standards and when a limit does not exist, member States can impose their own standards (for example, in the case of green coffee). The EU is presently considering plans to set a maximum level for OTA in green coffee;³¹ dried fruit other than dried vine fruit, beer, cocoa and cocoa products, liqueur wines, meat and meat products, spices, and liquorice. There was no Codex system for OTA in coffee; however, in the 2005 annual Codex meeting an international standard was due to be discussed. A study by the Institute for Scientific Information on Coffee (ISIC) estimated that applying an international standard 3 ppb limit on roasted coffee (the same as imposed by Germany in 2003) is likely to remove 600,000-700,000 tons of coffee from international trading circuits.³² This was equivalent to the combined output of Côte d'Ivoire, Ethiopia and Uganda in Africa, and Costa Rica, El Salvador and Guatemala in Central America (Duris, 2002).

Table 2. OTA standards for coffee in 2004

(Ochratoxin A limits ($\mu\text{g}/\text{kg}$) for coffee (2004))

Country	Green coffee	Instant coffee	Roasted coffee
Bulgaria	8	4	—
Cuba	5	5	5
Czech Republic	10	10	10
EU (starting April 2005)	—	10	5
Finland	5	5	5
Greece	20	20	20
Germany	—	3	6
Hungary	15	10	10
Italy	8	4	4
Netherlands	—	10	10
Portugal	8	4	4
Singapore	2.5	2.5	2.5
Spain	8	4	4
Switzerland	5	5	5
Uruguay	50	50	50

Note: The status of these limits differs; some are embodied in law or in implementing legislation, others are customs instructions or guidelines for food safety inspectors. A limit of "—" means that the government has not set an OTA limit for the category of coffee.

Source: European Coffee Co-operation (2005), FAO (2003).

²⁹Roasted coffee is defined by the FAO as coffee with or without caffeine, and whether or not ground.

³⁰Instant and soluble coffee has been dried into soluble powder or granules, which can be quickly dissolved in hot water for consumption.

<http://www.fao.org/WAICENT/faoinfo/economic/faodef/fdef12e.htm#12.2>

³¹The FAO defines green coffee as raw coffee in all forms (arabica, robusta, liberica).

³²Cited in Duris, 2002. Unfortunately, Duris did not cite the method used to estimate these results.

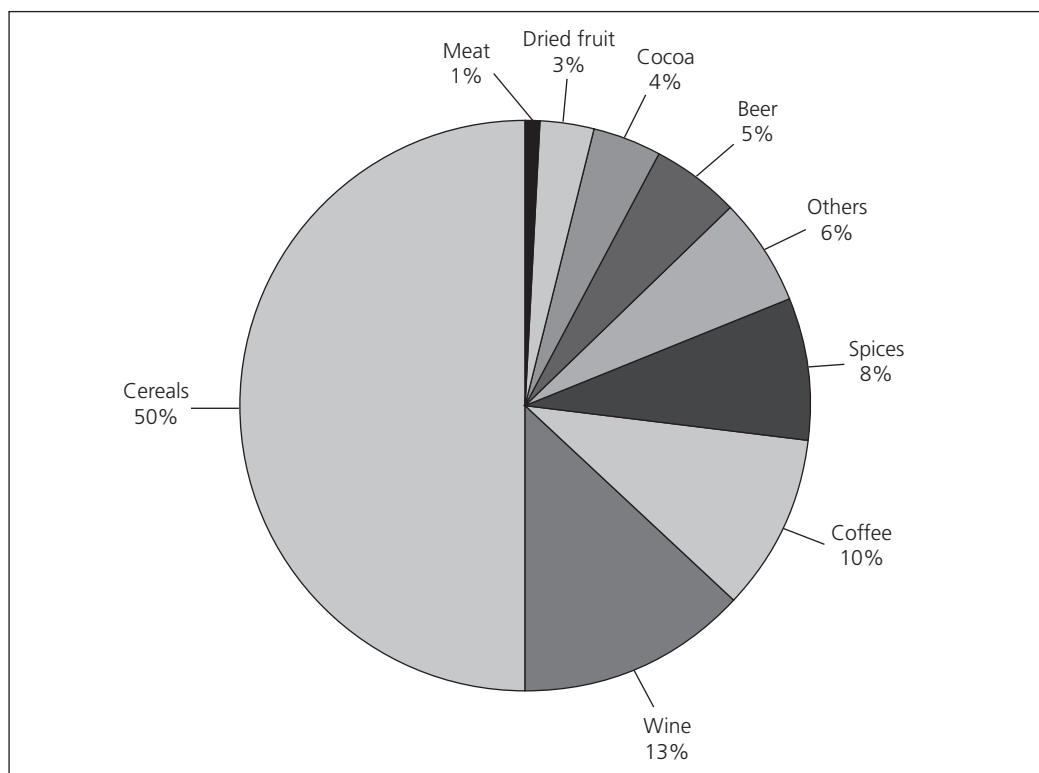
For the EU countries in table 2, the OTA limits are replaced by the following:

Table 3. EU OTA standards introduced in April 2005

Products	Ochratoxin A: maximum levels ($\mu\text{g/kg}$ or pb)
Raw cereal grains (including raw rice and buckwheat)	5
All products derived from cereals (including processed cereal products and cereal grains intended for direct human consumption)	3
Dried vine fruit (currents, raisins and sultanas)	10
Roasted coffee beans and ground coffee with the exception of soluble coffee	5
Soluble coffee (instant coffee)	10
Wine (red, white and rosé) and other wine and/or grape-based beverages	2
Baby foods and processed cereal-based foods for infants and young children	0.5
Dietary foods for special medical purposes intended specifically for infants	0.5
Green coffee, dried fruit other than dried vine fruit, beer cocoa and cocoa products, liqueur wines, meat products, spices and licorice	None

Source: EU Commission directive 2005/5/EC.

Figure 10. Contribution of each food commodity to the mean European total dietary intake of OTA (consumption data related to consumers only were employed for France, Norway and Sweden)



Source: Task 3.2.7. Assessment of dietary intake of OTA by the population of EU member States, January 2002, Fig 18, p. 152. Cited in the FAO, 2005. Reducing OTA in coffee, http://www.coffee.ota.org.ota_emergence.asp

OTA in coffee

The share of coffee in the total OTA intake is comparatively low. According to a study for the EU³³ in 2002, cereals contribute 50 per cent to the total intake, wine 13 per cent, coffee 10 per cent, spices 8 per cent, beer 5 per cent and cocoa 4 per cent. Data from the EU rapid-alert system shows that there are relatively high OTA levels in African producing countries, which can lead to food-inspection authorities regularly insisting on stricter controls. There appears to be a greater occurrence of OTA in unwashed or dry-processed coffees, which explains the high risks in East Africa (Ethiopia), where Arabica is mostly processed by the dry method (FAO, 2005).

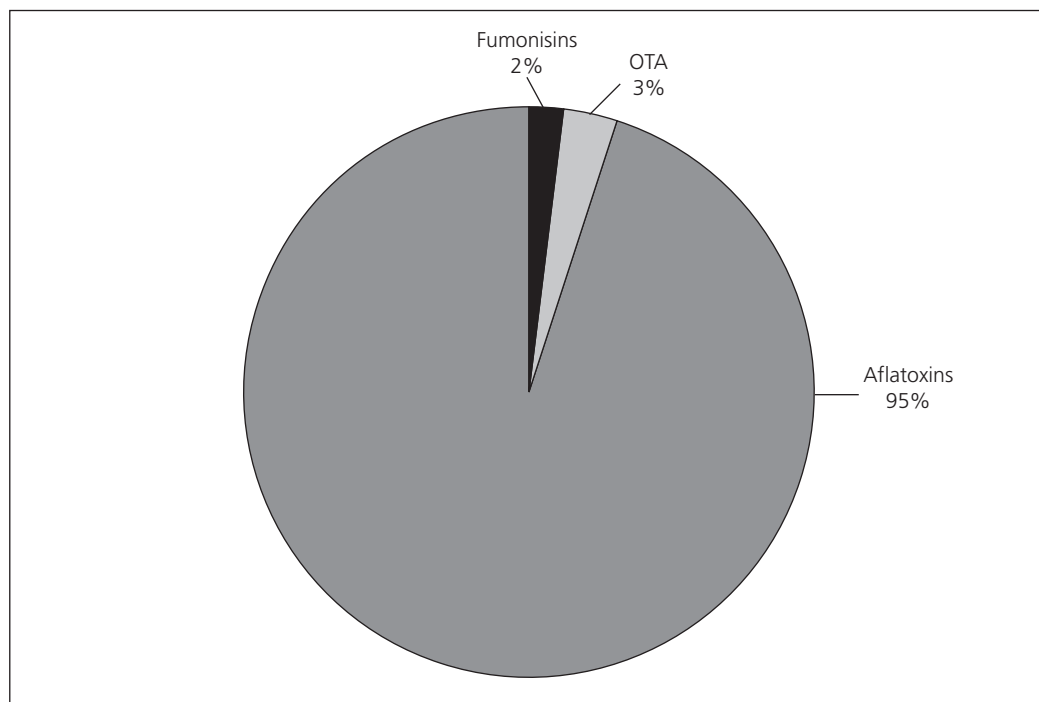
Trade concerns

In 2004, OTA contamination represented only 3 per cent of the overall mycotoxin import rapid alerts (import rejections) in the EU (figure 11), which is equivalent to 0.18 per cent of the total food and feed import alerts that year.³⁴ It is therefore evident that OTA contamination is not a serious problem and that the reasons for introducing OTA standards are questionable as they could have protectionist intentions. Both Colombia and Papua New Guinea have raised complaints at the WTO Committee on Sanitary and Phytosanitary Measures about the nature of these standards. In 2003, Colombia voiced concerns about Germany's Maximum Residue Levels (MRLs) for OTA in products including soluble and roasted coffee (WTO, 2003 G/SPS/GEN/434). Colombia argued that the MRL was disproportionate and that the scientific evidence regarding risks to human health was not conclusive. In 2004, Colombia also queried the EU's proposed standard for OTA. It asked why OTA levels were set for coffee when it contributed only 8 per cent of the total intake of OTA in the European diet compared with cereals and cereal products that contributed 50 per cent (WTO, 2004a G/SPS/GEN/515). Moreover, Colombia complained that if the OTA levels for beer were indirectly controlled by its main input, malt, why were not the OTA levels for soluble coffee indirectly controlled by its main input, roasted coffee.

Papua New Guinea also raised concerns regarding the EU's OTA limits. Its complaints were based on problems complying with existing SPS requirements, imposed by trade partners because of "the scarcity of adequate testing and certification facilities, as well as lack of expertise and financial resources to devote to quarantine matters" (WTO, 2004b, G/SPS/GEN/470). The representatives of Bolivia, Brazil, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, India, Mexico, Nicaragua and Peru shared the concerns raised by Colombia and Papua New Guinea.

³³European Commission (2002) "Assessment of dietary intake of OTA by the population of EU member states", Report on Tasks for Scientific cooperation (SCOOP): Report of experts participating in Task 3.2.7, January 2002.

³⁴Mycotoxins represent 6 per cent of total EU import alerts and OTA contamination represents 3% of total mycotoxin import alerts.

Figure 11. Breakdown of Mycotoxin EU food and feed rapid alerts

Source: EU Rapid Alert system for Food and Feed (RASFF), 2004.

Implications

While producing countries may question the appropriateness of the levels proposed for coffee, they had little choice but to prepare for the change if they do not wish to see their trade diminish (Duris, 2002). The main challenges arise for small farmers who have limited access to resources and modern techniques, and who generally are in weak bargaining positions in the supply chain. The potential introduction of OTA limits for green coffee could have serious implications for trade. The European Coffee Cooperation (2005) estimates that a maximum limit of 5 ppb on green coffee could mean an average rejection rate of traded lots of around 7 per cent, and up to 18 per cent for some African producers.³⁵ Another consideration is that contractors might take into account the 5 ppb and 10 ppb for roasted coffee and soluble coffee and insist that green coffee meets the same limits.

Lessons learned

The lessons learnt from this case are similar to those from the aflatoxins case. The following points highlight the findings of section 4.

³⁵Cited in the European Commission (2002) "Assessment of dietary intake of OTA by the population of EU member states". Report on tasks for scientific cooperation.

- The private nature of compliance: producers that can comply with food safety standards will receive higher prices (not least because they will be able to access the EU market). The producer is the only beneficiary of compliance.
- Externalities: both at the level of training/upgrading and at the level of monitoring and compliance there are externalities. If one producer has contaminated coffee, then the whole batch is rejected. This is a crucial issue for small producers who band together for joint marketing. There is a role for public intervention to support upgrading and a need for coordination due to the high initial costs.
- Certification and conformity assessment have important elements of public goods.
- Opportunities from upgrading: the challenge of complying with OTA is likely to have positive spillovers. Controlling OTA implies better post-harvesting techniques, which will, at worst, reduce post-harvesting losses and, at best, be accompanied by the introduction of better farm-management techniques and good agricultural practices with improved production/efficiency.

Case study 3: impact of revised EU aflatoxins regulations

Background

Aflatoxins are a group of toxic compounds that contaminate certain foods and can, in very rare cases, cause acute liver damage in the human body. The major aflatoxins of concern are designated B1, B2, G1 and G2. They are usually found together in foods, with aflatoxin B1 being predominant and the most toxic (FAO-WHO, 1997).³⁶ Although aflatoxins have acute and chronic toxicity in animals, their toxicity in humans is rare (Otsuki et al., 2001).

In developed countries, aflatoxin contamination rarely occurs at levels that cause acute carcinogens in humans. Studies on human toxicity from ingestion of aflatoxins have therefore focused on their carcinogenic potential. A 1997 report by the joint FAO/WHO Expert Committee on Food Additives (JECFA) concluded that “aflatoxins should be treated as carcinogenic food contaminants, the intake of which should be reduced to levels as low as reasonably achievable” (FAO/WHO, 1997). JECFA analysed the potential human health impact of aflatoxin for two hypothetical levels (10 ppb and 20 ppb). It estimated that reducing the standard from 20 ppb to 10 ppb in countries where the percentage of carriers of hepatitis B1 is around 1 per cent (e.g. members of the European community) would result in a drop in the population risk of approximately two cancer deaths per year per billion people.

³⁶Aflatoxins have been identified in corn and corn products, groundnuts and groundnut products, cottonseed, milk, and tree nuts such as Brazil nuts, pecans, pistachios and walnuts.

Until 1998, members of the EU had different standards for aflatoxins in foodstuffs. In 1997, the European Commission proposed a uniform standard setting the acceptable level of the contaminant in certain foodstuffs, which triggered serious concerns among exporters of food products subject to the proposed directive (WTO, 1998a; 1998b; 1998c; 1998d; 1998e; 1998f; 1998g).³⁷ For instance, Australia stated that “the proposed sampling procedure is unduly onerous and likely to be costly” and under the proposed sampling plan it is estimated that up to 75 per cent of lots rejected would be “good lots” (WTO, 1998b). Bolivia argued that the EU’s proposals departed from the recommendations of *Codex Alimentarius* and would have a considerable social and economic impact on producing countries.³⁸

As a result of the objections raised by various trading partners, the EC decided to relax the proposed acceptable levels in cereals, dried fruits and nuts but the standard was much still more stringent than that suggested by Codex, especially regarding products for direct human consumption.³⁹

Implications for developing countries

Aflatoxins, as other mycotoxins (e.g. ochratoxins), are a consequence of mould infestations and their incidence tends to be higher in humid climate conditions. Appropriate post-harvesting practices are the key to their reduction and elimination. The same moulds are also responsible for crop losses, reducing the output and productivity of affected farmers. It can therefore be argued that appropriate farm-management and post-harvesting practices (i.e. storage in dry places) can be potentially implemented as long as the farmers are trained and have access to adequate post-harvesting infrastructures. Clearly, this is possible but it is a challenge, especially where production is highly fragmented and coordination among smallholders is left to the market. In fact, the presence of negative externalities (e.g. if just one producer is unable to control the aflatoxins level, the entire batch is affected) and high fixed costs may require public intervention. However, attention to the remedies to address the problem of mycotoxins would have a “positive externalities” because it would also reduce post-harvesting losses and increase productivity.

The aflatoxins case was extremely contentious. In particular, the much-cited study of Otsuki et al (2001) argued that the more demanding EU regulations would affect imports from African countries for an amount equal to US\$667 million. An extremely high cost given that the benefits in terms of “potential human lives” were estimated to be two in a billion.

³⁷One of the most discussed aspects of the regulation proposed by the EC is its sampling procedure which is extremely more demanding than the regulations currently under discussion by CODEX. The sampling procedure is a key element due to the non-homogeneous nature of aflatoxin distribution in foods.

³⁸The EU is the main market for its Brazil nuts.

³⁹The total allowable level of aflatoxins was set at 4 ppb and 2 ppb for B1, while Codex sets the total aflatoxin level at 15 ppb, and assuming that 50-70 per cent of it is caused by B1 allows it to be approximately 9 ppb.

Jaffee and Henson (2004) argue that the calculations of Otsuki et al (2001) were exaggerated. Based on information obtained from the EU import alerts, they note that the cost of rejections due to the extra-restrictiveness of EU standards would be in the range of hundreds of thousands rather than millions of US dollars. However, they also note that, even if the more restrictive aflatoxins standards do not appear to have had a disruptive impact on trade, they may put an extra burden on certain countries that, because of specific geographic and climatic conditions, are particularly affected by the insurgence of mould. Implicitly, their argument is that standards have the effect of accentuating pre-existing comparative advantages. However, even if from an “efficiency” point of view this argument is valid, from a distributional perspective the consequences of stricter standards may well be to penalise poorer countries (i.e. where appropriate infrastructure is missing) and smaller producers (i.e. unable to catch up and upgrade their farm-management capacities). This calls into question the need for corrective measures to support these countries and producers to “make the transition” towards safer and more efficient production systems.

Table 4. Maximum level of Aflatoxin B1 allowed, measured in ppb

<i>Country</i>	<i>Old standard</i>	<i>New EU standard</i>	<i>Codex International standard</i>
France	1	2	9
Belgium-Luxembourg	5	2	9
Netherlands	5	2	9
Germany	2	2	9
Italy	5	2	9
UK	2	2	9
Ireland	5	2	9
Denmark	2	2	9
Greece	5	2	9
Portugal	25	2	9
Spain	5	2	9
Sweden	NA	2	9
Finland	NA	2	9
Austria	1	2	9
United States	10		9
Canada	7.5		9
Japan	10		9
Nigeria	20		9
India	30		9
Malaysia	17.5		9

Source: Otsuki et al. (2001).

Benefits of compliance

The benefits of compliance are private, in that those producers who are able to do so will receive higher prices for their goods, not least because they will be able to access the EU market. There are externalities both at the level of training and upgrading of facilities, and the level of monitoring and compliance (because, for example, if one producer has contaminated coffee, the whole batch is rejected). This leaves coordination due

to high initial costs, and perhaps a role for public intervention to support the upgrading process as well as a role for external support when producers are small and have joint marketing procedures. The certification and conformity assessments have important elements of public goods. There are opportunities from upgrading. The challenge of complying with ochratoxin regulations is likely to have positive spillovers. For example, controlling ochratoxin implies better post-harvesting techniques, which at worst will reduce post-harvesting losses and at best, be accompanied by the introduction of better farm-management techniques and improved agricultural practices, leading to increased productivity and efficiency.

Case study 4: MRL regulations and the impact on horticultural exporters

Background

In the early 1990s, the EU instituted a programme of harmonization for Maximum Residue Levels (MRLs) for pesticides. It gave three principal reasons for the revision and harmonization of the MRLs:

- Removal of barriers to trade;
- Harmonizing of data requirements, protocols for data generation, data-assessment criteria and decision-making;
- Ensuring high standards of safety to consumer, operator and environment.

The intended date of completion was 2003, but in fact, the programme will not be concluded before December 2007. The process began by listing and organizing existing pesticides in member countries. When acceptable data was available, the EU was able to establish the relevant MRL for the specific product/active substance combination. When this was not the case, which was true for a significant number of compounds, the EU allowed extra time so that interested parties could submit further relevant data. In practice, this usually meant submissions from agrochemical companies. If no additional data is submitted before the end of the extended period, the EU fixes the MRL at the analytical Limit of Determination (LOD), which is the minimum detectable level (e.g. the level below which residues cannot be detected using suitable methods in accredited laboratories).⁴⁰ A number of compounds were taken out of the list of “usable products” that meant that exporters outside Europe could use them, but the MRL is automatically set at LOD.

Once the position is “closed off” and the appropriate MRL is established, member States have 12 months in which to implement it in their national legislation. The process

⁴⁰When the MRL is fixed at LOD, the minimum acceptable level is de facto reduced as long as technological progress allows more detailed detection at lower levels. This is a further problem for exporter countries that need to keep up with the pace of technological progress and update their laboratories' equipment.

of establishing MRLs is, in theory, open and ongoing. In fact, after the position is closed off at LOD, there is still the possibility of submitting appropriate data to defend the creation of a less-stringent MRL. However, except when it is possible to extrapolate an MRL from a similar crop grown under similar conditions, this process is both costly and lengthy.⁴¹

When evaluating the programme it is important to distinguish between intentions and actual impact. As noted earlier, technical regulations may have a disruptive impact on trade even when this is not intended, and even measures that apply equally to all producers (domestic and foreign) can actually have a discriminatory impact on foreign producers.

A problem with this system of revision and harmonization is that agrochemicals companies are not prepared to pay for providing the relevant information unless they consider a specific product or product/active substance worth it in terms of market potential. Among all the products exported from ACP countries, the agrochemical companies have considered only two, citrus and bananas, as “major crops”. For this reason, many of the crop/active ingredient combinations important to developing countries have been set at LOD (Chan and King, 2000). In this sense, the chemical compounds may be driven off the market for commercial and not food-safety reasons. It is also more lucrative for agrochemical companies to invest in defending MRLs for newer, recently patented, pesticides rather than older ones that are out of patent or generic pesticides, which are often used by producers in developing countries for economic and information reasons. However, a positive aspect of the harmonization programme is that the procedural requirements for minor crops are less stringent.⁴²

Impact on individual producers and producing countries

The potential negative effects of the introduction of this regulation on producers and exporters are:

- Increase in the costs of production, principally due to the increased costs of residue testing, increased costs for pesticides and increased risk of crop wastage because of pests or rejection of batches by importers.
- Exclusion of smallholders and outgrowers from the export-oriented value chain because of their inability to cope with the increased management and monitoring skills resulting from the more restrictive regulations. Further, the smallholders may have greater difficulty in accessing the adequate pesticides or lack adequate financial resources for purchasing the more expensive chemicals. Finally, they may lack the access to updated relevant information regarding allowed and non-allowed pesticides.

⁴¹An absolute need of one year of trials to be conducted and the subsequent discussions over the MRL to be established can take two to three years.

⁴²Only Good Efficacy Practices (GEP) are required compared to the more cumbersome Good Laboratory Practice (GLP) required for major crops.

- Constraints on agricultural practices can also arise because of elimination of a high number of pesticides needed in developing countries. In fact, reducing the range of available pesticides may leave the growers with fewer pesticides that need to be used more often in order to be effective, which can eventually lead to incorrect and costly agricultural practices.⁴³

Potential positive effects for producers are:

- Increase in demand if consumers are able to recognize the increased value of “safer” products.
- Upgrading of production processes and general management improvements that could stem from the need for increasing productivity and cutting costs because of the competitive pressures imposed by the regulations.⁴⁴ In particular, a more careful use and management of pesticides may lead to reduced costs for spraying.

At a country level, two other types of impact from the introduction of the MRL regulations can be identified. On the negative side, there is a risk, especially for smaller countries, of being excluded from the export-oriented value chains because they have less-developed input-distribution systems and higher prices for accessing the same chemicals. On the positive side, some countries may be able to respond to this challenge and coordinate a response through public-private partnerships and alliances among the producers in order to upgrade the overall sector and reposition the national production on export markets. However, this is not necessarily an automatic consequence and may require a high degree of organization and coordination within the industry.

The case of SADC

Fieldwork was carried out during 2005 to evaluate the on-the-ground impact of the new MRL regulations in SADC.⁴⁵ The findings included the following:

- The negative impact of costs was not considered particularly relevant by interviewees; the imposition of the new MRLs raised the visibility of the risks related to pesticides and implied more careful management of pesticides which tends to have general cost-savings consequences in the medium run.
- Small farmers and outgrowers have not so far faced major problems in compliance as those able to access export markets are normally linked to larger farmers. In these cases, they can obtain information about MRL and pesticides use and, in Zambia for example, outsource spraying activities to the larger growers.
- Zambia has been extremely proactive in complying with the new regulations and has had only had four rejections in the last four years due to MRLs. On the other hand, South Africa appears to have underestimated the importance of the changes and has only begun to take appropriate measures recently. In particular, the citrus

⁴³The best agricultural practices would mean using the most appropriate products the smallest number of times.

⁴⁴This argument is in line with the X-efficiency argument.

⁴⁵Based on Cassing, Iacovone and Trask (2004).

sector had to move quickly to defend the MRLs for some fundamental compounds that the European agrochemical companies had not considered particularly important. However, due to the organized structure of the citrus industry and given some financial support from the EU, the crisis was overcome and South Africa has a PIP (Pesticides Initiative Programme) running and working in four areas: information and communication, regulation, agricultural practices and capacity building.⁴⁶

- Although so far the costs associated with compliance have not appeared to create a barrier for exports, the reduction in the number of compounds allowed worries many farmers because of the risk of being pushed towards inappropriate and more costly agricultural practices
- The high costs of complete MRL trials may deter growers from continuing to use specific compounds. These must be carried out by a GLP-accredited laboratory (at present the only one in the SADC region is the SABS laboratory in Pretoria) and must be replicated every two years at an estimated cost of €10,000. Clearly, transport costs increase substantially for farmers based further from Pretoria. One solution is support from the EU through the Pesticides Initiative Programme (COLEACP) that is available on a demand-driven basis.
- Because of the absence of an in-country GLP-accredited laboratory, Zambian and Mozambican producers must rely on the importer carrying out the MRL tests. This has potential risks but does not seem to have posed serious problems so far.
- Access to information is in general considered an important issue for all types of farmers, but especially smallholders. Only the deciduous fruit industry in South Africa has access to a central database, which holds information about authorized products and respective MRLs around the world. Those without this information may avoid using a chemical that they believe to be non-compliant when in fact it has been registered and authorized in some other country with similar climatic conditions.
- A common cause of concern for growers in SADC is the length and way in which the transition process works. Growers need to be made aware in advance in order to evaluate and apply for alternative chemicals. For some this may not be immediate, so the possibility of a slower phase-out should be considered when information problems arise.

Lessons learned

A number of lessons emerge from this case study:

- The costs incurred by the new regulations are, in general, not “prohibitive” at a country level but their impact is highly asymmetric. Smaller countries and producers can pay higher prices for certification and accreditation services that, because of market size, they are forced to import from abroad. In certain cases, the fixed costs can be so high that smaller producers are put out of the market when they are unable to find a way out of this. In the case of Zambia, however, smallholders and outgrowers can outsource “pesticides-related activities” to larger farmers.

⁴⁶For more information refer to <http://www.ppecb.com/SAPIP/InformationAndCommsComp.asp>

- There is an important “public goods” element at the level of the definition of the standards. It is clear from the process of revision of EU MRLs standards that the existence of market failure and the high fixed cost of “submitting” the required information so that MRLs will not be set at LOD—implying that this is an area where markets can work inefficiently and public support from government and international organizations may be required. Standards set unilaterally, or through an asymmetric process, may in fact be sub-optimal and imply negative spillovers on producing and exporting countries.
- The analysis of the implications of the EU MRL harmonization and revision shows that the appropriate interventions should sometimes be considered at a regional rather than a national level. There are, in fact, important cross-border externalities and these should be addressed by supporting regional intervention and coordination of the following: infrastructure and laboratories for testing and certification, coordination and common lobbying in international standards-setting bodies, information gathering and dissemination.

Case study 5: Private standards—EurepGAP

Background

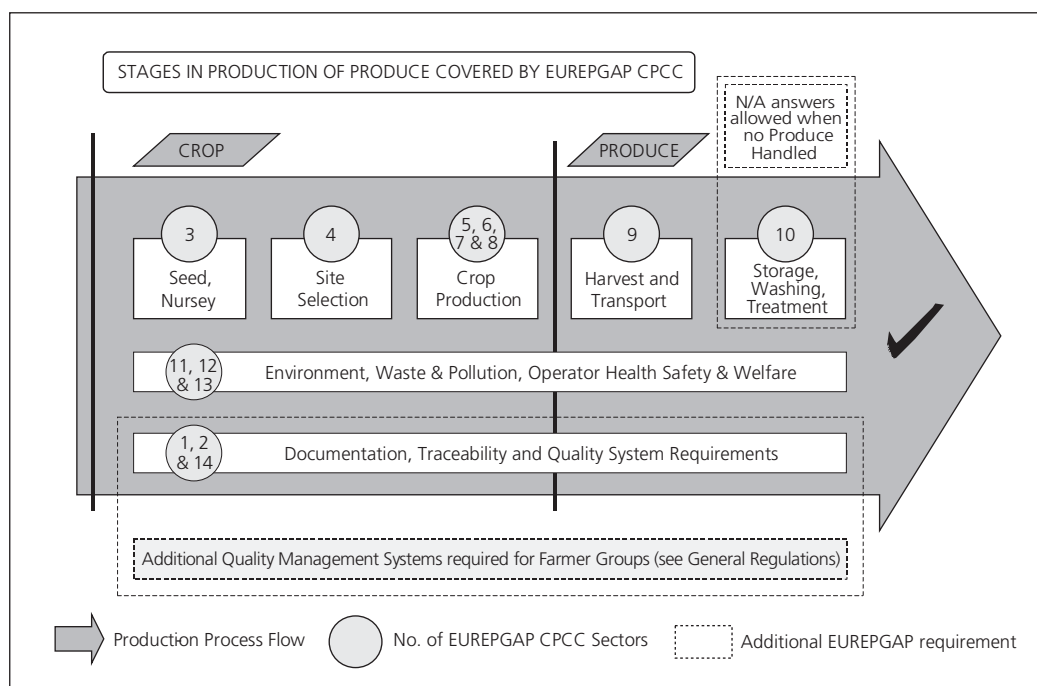
In 1999, a number of European retailers (the Euro-Retailer Produce working group-Eurep) took the initiative to develop a set of requirements for primary producers: European Retailer Producers Good Agricultural Practices (EurepGAP). EurepGAP is a voluntary standard, driven by the private sector with no official influence. It is a quality-management system that applies to farm management and aims at guaranteeing food-chain control and food safety. Eurep decided that EurepGAP should be a minimum standard rather than a competitive element between suppliers. For this reason, EurepGAP is necessary for selling to European retailers but it is not advertised to the consumer and does not imply any price premium for the producer.

Besides food safety, the code also applies to the environment, nature and labour conditions. Further, the starting points of the code are based on national and international laws and regulations with which primary producers have to comply. In particular, primary producers must demonstrate that they work on:

- Maintaining consumer confidence in food quality and safety
- Minimizing environmental emissions and maximizing respect for nature
- Reduction of chemicals and fertilizers
- Improving efficiency of natural resources (fossil energy)
- Responsible attitudes to health, safety and labour.

It applies to 14 areas. These are: traceability; record-keeping and internal self-inspection; varieties and rootstocks; site history and site management; soil and substrata management; fertilizer use; irrigation/fertigation; crop protection; harvesting; produce handling; waste and pollution management; worker health, safety and welfare; environmental issues; and complaint form. Each area is characterized by three types of criteria applied to specific control points: (a) should (not compulsory),⁴⁷ (b) minor musts (compulsory but with the possibility of minor 'deviation'),⁴⁸ (c) major musts (totally compulsory).⁴⁹ Figure 12 illustrates the process.

Figure 12. Stages and areas covered by EurepGAP



Source: www.eurep.org

EurepGAP is poised to become the major global player in agricultural production standards and verification frameworks for fruit and vegetables. Meanwhile, the protocol is being worked out for flowers and ornamentals.

By December 2003, there were almost 13,000 EurepGAP certified growers, the overwhelming majority of which were in Europe. There were about 80 in Latin America, 423 in Australia and New Zealand and more than 1,100 in Africa. In Africa, most certified growers were in South Africa with 926 farmers, second only to the Netherlands. In the rest of Africa, Egypt had 116, there were 8 in Kenya, 3 in Zambia and none in Mozambique.⁵⁰

⁴⁷No minimum percentage of compliance is set.

⁴⁸95 per cent compliance of all applicable Minor Must Control Points is compulsory.

⁴⁹100 per cent compliance of all Applicable Major Must Control Points is compulsory.

⁵⁰In Mozambique, various producers have been working towards EurepGAP certification and at the time of writing it is likely that some producers have already been certified.

EurepGAP recognizes that for smaller farmers the costs and complexity of the certification may be too high. For this reason, group certification is an option for producer marketing organizations (PMOs). However, no PMO-certified producers have been recorded to date in SADC, not even in South Africa despite the high number of certifications in that country. In order to comply with group certification, a farmers' association must be a legal entity, with a documented administrative structure and a clearly identified relationship between the farmers and the Farmer Group (a written signed contract between each farmer and the Farmer Group). The Farmer Group must have a management structure and enough trained staff to ensure that EurepGAP's requirements are met by the registered farms. The organizational structure of the Farmer Group must be documented and, where applicable, must include a EurepGAP management representative, an internal audit department, an agricultural technical department, quality-systems management and produce-handling management (Plantconsult, 2003).

Impact on producers and producing countries

As with the MRL regulations, the expected EurepGAP impact on growers is a priori ambiguous, as it is likely to be uneven depending on the type and size of the grower. Compliance with EurepGAP normally requires growers to upgrade their facilities. This investment can be large depending on the original state of the farm. Further, since these costs will act as fixed costs, they will affect different-sized growers to a different extent.

The principal elements for compliance with EurepGAP constitute a management system. Putting this in place may be costly, especially for less-advanced farmers, but it should lead to better farming practices and increased efficiency.⁵¹ If the grower is already advanced, his farming practices will normally be close to what EurepGAP requires, so his compliance costs and his efficiency benefits will be smaller.

There are also certification costs, which impact differently on producers because of their location and size. The location matters because of the distance from authorized certifying institutions. The grower incurs not only the cost of the certification process, but also all the related auditing costs (including travel costs). The size of the grower matters, given the "fixed costs" nature of the auditing and certification expenditure.

An important point is that for EurepGAP certification, large commercial farmers cannot be certified jointly with their outgrowers. These need to be certified separately, normally through group certification. The impact of EurepGAP could force outgrowers out of the export chain for three reasons. Firstly, the large commercial farmers may decide to expand their own areas and not wait for the process of upgrading and certification of their outgrowers. Secondly, the costs of compliance, including certification costs, may be too large for the outgrowers who tend to have thin margins. Thirdly, given the nature of the group certification, the failure of only one outgrower in the group implies

⁵¹Based on field interviews with farmers (Source: Cassing, Iacovone and Trask, 2004)

collective failure, an externality. Therefore, the risks involved in the group certification can push more advanced outgrowers out of the export chains if other outgrowers are unable or unwilling to make the effort and absorb the costs of EurepGAP compliance.

The case of SADC

In the case of the SADC region, the impact of EurepGAP was discussed with various growers and relevant institutions in South Africa, Mozambique and Zambia. The findings were consistent with the expected potential impacts outlined in the previous section. In particular:

- Consistently, all large farmers said that compliance with EurepGAP does not pose a problem and would in fact improve their farming practices (see IIED, 2003).
- Only South Africa has accredited institutions for EurepGAP certification, in Pretoria and Cape Town. Other SADC countries have to use South African institutions, or European ones, which they have to add to the cost of the certification and auditing, roughly US\$500 for South African auditors, including the related costs of travel.
- South African industry appears to have been very proactive towards EurepGAP and has tried to use this external pressure as a tool for modernizing and improving working conditions in the industry. This is the case for commercial farmers, but outgrowers and emerging farmers have still not been certified and this poses some threat to the development of an emerging, widespread horticulture sector with linkages and positive poverty-reducing impacts.
- Zambian industry has also been able to cope proactively with EurepGAP but so far, as in South Africa, only the large commercial growers have been able to be certified.
- Mozambique is still behind and no case of EurepGAP certification has been yet recorded.
- Given the differential impact of EurepGAP on commercial farmers and smallholders, the risk is that this standard will affect the industry by segmenting it, with a “commercial tier” able to gain access to international markets and a “second tier” pushed towards regional or domestic markets where margins are lower but standards less demanding.
- Outgrowers and smaller farmers do not have other options besides using the group certification (PMO), which although technically feasible has not yet been recorded in the SADC region. In Zambia, the Trust Training Unit of the Zambia Export Grower’s Association (ZEGA) has been developing a model for group certification and has completed a training process for outgrowers working with the company Agriflora.⁵² The major obstacle so far is the cost of certification for the PMO which is about US\$6,000 for a group of about 25-30 farmers with individual costs of US\$200 for an average farmer with two hectares. Problems in finding an appropriate certifying institution have delayed the development of certification. If successful, this would be the first case of a PMO certification in the region and could be

⁵²www.zambiaexportgrowers.com

used as a template for other SADC countries. The process of making the outgrowers compliant with the standard is costly in terms of both training and support. In Zambia, donors have so far absorbed these costs. However, there has not yet been any study analysing the economic viability of group certification and EurepGAP compliance for smallholders. It could be that for many outgrowers the opportunity cost of EurepGAP certification is simply too high and shifting to local or regional markets is a better option.

- The cost per hectare of certification is higher for smaller farmers. The cost for an average outgrower with two hectares would be about US\$100 per hectare, while the cost for an average commercial farmer with 200 hectares would be between US\$25-50 (the lower end of the range in South Africa and the higher in Zambia). This problem has led to suggestions that these standards tend to marginalize small farmers.
- Domestic and regional standards are only relevant for South Africa, as the weight of the domestic market for Zambia and Mozambique is marginal. However, it must be noted that these standards are converging towards international ones with some regional retailers (e.g., Pick and Pay, from South Africa) already buying only from EurepGAP-compliant suppliers. Others are following this trend even if product costs are sometimes more relevant than quality for consumers with lower purchasing power.
- A general concern is manifested by all type of producers with regard to the proliferation of heterogeneous standards, which can significantly raise compliance costs.

6 ■ Conclusions

This report has explored the different aspects of the public and private sides to standards and standards-related activity. The borderline between private and public is not easy to draw and no straightforward policy recommendations can be made about exactly where the gaps in the provision of international public goods lie.

However, some preliminary observations can be made. They are divided into three categories:

- The importance of SPS standards and regulations
- The public nature versus private nature
- Demand and supply of standards assistance in the SPS field.

Under each heading, suggestions are made for UNIDO's possible role.

Importance of and perspective on SPS standards and regulations

The traditional technical approach was to treat standards as a form of public goods or service. Increasingly, trade economists have grouped standards regulations and conformity-assessment procedures together as “technical barriers to trade”. This paper argues that it is time to return to the original paradigm, but taking into account recent thinking about where the borderline between public and private really lies in an era of network firms. This is illustrated with SPS norms.

Tighter SPS standards are a double-edged device. They are clearly a public good in several respects. They raise output quality and provide indications to firms on how to access markets better and even to lower costs through the adoption of best practice. However, they also act as a selection device, assisting those producers able to adapt to them, and those consumers wishing to pay for superior quality (where this has a cost). The provision of standards therefore has uneven benefits and may well accentuate competitive differences based on existing comparative advantage. Where markets are highly competitive, those who gain least may go out of business.

However, many “standards” are based on institutions where the public and private sectors are both simultaneously engaged, and may be able to create a comparative or competitive advantage where an absorptive capacity exists.

In this perspective, there can be opportunities for upgrading but they are also potential threats. The unwelcome feature is that their impact is highly asymmetric: small countries, smaller producers, less-advanced productive systems and institutions are in a much worse “initial position”. Special efforts towards these may therefore be required.

The reasoning suggests that where producers are trying to upgrade into new niches, the market may be best placed to create standards where vertical Smithian trade is concerned. There is, however, a genuine concern that where buyer power is concentrated the norms may evolve in a manner that does not reflect efficiency, let alone fairness. Indeed the difficulty in setting agreed uniform international standards is reflected in the increasing politicization and recent contentious votes within Codex.⁵³

Role for UNIDO

- Participate actively in the analytical debate over the role of standards in order to promote the transformation from the vision of “standards as pure barriers” towards a more realistic vision of standards as a “double-edged sword” embodying both a threat and an opportunity for exporting countries.
- Support less-developed countries in a selective and strategic manner. For this reason, analytical work is crucial to identify the existence of initial comparative advantages and basic “absorptive capacities”.
- Based on its experience, support the development of the public-private interface and institutions to promote the definition of priority areas of investment and the upgrading of capacity to comply with standards and regulations.

Public nature vs private nature

This paper’s thesis is that the borderline between private and public goods and services is messy. EurepGAP is a classic example of standards that initially represented a public good for the “club” of European supermarkets, but has now become a system that rivals the public standards systems, and is incorporated into some legislation.

⁵³Three recent cases stand up as proof of the increased politicization of this body: the 1995 Codex vote on hormone standards and the 1997 vote on mineral-water standards approved by slim majorities rather than by consensus, and the debate over the “Codex Statements of Principle Concerning the Role of Science in the Codex Decision-Making Process and the Extent to Which other Factors are Taken into Account” was plagued by compromise and ambiguous language that tried to balance the pressure of the US on one side and the EU on the other (Roberts et al., 1999). In the case of the standards for hormones, this was adopted by a vote of 33-29 with 7 abstentions. In the case of the revised standard for natural mineral waters, the result was favourable for 33 against 31 votes with 10 abstentions. Both these decisions may hardly be considered a clear endorsement of the safety of either eating hormone-processed meat or mineral-water contents (Howse and Trebilcock, 2001).

It is important to distinguish the two fields but to recognize that there is no universal classification. Depending on the strength and capacities of domestic and regional institutions, the dividing line can move: in some regions, market institutions can develop standards-related services, but not in others, and this can change over time. The approach to define “publicness” needs to take into account historical and institutional specificities.

Moreover, private and public nature needs to be assessed not only at domestic level but also at regional level: the development of standards capacity in South Africa can have a major spillover to other neighbours. Indeed, in cases when domestic-market or supply capacities do not justify national public investment, this may still make sense at regional level. In Southern Africa, for example, it would be hard to justify investment in upgrading the standards and quality systems for many of the minor “tropical crops”, even in South Africa. But a regional approach would make sense, given the importance of these crops at regional level and the possibility of spreading the fixed costs among more countries and producers.

A large part of the standards-related activity is of a private-goods nature, notably the actual activity of conformity assessment, which is generally carried out by and for private actors. However, there are many possibilities for market failure, economies of scale and externalities in this domain. All these clearly call for public monitoring and intervention.

Excessive or inappropriate involvement by the state may discourage private entrepreneurship in this area and worsen qualities of services (i.e. inspection and certification). This may frustrate international recognition while still increasing costs for domestic producers. In the worst case, this may condemn producers to remain out of lucrative markets.

But excessive or inappropriate reliance on the private sector may imply serious problems, especially for smaller and weaker entrepreneurs and countries. The development of strong institutions is, in any case, required by recent moves of the principal buyers (i.e. EU Food and Feed legislation). Where costs are too high at a national level, a regional response maybe needed (e.g. in SADC).

The implications for public policy are clearly that governments cannot neglect standards but they must think carefully about where the policy response should focus in order to facilitate the private sector and where it should provide direct public infrastructure services. If it is right that for the least-developed countries the toughest bottleneck is in conformity assessment, there is a dilemma. There are numerous market failures, learning effects, informational externalities, but it is in the nature of this activity that the provision of public-goods alone cannot substitute for an effective market. The public provision has to be of the basic infrastructure, within which internationally recognized operators can provide services to local producers, who must be given incentives to use them. There is a line between appropriate and needed public intervention, and harmful interventionism. This paper has attempted to outline some general principles but strongly advocates a case-by-case solution based on appropriate analysis.

Role for UNIDO

- Analytical support to countries/regions to identify areas where direct public intervention is needed and areas where facilitation and support of the private sector as the main actor has to be sought.
- Support the definition of and implementation of public intervention with the aim of making this selective and efficient. Capacity building to provide services efficiently, benchmarking and diffusion of successful international experiences across countries. One important area where UNIDO has experience and knowledge to share, and which could be extremely useful, is fostering public-private partnerships in the provision of services in order to minimize the costs of public intervention and guarantee its efficiency and to make it responsive to the needs of the private sector.

Demand and supply in the SPS field

A preliminary analysis (see annex III) could only be attempted with great difficulty when trying to analyse and match global demand and supply. There are many limitations with both the proxies for “supply” and the proxies of “demand”—nevertheless some interesting lessons arise.

When looking at “trade concerns” as “demand proxy”, there is little correlation between assistance and concerns raised. This may be because those countries most able to identify concerns at the WTO are thought to be most able to respond at a national level, whether by private or public means.

When looking at alerts, detentions, rejections by the United States and the EU as demand proxies, the matching appears better. But there is still an issue that countries that are larger exporters tend, naturally, to be more present in the “alerts, detentions and rejections” database but are not always recipients of aid funds.

The best matching appears to be with EU alerts and rejections. However, this is linked to the fact that Africa is one of the biggest receivers of aid funds and, traditionally, is also an important exporter of agricultural and food products to the EU.

An important conclusion here is that more data is required and more open discussions of criteria and mechanisms of allocations of SPS-related funds are needed. This should be based on analysis that is more detailed but again data is a bottleneck.⁵⁴ The effort of the STDF is remarkable and deserves praise. It is going in the right direction but it is clearly not yet enough.⁵⁵ As to the overall scale of the assistance provided, it is difficult to estimate the proportion of the need that is covered. Cerrex estimates that for

⁵⁴As to whether the total scale of assistance is appropriate, the interpretation of the totals in the STDF database is uncertain

⁵⁵However Cerrex (2003) provides some interesting insights.

ACP countries: “a figure of between €140m and €700m is calculated as likely to represent the annual ongoing cost to the ACP private-sector exporters. This is based on estimates that SPS measures represent overheads of between 2 per cent and 10 per cent of the value of produce exported by the vast majority of ACP exporters.”

But even where large sums are disbursed, the Cerrex study suggests that developing countries and their producers must still supply large sums themselves. Estimates of costs of individual projects given by Cerrex (2003: p. 59) for assisting compliance with EU pesticide MRLs are in the range of from US\$59,000 to US\$828,000, with the share covered by aid ranging from 28 to 90 per cent. Given that donors do not pay the full costs, the more aid there is the bigger the scale of the co-funding required.

Role for UNIDO

- Support the effort of the STDF in developing complete and transparent data on the distribution of aid funds for supporting activities in the area of capacity building related to compliance with standards and technical norms.
- Carry out analytical work to identify priority areas for actions and interventions of the donor community based on a set of appropriate “demand proxies” as well as on detailed country and regional-level studies. In particular, with respect to many African countries, this effort could be linked to the already existing programmes to promote trade integration: the IF (Integrated Framework) and the JTAP (Joint Trade Assistance Programme). Also, integration and coordination with the various activities of the STDF should be explored.

Annex I. Assessing the global demand for SPS-related development assistance

Having argued that some components of the standards and regulations system will be affected by externalities and market failures, the following question needs to be addressed: what evidence is there that these market failures and externalities are being addressed by the provision of public aid funds? This appendix, through some innovative exploratory work, will attempt to find a preliminary answer to this complex question. This is only the first step towards a better understanding of the issue and its limits and possible extensions for future research work will be flagged.

It was decided to use some objective, and already existing, measures of “revealed problems”. This approach should help to identify needs for SPS-related technical assistance and capacity building in developing countries in upgrading SPS-related competences.

The approach taken

Firstly, trade concerns raised by developing countries participating in the WTO SPS Committee Meetings are looked at as a proxy for the identification of direct demand for assistance.⁵⁶ This should provide a direct measure of “demand for support” from developing countries. Clearly, there is a selection bias when looking at countries that raise (or support) a concern at the SPS level which needs to be borne in mind. In order to raise a “trade concern”, a country needs to be able to participate in SPS Committee Meetings and articulate its concerns, which indicates some level of institutional capacities. The producers in that country also need to be able to articulate their concerns via appropriate channels to the respective WTO representative in Geneva. The higher the economic interests at stake, the more likely this is; similarly, the better organized the producers, the more likely they are to raise their concerns and make them heard by their government. For this reason, care must be taken when drawing generalizations from the analysis. Nevertheless, there is an advantage in using SPS-related concerns (also known as cross-notification). This is that the “needs” are not elicited or obtained through questionnaires, but are derived from concerns raised by the country representative at WTO level and can therefore be considered as a “direct” request for support from developing countries. All trade concerns raised by developing countries between

⁵⁶G/SPS/GEN/204/Rev.5 , G/SPS/GEN/204/Rev.5 Add.1, Add.2, Add. 3.

1995 and 2004 against the three major industrialized markets, i.e., the EU, the United States and Japan, have been reviewed and summarized.⁵⁷

Secondly, the appendix focuses on the alerts notification of the two most important developed markets, the EU and the United States. These notifications are used as a proxy for direct demand for standardization and indirect demand for assistance. For this purpose, the EU rapid-alerts system for food and feed (RASFF)⁵⁸ and the data from US alerts (US Food and Drug Administration import refusal reports)⁵⁹ have been reviewed.

Potential demands for “standardization”: analysis of US and EU alerts

This subsection explores the potential demand for SPS-standards compliance by looking at the EU rapid-alert system for food and feed and the United States import alerts for food and drugs. Both these databases show complaints about non-compliance with importer standards for a specific exporter. This information indicates a direct demand for standardization and an indirect demand for assistance.

United States import alerts for food products

The data used in this section is from the US Food and Drug Administration (FDA) database for import alerts for food products.⁶⁰ All imported products into the United States are required to meet the same standards as domestic goods. The FDA states that “food must be pure, wholesome, safe to eat and produced under sanitary conditions”.⁶¹ An import alert is the “detention without physical examination and surveillance of a food product from a particular region”, for example an import alert on basmati rice from India means that all basmati rice products from India will receive automatic detention.⁶² The database gives detailed information about the reasons for issuing import alerts. The reasons include listeria, salmonella and E. coli contamination and the presence of filth and rodents/insects in food products. These would seem to be very genuine reasons for issuing import alerts. The FDA database also contains information about imports that fail to comply with the Food, Drug and Cosmetic Act (the Act) and therefore are detained by the FDA.⁶³ This paper only looks at data on US alerts.

⁵⁷The trade concerns raised by developing countries against other developing countries have been omitted for reasons of time.

⁵⁸http://europa.eu.int/comm/food/food/rapidalert/resources/publications_en.htm and http://europa.eu.int/comm/food/food/rapidalert/archive_en.htm

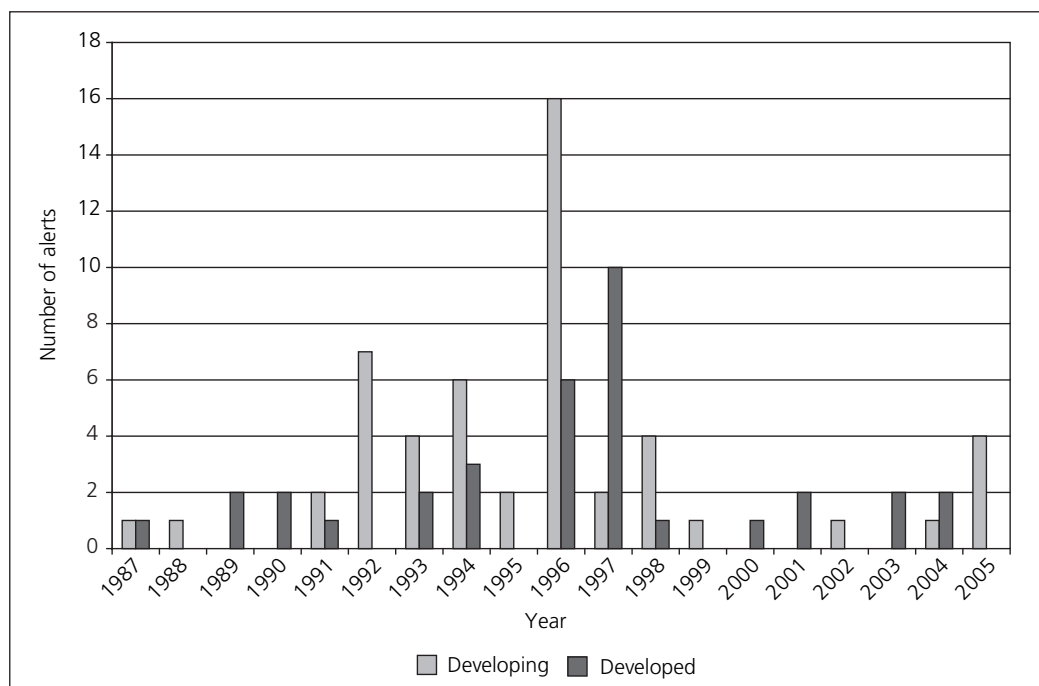
⁵⁹http://www.fda.gov/ora/fiars/ora_import_alerts.html (alerts) and http://www.fda.gov/ora/oasis/ora_oasis_ref.html (refusals)

⁶⁰http://www.fda.gov/ora/fiars/ora_import_alerts.html

⁶¹Federal Food, Drug, and Cosmetic (FD&C) Act

⁶²http://www.fda.gov/ora/fiars/ora_import_alerts.html

⁶³http://www.fda.gov/ora/oasis/ora_oasis_ref.html

Figure 13. Number of US alerts by type of country, 1987-2004

Source: US Food and Drug Administration (FDA).

Maximum level of aggregation (US): total trends through time

From 1987 to 2004, there were 87 United States import alerts for food which affected individual countries.⁶⁴ Figure 13 shows them broken down by developed and developing countries. Over the 18-year period, the number of developed and developing country alerts has fluctuated. Nevertheless, in most years, the majority is from developing countries, suggesting they have a lower capacity to comply with standards. The highest number of import alerts from developing countries was 16 in 1996. There were none in 1989, 1990, 2000 and 2003.

Medium level of aggregation (US): developed countries by region

For further analysis, United States alerts from developing countries by region from 1987 to 2004 are examined. Over the period, the majority of food-import alerts were for Latin America (30) and Asia (29). They peaked in 1996 and 1997 when there were concerns about fish products from Asia. Africa has only one alert, which could reflect the low level of its exports, and there were only two alerts from Eastern Europe.

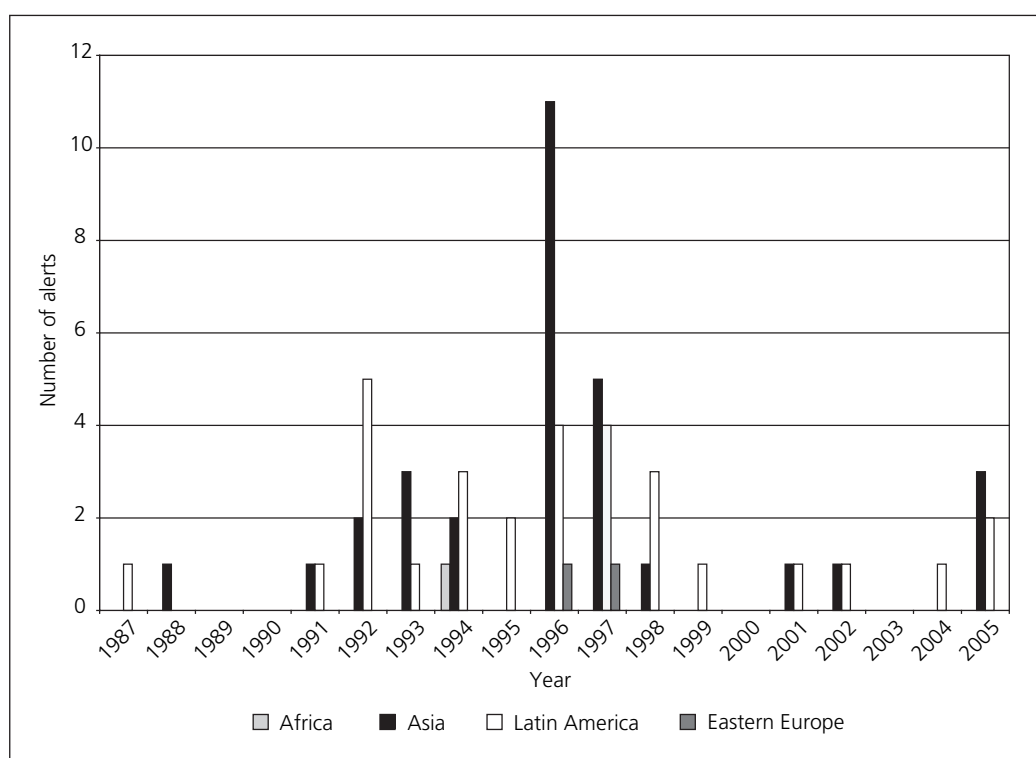
Minimum level of aggregation (US): time trend by country

The developing countries with the highest number of US import alerts for food and drugs between 1987 and 2004 were Mexico, China, Thailand and India. Regionally, the

⁶⁴Alerts made for multiple countries are not included.

majority of developing countries were Latin American—Brazil, Chile, Costa Rica, the Dominican Republic, Ecuador, Guatemala and Mexico—but there were also Asian countries; China, the Philippines, Taiwan Province of China and Thailand. Turkey is the only developing country from Europe with a high number of alerts. Surprisingly, the countries that appear to have problems meeting US food standards are emerging countries. The only low-income country with a high number of US alerts was India. There were no African countries.

Figure 14. Number of US alerts by region, 1987-2004



Source: US Food and Drug Administration.

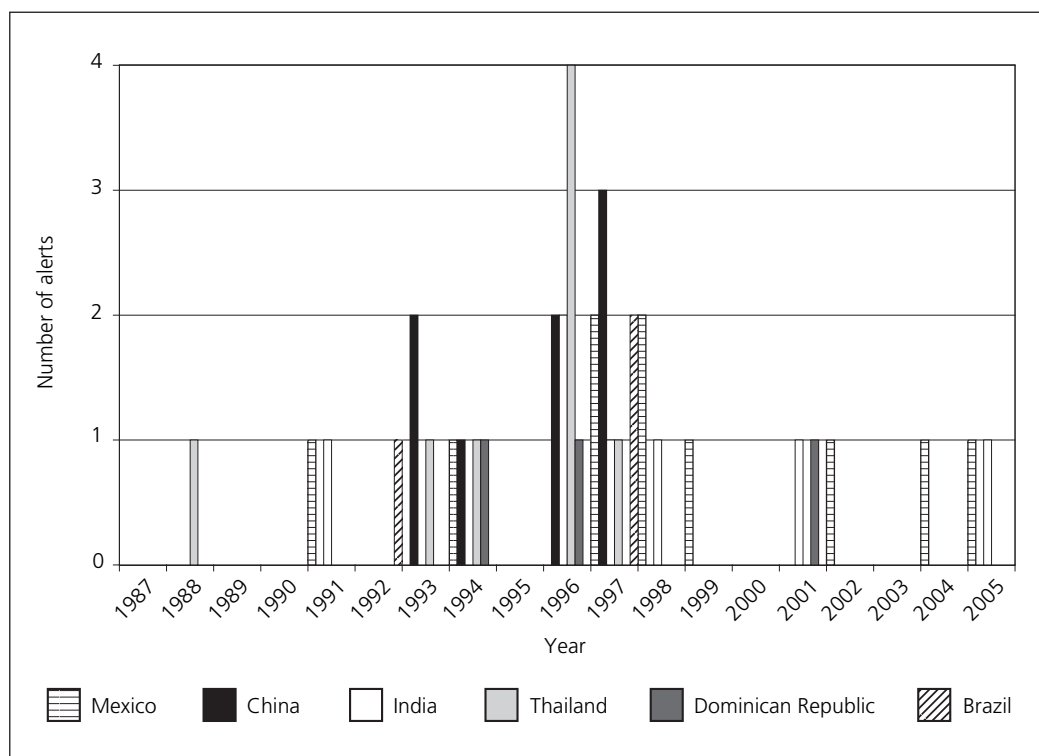
Table 5. Number of US import alerts from 1987 to 2004 by country

Country	Number of import alerts for food from 1987 to 2004
Mexico	10
China	8
Thailand	8
India	7
Brazil	3
Dominican Republic	3
Chile	2
Costa Rica	2
Ecuador	2
Guatemala	2
Philippines	2
Taiwan Province	2
Turkey	2

Source: US Food and Drug Administration.

Figure 15 shows those countries with three or more import alerts. After 1998, only Mexico and India have had import alerts. The data shows that India has a problem with filth and salmonella contaminating food products, whereas Mexico has problems with listeria and filth. The import alerts for food appear to peak between 1996 and 1998.

Figure 15. Highest number of US import alerts by country, 1987-2004



Source: US Food and Drug Administration.

EU rapid alerts for food and feed

The EU data from the rapid-alert system for food and feed (RASFF) is based on information from member States when they notify or alert the EU commission about food and feed imports which present risks to human health. If a member State has information relating to the existence of a serious direct or indirect risk to human health, other members are immediately notified. The information is classified under two headings.⁶⁵

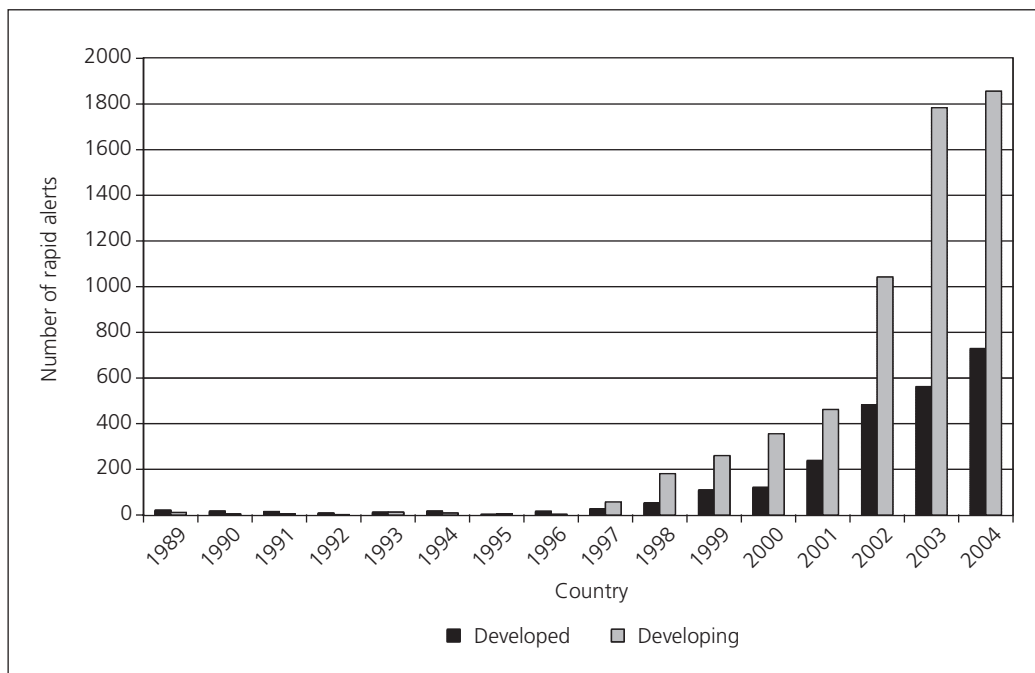
- Alert notifications: information about when food or feed presenting a risk is on the market and when immediate action is required. Alerts are sent by member States that detect the problem and have initiated the relevant measure, such as withdrawal/recall.

⁶⁵See European Commission RASFF (2005), Annual Report for 2004.

- Information notifications: notifications about food and feed for which a risk has been identified, but other member States do not have to take immediate action because the product has not reached their markets. These notifications mostly concern food and feed consignments that have been tested and rejected at the external borders of the EU.

Import “alert” here covers both information and alert notifications.

Figure 16. The number of EU import rapid alerts by type of country, 1989-2004



Source: EU Rapid Alert System for Food and Feed.

Maximum level of aggregation (EU)

In 2004, the majority of EU import rapid alerts, as was the case with the United States alerts, were from developing countries (figure 16). Until 1996, the highest numbers came from developed countries but from 1997 there was a sudden increase in the number from developing countries and between 1997 and 2004 they accounted for about 80 per cent. This increase is largely explained by recent concerns about the carcinogenic effects of aflatoxins, which can be found in milk, cheese, corn, peanuts, cottonseed, nuts, almonds, figs, spices and a variety of other foods and feed. Many of these products, e.g. nuts and peanuts, come from developing countries. In 2004, the RASFF received a total of 844 alerts on aflatoxins, which is considerably higher than in 2003 (736) and nearly three times as many as in 2002 (288). Most of the alerts concerned pistachios (538), primarily originating from the Islamic Republic of Iran (487).

Aflatoxins were also regularly reported in peanuts and derived products from China (62), Argentina (27) and India (24), in hazelnuts (24) and in dried figs (35) from Turkey and in paprika powder (16).⁶⁶

Medium level of aggregation (EU)

Table 6 shows the regions with the highest number of EU import alerts for food and feed from 1989 to 2004. South-central Asia had the most (1,731), a large proportion of which came from the Islamic Republic of Iran. Other regions with high import alerts over the period were South-eastern Asia (1,010) and Western Europe (999). African regions had fewer alerts, with North Africa (265) with the most and East Africa the least (68).

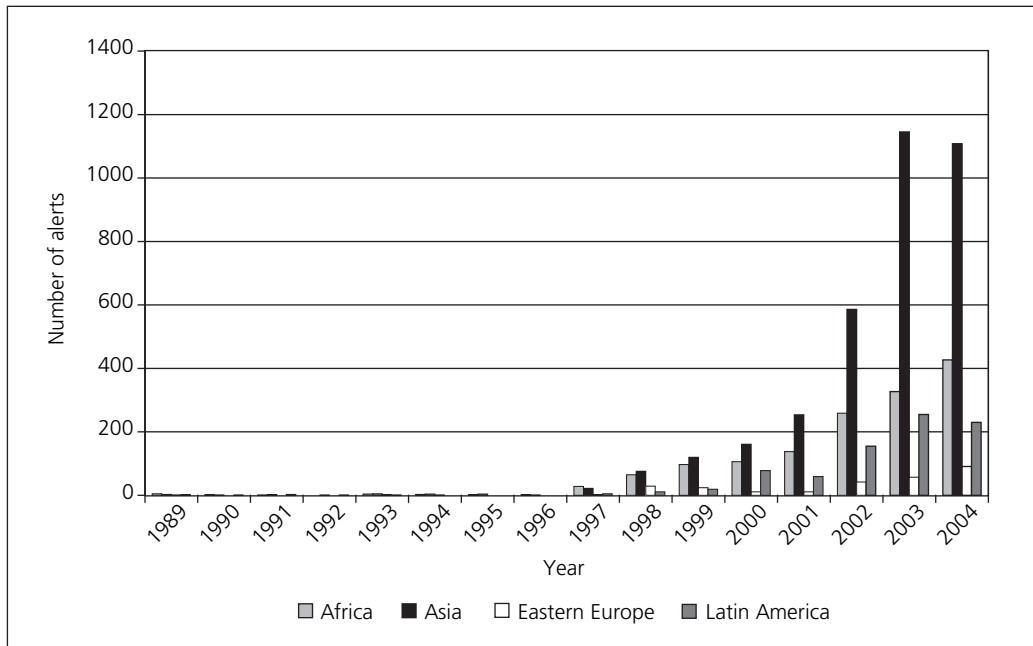
Table 6. The number of EU import alerts by region, 1989-2004

<i>Region</i>	<i>Number of EU import alerts for food and feed</i>
South-central Asia	1,731
South-eastern Asia	1,010
Western Europe	999
Southern America	758
Eastern Asia	753
Western Asia	749
Southern Europe	747
Northern Europe	465
Eastern Europe	271
Northern Africa	265
Western Africa	247
Northern America	181
Southern Africa	124
Eastern Africa	68
Central American	55
Australia and New Zealand	39
Middle Africa	9
Caribbean	9
Melanesia	2
Polynesia	1
Micronesia	0

Source: EU RASFF.

More detailed analysis (figure 17) shows that EU rapid alerts from Asia between 1989 and 2004 increased substantially, rising from 3 in 1989 to more than 1,100 in 2004. The greatest increases were between 2002 and 2004. Import alerts from Africa reached just over 420 in 2004 when they accounted for 20 per cent of the total. Latin American import alerts have also been increasing since 1997 while Eastern Europe alerts remained constant.

⁶⁶Ibid.

Figure 17. Number of EU rapid alerts by region, 1989-2004

Source: EU RASFF.

Conclusions

Interpretation of data from the US import alerts is that they appear to be linked to the volume of trade, as China, India, Mexico and Thailand have the most alerts. The developing countries with the highest import alerts are emerging economies. A striking finding is that imports from African countries have a low level of alerts. This is probably because African exports are at very low levels compared with those from other regions, for reasons other than compliance with SPS measures.

In the EU there has been a recent proliferation of import alerts from developing countries. This can be largely explained by concerns regarding aflatoxin contamination in food products. The main developing regions subject to alerts are in Asia, where many emerging economies are situated. As in the US findings, the EU rapid-alert system shows that African countries have relatively few import alerts. On the basis of this data, it could be argued that African countries experience problems in reaching export markets rather than with complying with the standards of developed countries. However, further analysis is needed to confirm this hypothesis.

Cross-notification: trade concerns raised in WTO SPS Committee Meetings

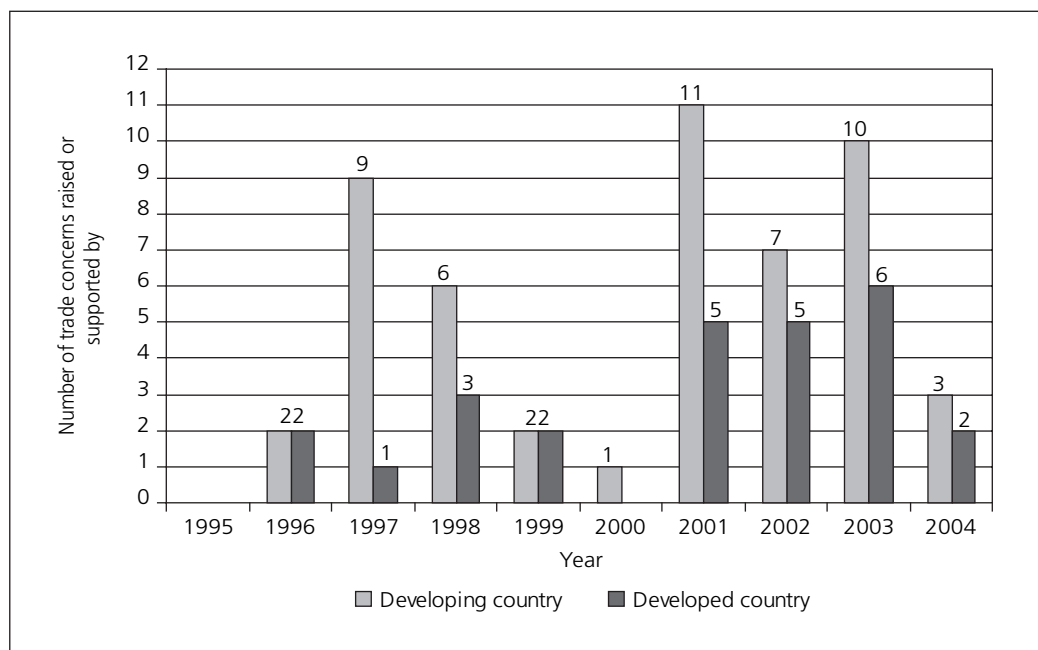
Maximum level of aggregation: developing countries in general

In the period 1995 to 2004, developing countries either raised SPS-related trade concerns themselves or supported other countries' (i.e. developed countries) trade concerns

against the EU, the United States and Japan. This accounted for 51, or 67 per cent, out of 76 cases.

Figure 18 shows that the number of trade concerns raised by developing countries against the EU, the United States and Japan fluctuated over this 10-year period, although the trend seems to be upward for the last four years. There were two peaks in the overall trend in 1997 and 2001. This suggests that in those years the three developed markets introduced new standards and regulations with which developing countries could not comply. The fall between 1998 and 2000 could be because developing countries received assistance in complying with SPS-related standards or were treated on a special and differential (S&D) basis. Developing countries' concerns relating to the three markets outnumbered those of developed countries in all of the years analysed.

Figure 18. Trade concerns raised against the EU, US and Japan in SPS Committee Meetings

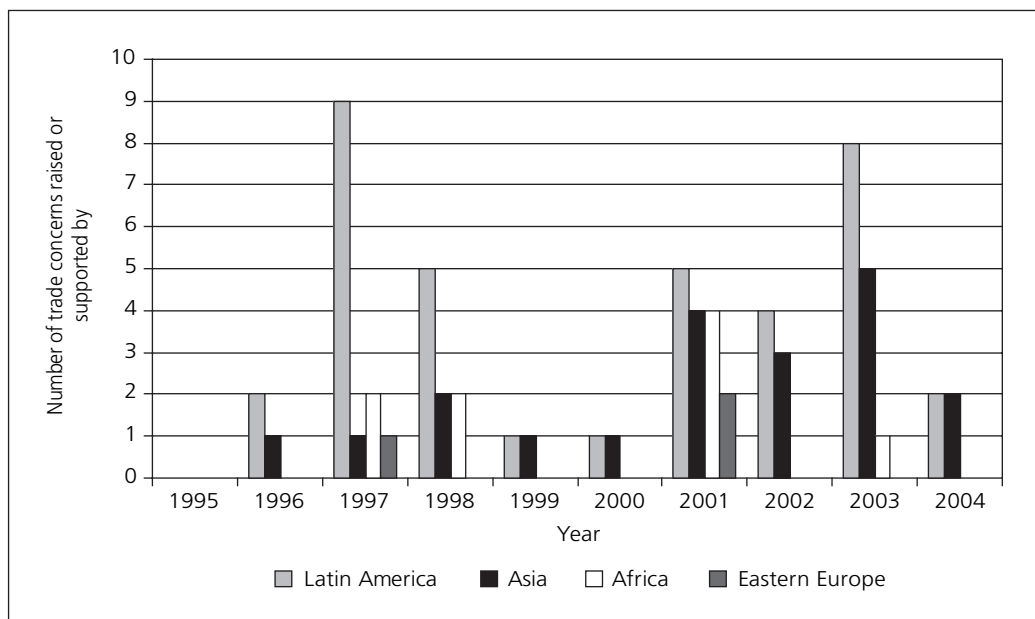


Source: WTO.

Medium level of aggregation: regional total

In order to gain a more detailed picture of which countries appear to raise more “demand” related to SPS concerns, developing countries were split into four geographic areas: Latin America, Asia, Africa and Eastern Europe. From 1995 to 2004, Latin American countries raised or supported more than half (53 per cent) of the total trade concerns. Asian developing countries raised or supported about 30 per cent while African and East European developing countries accounted for 13 and 4 per cent, respectively. Figure 19 shows the evolution of trade concerns raised or supported by developing countries by region during the 1995-2004 period.⁶⁷

⁶⁷When a trade concern is raised or supported by two regions, it will be counted twice and so on.

Figure 19. Trade concerns by region raised in SPS Committee Meetings

Source: WTO.

Minimum level of aggregation: country total

From 1995 to 2004, three Latin American countries (Argentina, Chile and Brazil) headed the list of the top 10 developing countries raising or supporting trade concerns against the EU, the United States and Japan. China, which has continuously raised or supported trade concerns since becoming a member of the WTO in 2001, came fourth but ranks first among Asian developing countries. South Africa is the only African country in the top 10 and there were no East European countries. Other developing countries not included have raised or supported three or fewer trade concerns during the period. Table 7 summarizes the top 10 developing countries raising or supporting trade concerns during 1995-2004 period.⁶⁸

Table 7. Trade concerns raised by developing countries in SPS Committee Meetings, 1995-2004

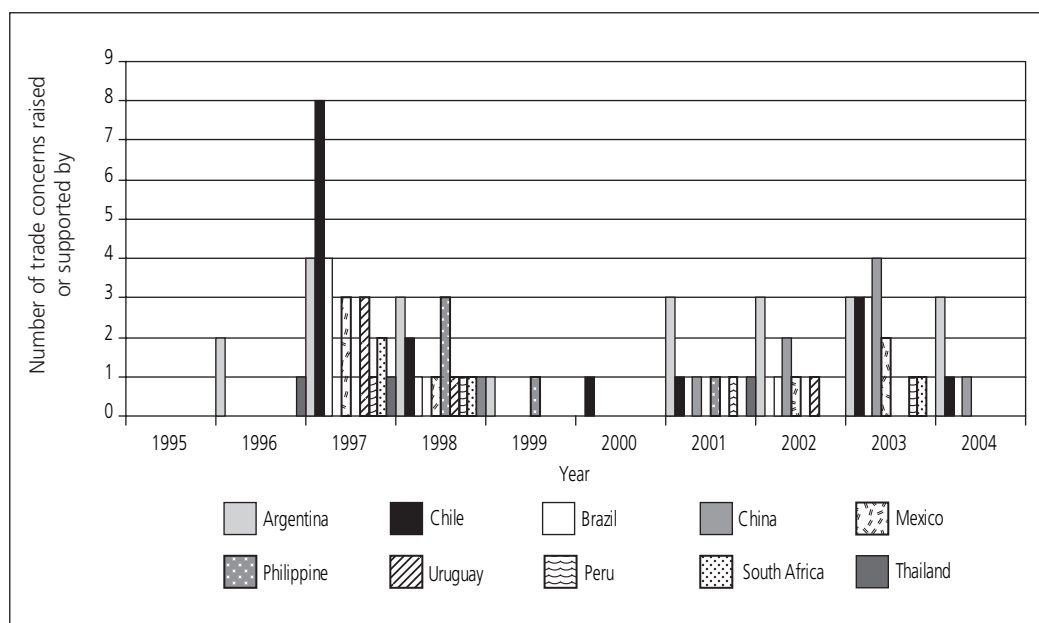
Country	Number of trade concerns raised or supported
Argentina	21
Chile	16
Brazil	9
China	8
Mexico	7
Philippines	5
Uruguay	5
Peru	4
South Africa	4
Thailand	4

Source: WTO.

⁶⁸When a trade concern is raised by two countries or more, it will be counted twice or more.

Figure 20 shows the evolution of the top 10 countries raising or supporting trade concerns against the EU, the US and Japan in SPS Committee Meetings from 1995 to 2004. Argentina has used the SPS Committee Meeting most consistently, followed by Chile, while China has also used this forum for raising trade concerns since its membership of the WTO.

Figure 20. Trade concerns raised against the EU, the US and Japan in SPS Committee Meetings



Source: WTO.

Conclusion

Analysis of the alert notifications shows that the number of alerts and detentions are proportionally related to trade coverage. Future research could address this issue by weighting the number of alerts or detentions against the trade coverage (i.e. the number of alerts per total exports). This weighted indicator would provide a more realistic picture of the problems faced by developing countries in each region.

The previously mentioned “selection bias” also needs to be brought to mind. In fact, it emerges that the middle-income countries that are very important agricultural exporters appear to be most vocal when raising their concerns at SPS Committees. It would also be useful to control for income per head and indicators of the importance of agricultural exports (ratio of agricultural exports to total exports or total value of agricultural exports).

Annex II. Assessing the global supply of SPS-related development assistance

This section attempts to identify the actual SPS-related technical assistance supplied to developing countries by using the Standards and Trade Development Facility (STDF) database as a preliminary indicator.

The STDF was established in 2002 by the WTO, together with the World Bank, the World Animal Health Organization (OIE), World Health Organization (WHO) and Food and Agriculture Organization (FAO) to provide information on SPS-related technical assistance and capacity-building projects. The STDF database includes data from the five partner institutions, multilateral agencies, regional and bilateral donors and the existing WTO/OECD Trade-Related Technical Assistance and Capacity Building database (TCBDB).⁶⁹ At the time of writing, the period of coverage was 2001, 2002 and part of 2003. The database is accessible through the STDF website at <http://stdfdb.wto.org/>.

There are two important issues relating to the limitations of the STDF database for this analysis. Firstly, some entries do not provide financial or monetary information about assistance and therefore cannot be included in the total. As a result, the actual monetary amount of assistance is more than shown in the analysis. However, a money-unspecified project is counted as one assistance programme so the number of assistance programmes is equal to those shown in our analysis.⁷⁰

Secondly, several assistance programmes are spread over more than one year. Some specify the period they cover, but there is no information on whether the amount of assistance is distributed evenly over the whole period. In addition, a number of programmes only give their start date. This issue is dealt with by using the same format as the STDF. Whether the duration of an assistance programme is specified or not, only the start date (i.e. the year) will be used. It is also assumed that the whole amount of assistance is allocated in the start year.

⁶⁹See <http://tcbdb.wto.org/index.asp?lang=ENG>.

⁷⁰In correspondence with the WTO secretariat, a number of points have been identified where the STDF database appears to contain financial figures that look anomalous or incorrect. The estimates of total STDF spending are affected by this, but for reasons given above other calculations are not affected by this.

Finally, “general assistance” programmes, which may have other components, might be included in the database, giving the measures an upward bias.⁷¹

As for demand-side analysis, this section contains three levels of aggregated data, developing country total, by region and by country. Two distinct approaches are used at each level to measure the technical assistance supplied. These are the monetary amount (US\$) and the number of technical-assistance programmes. Individual projects are not discussed.

Maximum level of aggregation: developing country total

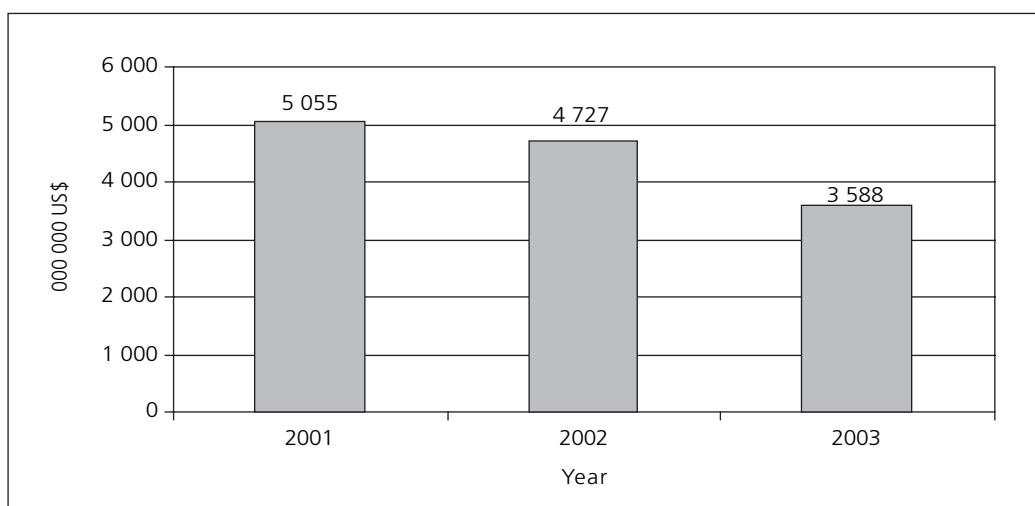
Monetary amount of technical assistance

The monetary amount of SPS-related technical assistance supplied to developing countries from 2001 to 2003 is summarized in figure 21, which shows that it has been decreasing.

Number of technical assistance programmes

Figure 22 shows the number of SPS-related technical-assistance programmes supplied to developing countries between 2001 and 2003. The number supplied was 88 per cent more in 2002 than in 2001 although the monetary amount was smaller. This suggests that the donors were likely to finance more, but smaller, programmes rather than providing financial assistance for large programmes. The figure does not show the distribution of technical-assistance programmes among the countries supplied.

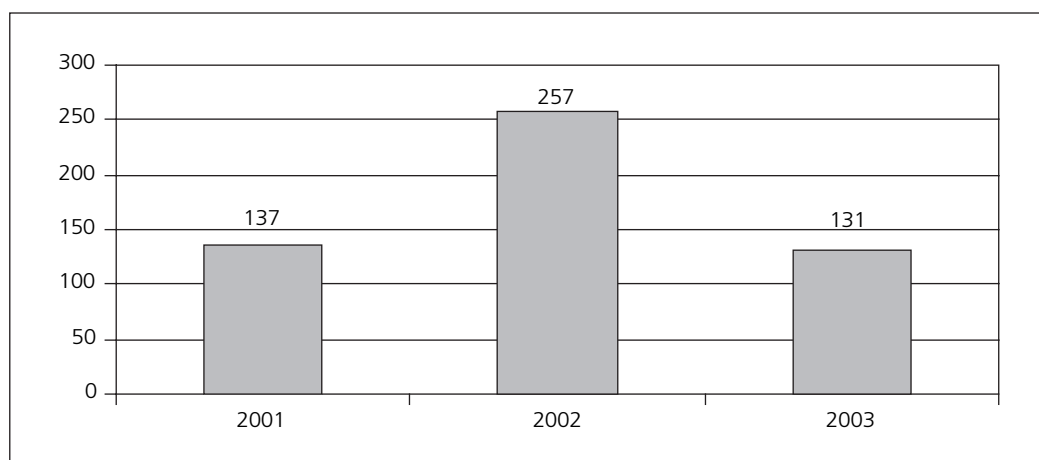
Figure 21. Monetary amount of SPS-related technical assistance, 2001-2003



Note. 2003 data is only partial.
Source: STDF.

⁷¹See, for instance, the assistance project allocated from Kenya to FAO included under the category “general” (http://stdfdb.wto.org/ben_country.asp?ctry=66). Also, UNIDO is providing such “general” assistance programmes.

Figure 22. Number of SPS-related technical assistance programmes, 2001-2003



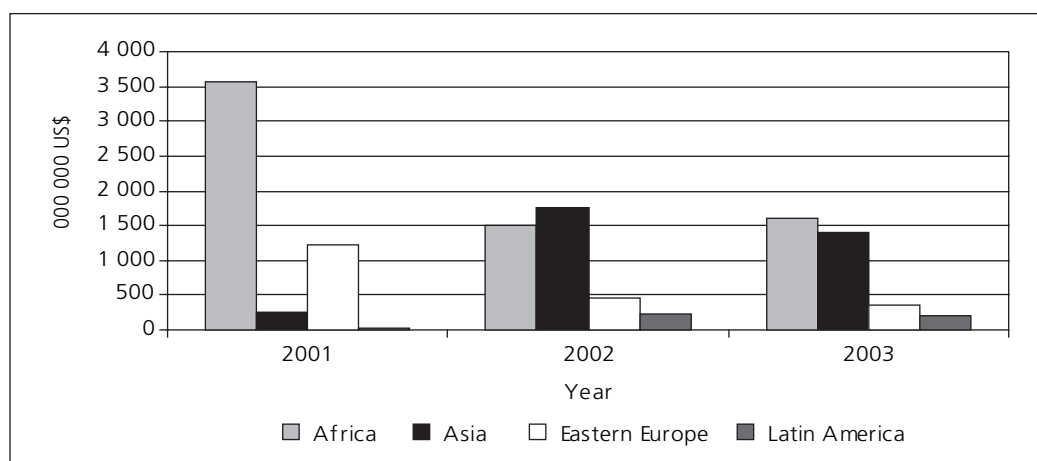
Note. 2003 data is only partial.
Source: STDF.

Medium level of aggregation: regional total

Monetary amount of technical assistance

The monetary amount of SPS-related technical assistance supplied to developing countries by region from 2001 to 2003 is summarized in figure 23. This shows that the financial support for SPS-related technical assistance is very unevenly distributed. In 2001, by far the greatest amount went to Africa, with all other regions together receiving less than half of the total. In 2002 and 2003, technical assistance was concentrated in Africa and Asia. The amount supplied to these two regions accounted for 67 per cent of the total in 2002 and 83 per cent in 2003. Interestingly, while Latin America raised more trade concerns in SPS Committees than other regions during 2001-2003, the actual amount of technical assistance supplied was far below that of Africa and Asia.

Figure 23. Monetary amount of SPS-related technical assistance programmes by region, 2001-2003

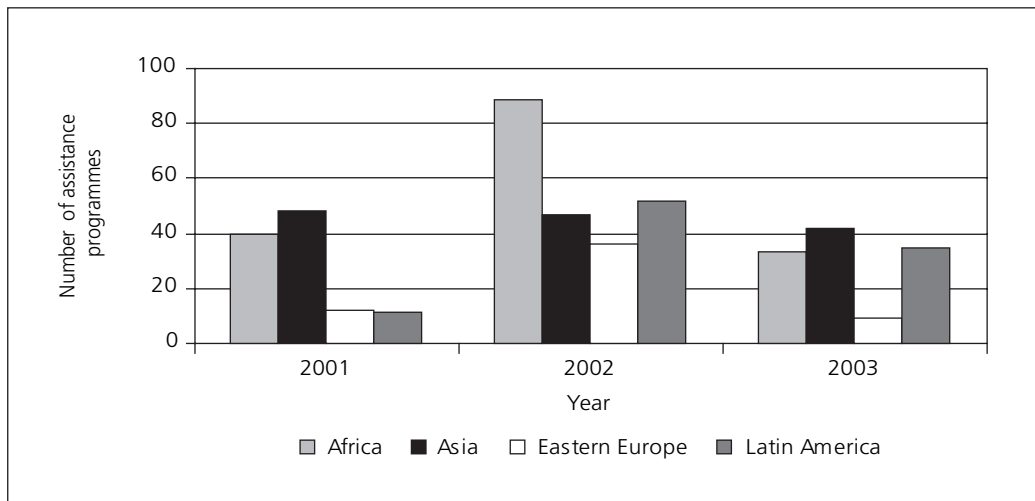


Note. 2003 data is only partial.
Source: STDF.

The number of technical-assistance programmes

Figure 24 raises three important issues. Firstly, although in 2001 Asia received far less monetary technical assistance than Africa, the number of programmes was higher. In other words, the size of programmes in Asian countries was much smaller than those in Africa. Secondly, the number of technical-assistance programmes allocated to Asian countries was almost constant (40-50 programmes), but those of other regions fluctuated. Thirdly, although Latin America received less monetary assistance, the total number of technical-assistance programmes was not substantially different from those allocated to Asian or African regions, especially in 2003. This implies that Latin America was allocated a high number of smaller programmes while Africa was given, on average, funds to finance larger programmes.

Figure 24. Number of SPS-related technical-assistance programmes by region, 2001-2003



Note. 2003 data is only partial.
Source: STDF.

Minimum level of aggregation: country total

Monetary amount of technical assistance

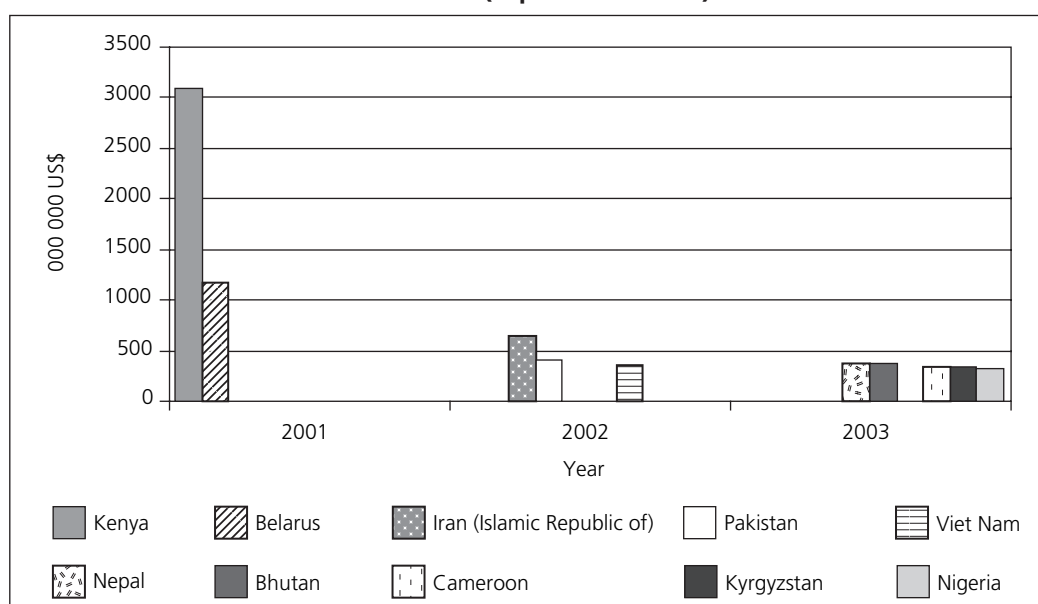
Figures 25-28 show the monetary amount of SPS-related technical assistance supplied to the top 10 developing countries between 2001 and 2003. They suggest three important issues. Firstly, and most importantly, in 2001 there was a major imbalance in the distribution of the monetary amount of technical assistance allocated, with Kenya receiving 1.6 times the amount allocated to the other developing countries in the top 10. In 2002 and 2003, the amounts of technical assistance supplied became closer to each other.

Secondly, the top ten countries change from year to year, with only the Islamic Republic of Iran and Thailand in the list for two years. This may imply that when a major investment in SPS-related capacity building has been made in a particular country, allocations

would subsequently be made to other countries. Alternatively, it could imply that there is no continuity in the technical assistance provided to developing countries.

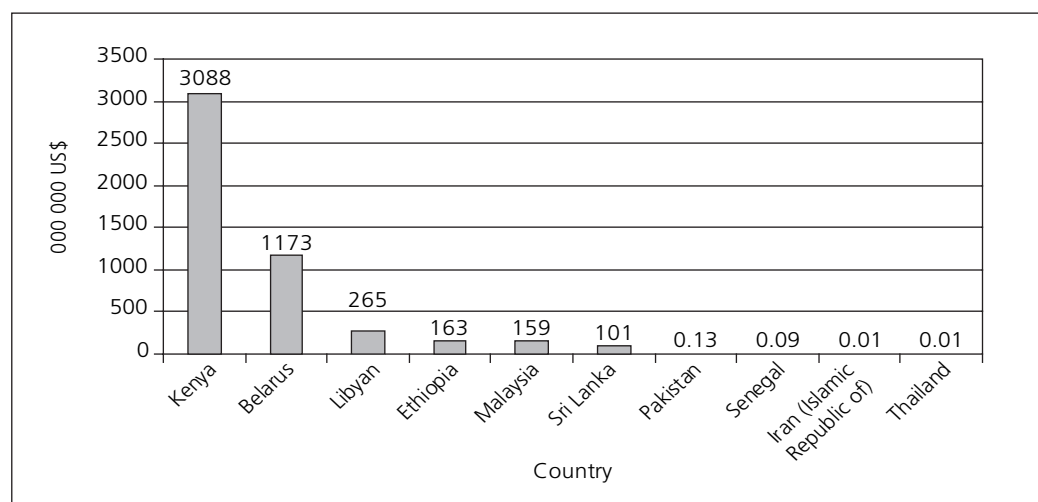
Thirdly, there is no Latin American country in the top 10 list of countries during the period 2001-2003 although it can be seen from demand analysis that several Latin American countries raised a number of SPS-related problems in the SPS Committee. Argentina, for instance, which raised the most SPS issues among Latin American countries in the SPS Committee between 1995 and 2004, is ranked eleventh among Latin American countries with respect to the amount of technical assistance.

Figure 25. Monetary amount of SPS-related technical assistance, 2001-2003 (top 10 countries)



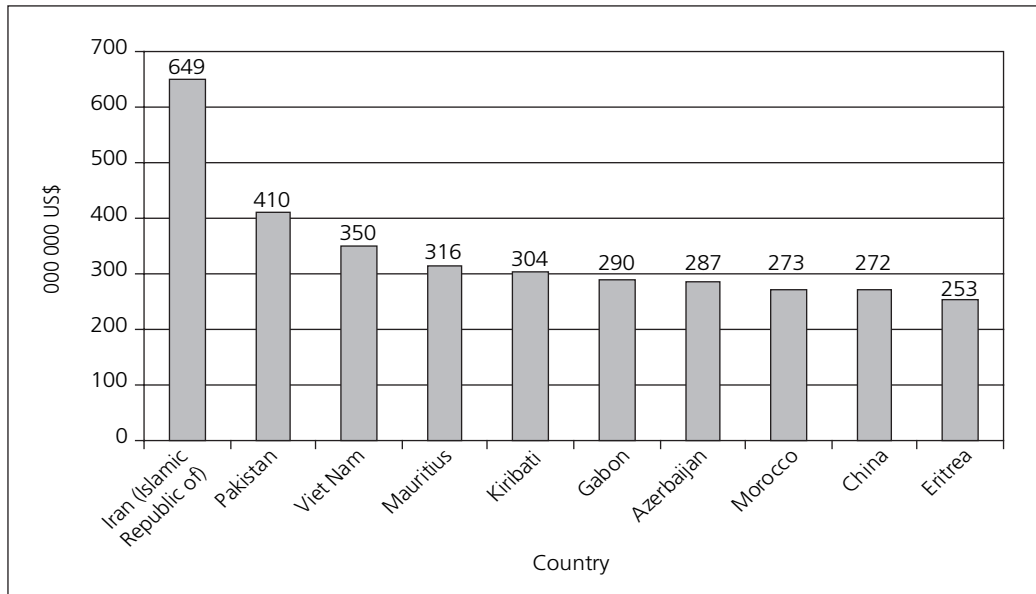
Note. 2003 data is only partial.
Source: STDF.

Figure 26. Monetary amount of SPS-related technical assistance in 2001 (top 10 countries)



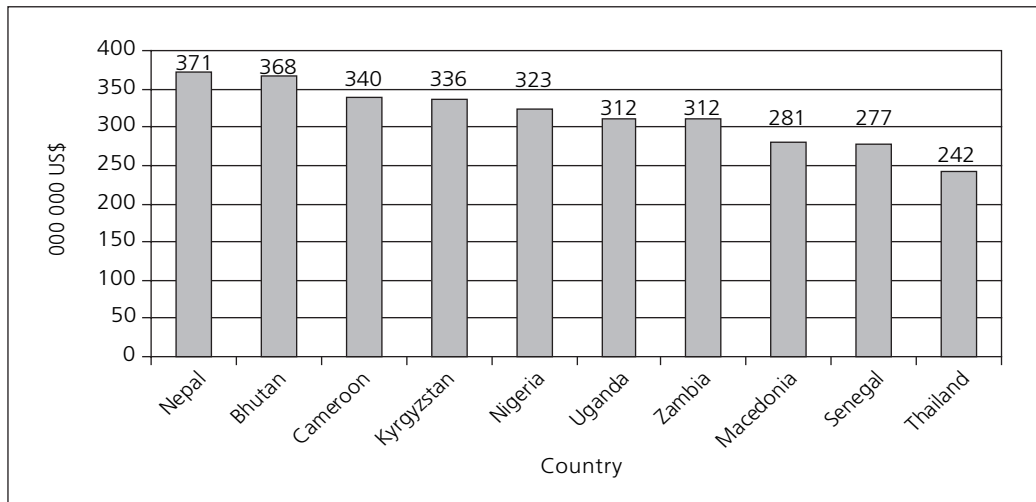
Source: STDF.

Figure 27. Monetary amount of SPS-related technical assistance in 2002 (top 10 countries)



Source: STDF.

Figure 28. Monetary amount of SPS-related technical assistance in 2003 (top 10 countries)



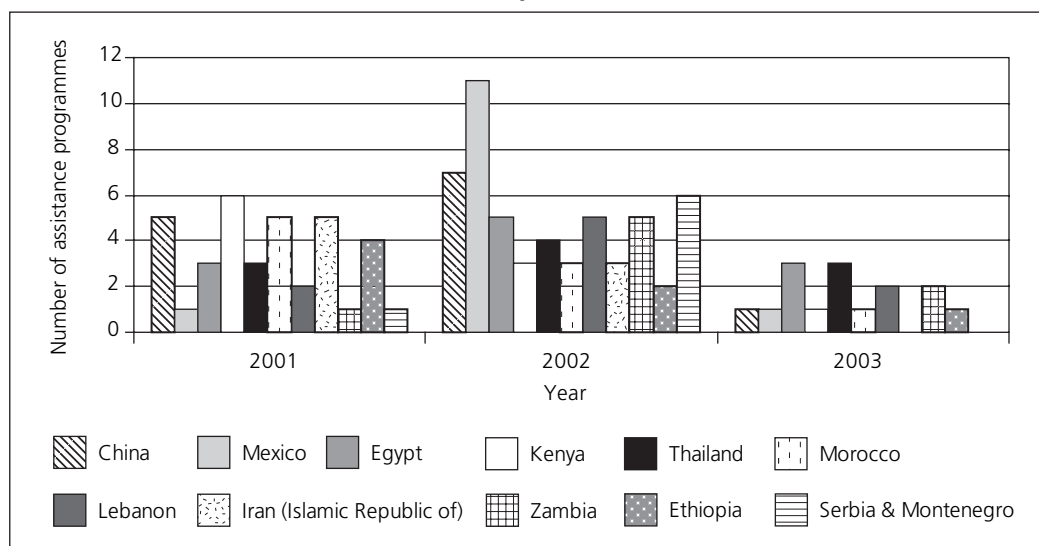
Note. 2003 data is only partial.
Source: STDF.

The number of technical assistance programmes

Figures 29-32 inclusive show the number of SPS-related technical-assistance programmes supplied to the 10 top developing countries during 2001-2003. Three main conclusions can be drawn. Firstly, the average number of assistance programmes provided to an individual country in the top 10 list was 3.2 in 2001, 5.6 in 2002 and 2.5 in 2003. Although the data for 2003 is incomplete, the average number of assistance programmes in 2003 is less than half of that in 2002.

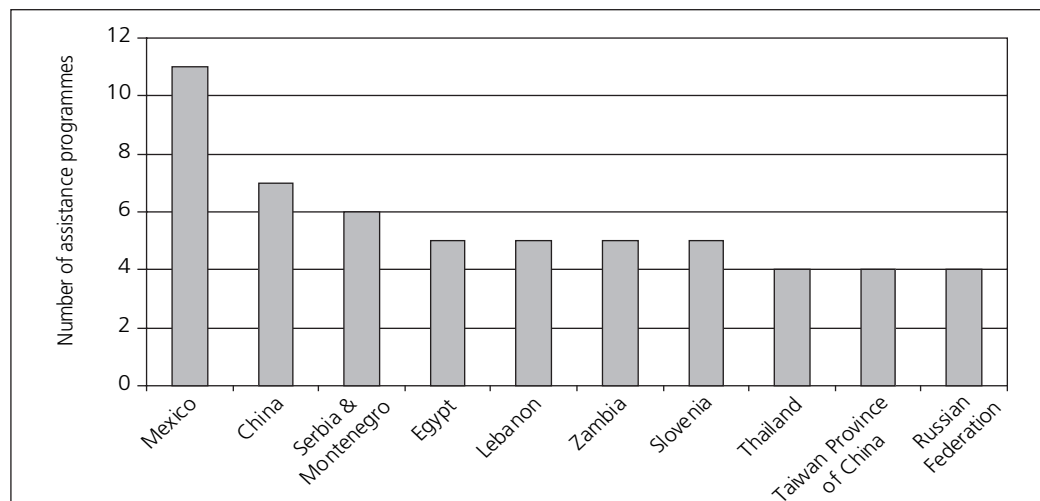
Secondly, in 2001 and 2003, only countries in the top 10 received two or more technical-assistance programmes, hence other countries received only one or none. In 2002, although not shown here, the STDF database indicates that only countries in the top 20 list received two or more technical-assistance programmes. Thirdly, it can be seen from the aggregate three-year period and the top 10 lists in different years that countries in the top 10 (i.e. suggesting priority for the technical assistance, e.g., Thailand, Egypt, Lebanon) tend to maintain their position the following year. This may imply either that the technical programmes might be provided on a continuous basis, or that technical-assistance programmes have been concentrated on a few countries only.

Figure 29. Number of SPS-related technical-assistance programmes, 2001-2003 (top 10 countries)



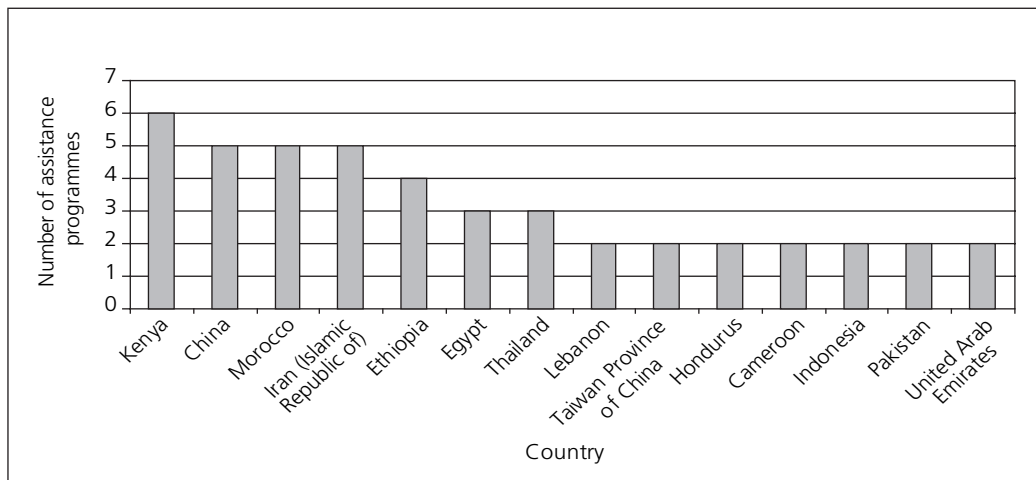
Note: 2003 data is only partial.
Source: STDF.

Figure 30. Number of SPS-related technical-assistance programmes in 2001 (top 10 countries)



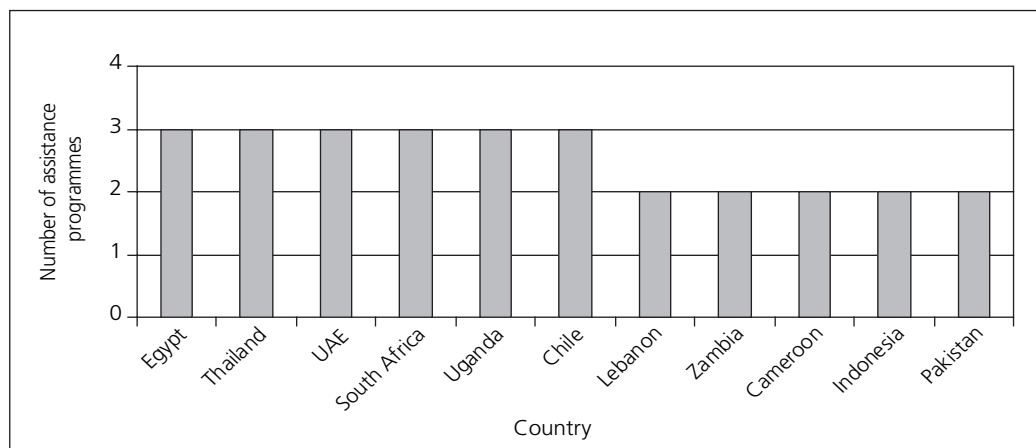
Source: STDF.

Figure 31. Number of SPS-related technical-assistance programmes in 2002 (top 10 countries)



Source: STDF.

Figure 32. Number of SPS-related technical-assistance programmes in 2003 (top 10 countries)



Note. 2003 data is only partial.
Source: STDF.

Conclusions

In this section, the Standards and Trade Development Facility (STDF) database is used to identify the supply of SPS-related technical assistance to developing countries. In general, the results show that developing countries have been allocated large amounts of assistance in both monetary terms and number of technical-assistance programmes. However, the results also suggest that there is an imbalance in the amount of technical assistance allocated to developing countries by region and by country. Ideally, the countries that get priority for the allocation of technical assistance should be those which are significantly affected by the increasingly strict SPS regulations in their export markets, as indicated by demand proxy. However, the results do not support this view—rather, countries in the less-developed regions seem to be the priority for the allocation of technical assistance.

Annex III. Matching demand and supply

This section compares “demand proxy” and “supply of assistance”, using the data presented in previous sections. This is done in two ways; i.e., for the whole period and by year. Three levels of analysis are used as in previous sections: total, regional and country. However, only at the regional level can the data be analysed for both the whole period and over time.

By using three different demand proxies; i.e., the number of trade concerns, the number of import rapid alerts based on the EU’s RASFF and the number of US alerts, the correlation between each demand proxy and the supply of assistance, i.e. the number of assistance programmes, is shown in the three following subsections.

Demand proxy I: number of trade concerns

In this subsection, the number of trade concerns is used as a “demand proxy” and the number of assistance programmes as “the supply of assistance”. The correlation coefficient is used as an indicator to represent the relation between two variables in questions (i.e. demand and supply).

Maximum level of aggregation: developing country total

The period 2001 to 2003 is used for the analysis, as supply-side data is available for the period.⁷² Table 8 summarizes the demand and supply for the three years.

Table 8. Summary of the number of trade concerns and assistance programmes for developing countries, 2001-2003

<i>Variable</i> <i>Year</i>	<i>Demand</i> <i>(No. of trade concerns)</i>	<i>Supply</i> <i>(No. of assistance programmes)</i>
2001	11	137
2002	7	257
2003	10	131
3 years	28	525

Source: US FDA.

⁷²Data on the number of assistance programmes provided in the year 2003 is partial.

Figure 33 shows that although the number of trade concerns in 2002 fell, the number of assistance programmes provided increased by almost 100 per cent. This could suggest that an assistance programme was not given in the year that a developing country faced difficulties in meeting SPS-related standards and regulations, but that it might be given in following years. This is consistent with the administrative delays in technical assistance but it is also worrisome as it suggests that donors need to time their SPS-related assistance better.

Figure 33. Scatter plot between the number of trade concerns and the number of assistance programmes for developing countries, 2001-2003

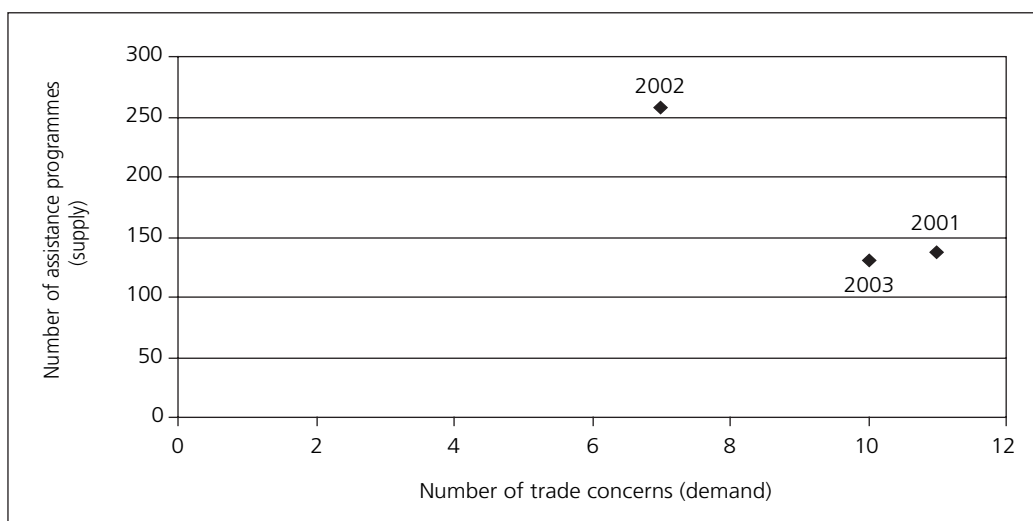


Table 9. Summary of the number of trade concerns and the number of assistance programmes for developing countries by region for three-year period, 2001-2003

Variable Region	Demand (No. of trade concerns)	Supply (No. of assistance programmes)
Africa	9	163
Asia	20	127
Eastern Europe	3	57
Latin America	37	98

Source: US FDA.

Medium level of aggregation: regional total

The three-year period

Demand and supply for 2001-2003 are summarized by region in table 9. The correlation coefficient for the summarized data is 0.07484. This means that supply and demand are almost uncorrelated—the correlation coefficient is close to zero. This implies that the regional pattern of assistance provided to developing countries does not match the

pattern of demand requested through SPS Committee Meetings. There are two interpretations for this: political economy (i.e. countries that do not raise their voice are “rewarded”); the other is that the correlation coefficients need to be corrected for income levels. Middle-income countries tend both to receive less assistance and to be able to make their voice better heard (because they have more capacity).

Evolution by year

Demand and supply for each year, i.e., 2001, 2002 and 2003, are summarized by region in tables 10-12 below.

Table 10. Summary of the number of trade concerns and the number of assistance programmes for developing countries by region, 2001

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	4	40
Asia	4	48
Eastern Europe	2	12
Latin America	5	11

Source: US FDA.

Table 11. Summary of the number of trade concerns and the number of assistance programmes for developing countries by region, 2002

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	-	29
Asia	3	47
Eastern Europe	-	36
Latin America	4	52

Source: US FDA.

Table 12. Summary of the number of trade concerns and the number of assistance programmes for developing countries by region, 2003

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	1	34
Asia	5	42
Eastern Europe	-	9
Latin America	8	35

Source: US FDA.

The correlation coefficients summarized in table 13 show that the number of trade concerns and the number of assistance programmes move together in different ways from year to year. On the one hand, the positive correlation coefficients in 2001 and

2003 mean that a high number of trade concerns is associated with the high number of assistance programmes in that year. On the other hand, the negative correlation coefficient in 2002 means that a high number of trade concerns is associated with a low number of assistance programmes and vice versa. In short, this suggests that the allocation of assistance programmes is not linked to the pattern of trade concerns of developing countries at regional level.

Figure 34. Matching of “demand” and “supply” of SPS-related technical assistance (2001-2003)

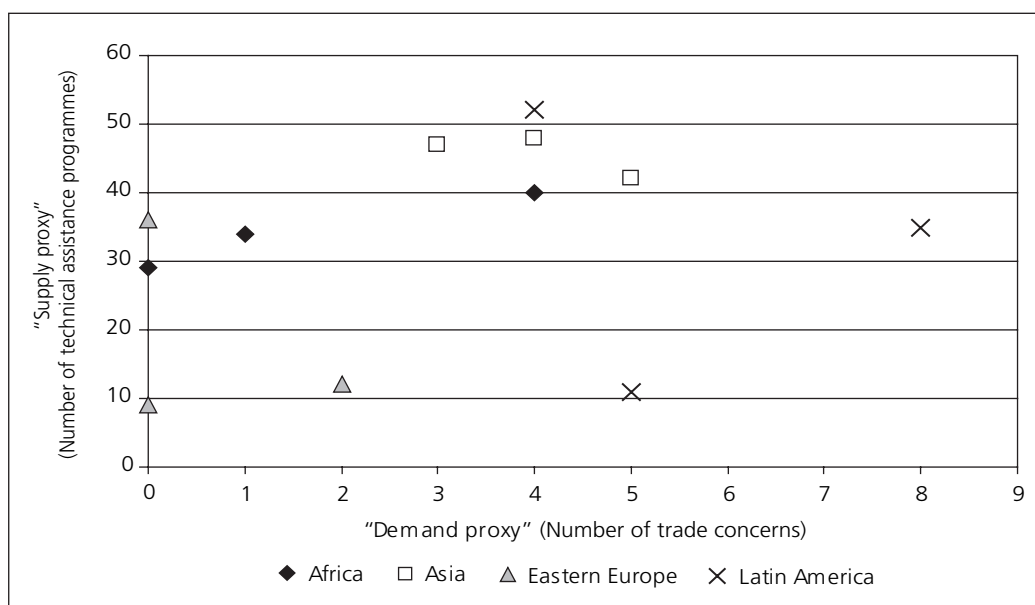


Table 13. Summary of correlation coefficients between the number of trade concerns and the number of assistance programmes, 2001-2003

Year	Correlation coefficient
2001	0.20511
2002	-0.30239
2003	0.64916

Source: US FDA.

Minimum level of aggregation: country total

Table 14 shows the number of trade concerns raised and the number of assistance programmes for the top 10 countries for the whole three-year period. Those countries that are not listed raised or supported one or no trade concerns.

Interestingly, eight out of the 12 countries listed are from Latin America, three are from Asia and one is from Africa. However, if the countries are ranked by the number of assistance programmes, the results are different with five countries from Africa, four from Asia, one from Central and Eastern Europe and one from Latin America. This suggests that there are other relevant factors. Simply raising trade concerns in SPS Committee Meetings may not be enough to qualify for an assistance programme.

The correlation coefficient of demand and supply for the dataset in table 14 is 0.167 and the coefficient for the dataset in table 15 is 0.844. The results suggest positive correlation between the number of trade concerns raised and the number of assistance programmes.

Table 14. Summary of number of trade concerns and assistance programmes for developing countries (ranked by number of trade concerns)

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
Argentina	9	3
China	7	13
Brazil	4	2
Chile	4	5
Mexico	3	13
Bolivia	2	3
Cuba	2	2
Ecuador	2	2
Egypt	2	11
Indonesia	2	5
Republic of Korea	2	3
Peru	2	5

Source: US FDA.

The results show that there is clearly a “selection bias” when considering the countries “raising” trade concerns; these countries are “able” to raise concerns and have high interests at stake given the importance of their agricultural exports. However, if the countries to which support programmes are granted are isolated, there is quite a good correlation between “demand” and “supply”. That is, among the countries that qualify for support (which is most likely to depend on per-capita income level and historical and geopolitical reasons) the support appears to be granted on the basis of “real demand”. If the general allocation of aid funds is overly biased towards criteria unrelated to “SPS needs”, then the bias involved in this “pre-screening” should be addressed carefully as it would imply that the funds had not been spent in the most appropriate manner.

Table 15. Summary of number of trade concerns and assistance programmes for developing countries (ranked by number of assistance programmes)

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
China	7	13
Mexico	3	13
Egypt	2	11
Kenya	1	10
Thailand	1	10
Morocco	-	9
Lebanon	-	9
Iran (Islamic Republic of)	-	8
Zambia	-	8
Ethiopia	-	7
Serbia and Montenegro	-	7

Source: US FDA.

Demand proxy II: number of US alerts

In this subsection, the number of US alerts based on US Food and Drug Administration import alerts for food are used as a “demand proxy” and the number of assistance programmes as “the supply of assistance”. The correlation coefficient is used as an indicator to represent the relationship between the two variables in question (i.e. demand and supply). In view of the small number of “import alerts” where all imports of a particular product from a particular country were banned, a wider demand indicator covering the years 1988-2004 has been created which is compared with assistance at the end of the period.

Table 16. Summary of the number of US alerts and the number of assistance programmes for developing countries (ranked by number of trade concerns)

<i>Variable Region</i>	<i>Demand (No. of trade concerns)</i>	<i>Supply (No. of assistance programmes)</i>
Mexico	10	13
Thailand	8	10
China	8	13
India	7	3
Brazil	3	2
Dominican Republic	3	2
Chile	2	5
Costa Rica	2	4
Ecuador	2	2
Guatemala	2	5
Philippines	2	2
Taiwan Province of China	2	6
Turkey	2	0

Source: US FDA.

Minimum level of aggregation: country total

There is no African country in the list for developing countries with high import alerts. China, Mexico and Thailand have the highest number of US alerts, which could be because they have more trade coverage with the United States than other developing countries.

Table 17. Summary of the number of US alerts and the number of assistance programmes for developing countries (ranked by number of assistance programmes)

<i>Variable Region</i>	<i>Demand (No. of US alerts) 1988-2004</i>	<i>Supply (No. of assistance programmes) 2001-2003</i>
China	8	13
Mexico	8	13
Egypt	-	11
Kenya	-	10
Thailand	7	10
Morocco	-	9
Lebanon	-	9
Iran, Islamic Republic of	-	8
Zambia	-	8
Ethiopia	-	7
Serbia and Montenegro	-	7

Source: US FDA.

However, when ranked by the number of assistance programmes, the results give a different perspective (table 17) with only China, Mexico and Thailand occurring in both lists. Thus it again seems that there are other relevant factors for a developing country to be allocated assistance programmes.

The correlation coefficient of demand and supply for the dataset in table 16 is 0.7950 and the coefficient for the dataset in table 17 is 0.7698. The results suggest positive correlation between the number of US alerts and the number of assistance programmes.

Demand proxy III: number of import rapid alerts based on the EU's RASFF

In this subsection, the number of import alerts based on the EU rapid-alerts system for food and feed (RASFF) are used as a "demand proxy" and the number of assistance programmes as "the supply of assistance". The correlation coefficient is used as an indicator to represent the relation between two variables in questions (i.e. supply and demand).

Maximum level of aggregation: developing country total

Table 18 summarizes the supply and demand for 2001-2003 of the analysis.

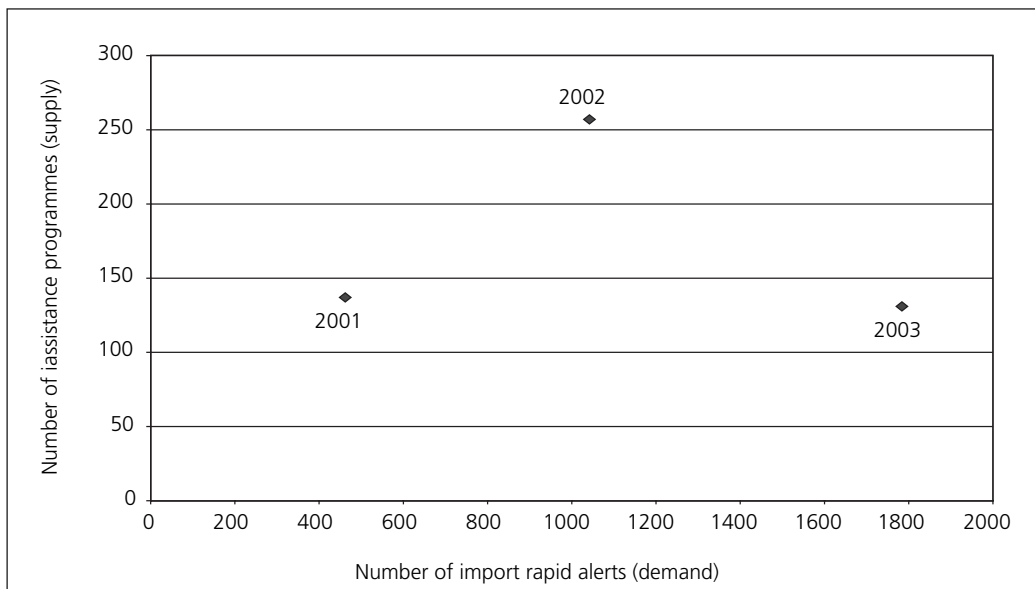
Table 18. Summary of the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for developing countries, 2001-2003

Variable Year	Demand (No. of import rapid alerts)	Supply (No. of assistance programmes)
2001	462	137
2002	1 042	257
2003	1 784	131
3 years	3 288	525

Source: US FDA.

Figure 35 produces different results from previous analyses with two demand proxies (i.e. number of trade concerns raised or supported in the SPS Committee Meetings and number of US alerts). While the number of import rapid alerts of developing countries' exports based on the EU's RASFF increased between 2001 and 2002, so did the number of assistance programmes. However, whereas the number of import rapid alerts continued to rise in 2003, the number of assistance programmes fell to about half of those in 2002. But, as previously noted, the data for assistance programmes in 2003 is incomplete.

Figure 35. Scatter plot between the number of import rapid alerts and the number of assistance programmes for developing countries, 2001-2003



Medium level of aggregation: regional total

The whole three-year period

Demand and supply for the whole three-year period are summarized by region in table 19. The correlation coefficient for the data is 0.6022 so demand and supply are

positively correlated, as large values of demand are associated with large values of supply. In contrast to the results from previous analyses using two demand proxies (the number of trade concerns and US alerts), the regions getting the most EU SPS assistance seem to be the ones with most problems.

Table 19. Summary of the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for developing countries by region, for the period 2001-2003

<i>Variable Region</i>	<i>Demand (No. of import rapid alerts)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	724	163
Asia	1 984	137
Eastern Europe	110	57
Latin America	465	98

Source: US FDA.

Evolution by year

For each year, i.e., 2001 to 2003, demand and supply are summarized by region in tables 20-22 below.

Table 20. Summary of the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for developing countries by region, 2001

<i>Variable Region</i>	<i>Demand (No. of import rapid alerts)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	138	40
Asia	254	48
Eastern Europe	11	12
Latin America	59	11

Source: US FDA.

Table 21. Summary of the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for developing countries by region, 2002

<i>Variable Region</i>	<i>Demand (No. of import rapid alerts)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	259	89
Asia	585	47
Eastern Europe	42	36
Latin America	155	52

Source: US FDA.

Table 22. Summary of the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for developing countries by region, 2003

<i>Variable Region</i>	<i>Demand (No. of import rapid alerts)</i>	<i>Supply (No. of assistance programmes)</i>
Africa	327	34
Asia	1 145	42
Eastern Europe	57	9
Latin America	251	35

Source: US FDA.

Table 23. Summary of correlation coefficients between the number of import rapid alerts based on the EU's RASFF and the number of assistance programmes for 2001, 2002 and 2003

<i>Year</i>	<i>Correlation coefficient</i>
2001	0.9351
2002	0.1129
2003	0.7257

Source: US FDA.

The correlation coefficients (table 23) show that the number of trade concerns and the number of assistance programmes move together between 2001 and 2003. The positive correlation coefficients mean that a high number of import rapid alerts based on the EU's RASFF is associated with a high number of assistance programmes.

Minimum level of aggregation: country total

Disaggregated data by country is not available for the period of 2001-2003 and analysis at the country level for this demand proxy cannot be completed.

Conclusion

This section has looked at the correlation between the demand and supply of SPS-related capacities for developing countries. On the demand side, three different "demand proxies" have been used: the number of trade concerns raised in SPS Committee Meetings; the number of US alerts; and import rapid alerts based on the EU's RASFF. On the supply side, the number of assistance programmes is used as a proxy.

In general, the results show that there are still mismatches between demand and supply of SPS-related capacities for developing countries. On the one hand, the demands for assistance for upgrading and meeting importers' SPS requirements, as suggested by

the number of trade concerns raised in SPS Committee Meetings, seemed not to be the main determinants of assistance. A possible explanation is that those countries which have the capacity to raise trade concerns in the SPS Committee are seen as having “some” financial and institutional capacities related to SPS measures and therefore are not eligible as candidates for most SPS-related assistance projects.

On the other hand, the demands observed through the number of EU import rapid alerts are better correlated with the supply of assistance programmes. This may suggest that recorded failures in meeting the importers’ SPS requirements (i.e. the EU’s SPS regulations) are actually more important factors for donors in providing SPS-related assistance programmes. It is possible that the EU is seeking to channel STDF funds towards potential suppliers into its market.⁷³ However, the results from the analysis using US detention data do not show this and it may be that the number of alerts are linked to trade coverage between the countries.

In future research, the rules and priorities for allocating technical assistance programmes (e.g. whether or not the countries are qualified or eligible for the assistance) to developing countries need further examination. This initial research suggests that low-income African countries have been prioritized in securing SPS-related assistance programmes but there is no evidence that this is due to their having the worst SPS problems. In addition, future research should control for trade coverage and indicators of the importance of agricultural exports since these can distort measures of the demand for assistance.

⁷³More detailed analysis would be needed to look at EU and US bilateral flows of aids for SPS assistance and correlate them with their alerts.

References

- Akerlof, G. A. (1970), "The Market for 'Lemon': Quality, Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 84 pp. 488-500.
- Antle, J. M. (1999), "Benefits and Costs of Food Safety Regulation", *Food Policy*, 24, pp. 605-623.
- Athukorala, P. and Jayasuriya, S. (2003) "Food Safety Issues, Trade and WTO Rules: a Developing Country Perspective", *The World Economy*, 26 (9) pp. 1395-1416.
- Baldwin, R. and Cave, M. (1999), *Understanding Regulations: "Theory, Strategy and Practice,"* (New York: Oxford University Press).
- Best, M. H. (1990), *The New Competition* (Cambridge: Polity Press).
- Cassing, J., Iacovone, L. and Trask, K. (2004), "Standards and Technical Regulations, Case Studies from SADC", report by TSG (The Services Group) for the Southern African Development Community Secretariat.
- Cato, James C. and Lima dos Santos, Carlos A. (1998), "European Union 1997 Seafood-Safety Ban: the Economic Impact on Bangladesh Shrimp Processing", *Marine Resource Economics*, 13 (2), pp. 215-227.
- Cerrex, (2003), "Study of the Consequences of the Application of Sanitary and Phytosanitary (SPS) Measures on ACP Countries", Commissioned by the Technical Centre for Agricultural and Rural Cooperation (CTA). Available online at: http://agri-trade.cta.int/CTA_SPS%20Study_EN.pdf
- Chan, M.-K. and B. King, (2000), "Review of the Implications of Changes in EU Pesticides Legislation on the Production of Fruits and Vegetables from Developing Country Suppliers", National Resource Institute, University of Greenwich, London, UK.
- Duris, D. (2002), "Coffee and Ochratoxin Contamination", Centre for International Cooperation in Agricultural Research for Development, Montpellier, France. Available online at: www.cirad.fr/colloque/fao/pdf/19-duris.pdf
- European Coffee Federation (2005), "OTA Risk Management: Guidelines For Green Coffee buying" available online at: ww.ico.org/documents/ed1939e.pdf

European Commission (2002), "Assessment of Dietary Intake of OTA by the Population of EU Member States", Report on Tasks for Scientific Cooperation (SCOOP): Report of Experts Participating in Task 3.2.7. Available online at: http://europa.eu.int/comm/food/fs/scoop/3.2.7_en.pdf

European Commission RASFF (Rapid alert system for food and feed), Annual Report of the Functioning of the Rapid Alerts System for Food and Feed 2004 available online at: europa.eu.int/comm/food/food/rapidalert/index_en.htm

Evans, D., Gasiorek, M., Ghoneim, A., Holmes, P., Iacovone, L., Iwanow, T., Jackson, K., Robinson, S. and Rollo, J. (2005), "A Framework for Evaluating Regional Trade Agreements Involving Developing Countries", Report for Department for International Development, London. Sussex University.

FAO/WHO (1995) "Application of Risk Analysis to Food Standards Issues", Geneva, WHO available online at: www.who.int/entity/foodsafety/publications/micro/march1995/en/

FAO (2003), "World Regulations for Mycotoxins in Food and Feed in 2003". Available online at: www.fao.org/docrep/007/y5499e/y5499e09.htm

FAO (2005), "Reducing OTA in Coffee" available online at: <http://www.coffee-ota.org/>

FAO (2005), "Definition and Classification of Commodities" available online at: <http://www.fao.org/WAICENT/faoinfo/economic/faodef/fdef12e.htm#12.2>

Freidburg, S. (2003), "The Contradictions of Clean: Supermarket Ethical Trade and African Horticulture", International Institute for Environment and Development, available online at: www.iied.org/NR/agbioliv/gatekeepers/documents/GK109.pdf -

Ghoneim, A., Holmes, P. and Iacovone, L. (2004), "TBTs and the EuroMed—an Empirical Analysis". Paper for EU FEMISE programme, University of Sussex, unpublished.

Hawkins, R. (1995), "Introduction: Addressing the Problematique of Standards and Standardization", in R. Hawkins, R. Mansell and J. Skea (eds), *Standards, Innovation and Competitiveness: The Politics and Economics of Standards in Natural and Technical Environments* (Cheltenham: Edward Elgar).

Helpman, E., Melitz, M. and Yeaple, S. (2004), "Exports Versus FDI with Heterogeneous Firms", *American Economic Review*, 94, 1, pp. 300-316.

Henson S., Brouder, A.-M. and Mitullah, W. (2000), "Food Safety Requirements and Food Exports from Developing Countries: The Case of Fish Exports from Kenya to the European Union", *American Journal of Agricultural Economics*, 82, 5 pp. 1159-1169.

Henson, S., Loader, R., Swinbank, A., Bredahl, M. and Lux, N. (2000), "Impact of Sanitary and Phytosanitary Measures on Developing Countries", Centre for Food Economics Research, University of Reading.

Von Hippel, E. (1986), "Lead Users: A Source of Novel Product Concepts", *Management Science*, 32, 7 pp. 791-805.

Hufbauer, G. C., Kotschwer, B. and Wilson, J. S. (2002), "Trade Policy, Standards, and Development in Central America", Washington D.C., World Bank. Available online at: <http://www.sice.oas.org/geograph/standards/hufkotw.pdf>.

Humphrey, J. and Schmitz, H. (2000), "Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research", Institute of Development Studies (IDS), Working Paper No. 120, Sussex, IDS.

Humphrey, J. and Schmitz, H. (2002), "Developing Countries Firms in the World Economy: Governance and Upgrading in Global Value Chains", Institut für Entwicklung und Frieden, Duisburg, Report 61.

Iacovone, L. (2005), "Analysis and Impact of Sanitary and Phytosanitary Measures", forthcoming in R. Devlin, M. Fouquin and Z. Vodusek (eds), *Integration and Trade*, Special Number, IDB/INTAL (Inter-American Development Bank and the Institute for the Integration of Latin America), Washington D.C.

ILAC-UNIDO (2003), "Laboratory Accreditation in Developing Economies Tested Once—Accepted Everywhere", Working paper No. 2, UNIDO/ILAC/ISO PPEP Project. Available online at: www.unido.org/doc/27291

Jaffee, S. and Henson, S. (2004), "Standards and Agro-food Exports from Developing Countries: rebalancing the debate", World Bank Policy Research Working Paper No. 3348.

Jaffee S, and Henson, S. (2004), "Standards and Agro-Food Exports from Developing Countries: Rebalancing the Debate", World Bank Policy Research Working Paper No. 3348.

Julian, J.-S., Glenn, H.-S. and Guillermo E. (2000), "Assessing the Impact of Food Quality and Safety Measures on the Agri-food sector in Developing Countries, Future Market Development Issues Impacting Central America's Non-traditional Agricultural Export Sector: Guatemala case study", *American Journal of Agricultural Economics*, 82, 5, pp. 1177-1183.

Joint FAO/WHO Expert Committee on Food Additives, JECFA (2001), "Evaluation of Certain Mycotoxins", 56th report, Geneva available online at: www.who.int/entity/csr/delibepidemics/annex2.pdf

Kalenga, P. and Kirk, R. (2003), "The Management of Technical Regulations: Issues for SADC", SADC Secretariat. Available online at: www.satradehub.org/CXA_html/reports.aspx

Kaul, Inge, Conceicao, Pedro, Le Goulven, Katell and Mendoza, Ronald U. (eds). (2003), *Providing Global Public Goods: Managing Globalization*, Oxford, Oxford University Press.

Mattoo, A. (2001), "Discriminatory Consequences of Non-discriminatory Standards", *Journal of Economic Integration*, 16, 1, pp. 78-105.

Melitz, M. (2003), "The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity", *Econometrica*, 71, pp. 1695-1725.

Menezes, R. and Antunes, A. de Souza, (2005), "Using the WTO/TBT Enquiry Point to Monitor Tendencies in the Regulation of Environment, Health, and Safety Issues Affecting the Chemical Industry", *Environment International*, 31, 3, pp. 407-416.

Nadvi, K. and Wältring, F. (2004), "Making Sense of Global Standards" in H. Schmitz (ed.), *Local Enterprises in the Global Economy: Issues of Governance and Upgrading* (Cheltenham: Edward Elgar).

Nidhiprabha, B., Chutisiriwong, P. and Sivanunsakul, S. (2005), "Food Safety Standards and Thailand's Processed Food Exports", presentations at the Workshop on International Food Safety Regulations and Processed Food Exports: A Comparative Study of India and Thailand, New Delhi, 13 August.

OECD (1997), "Product Standards, Conformity Assessment and Regulatory Reform" in *The OECD Report on Regulatory Reform, Volume I: Sectoral Studies*, Paris.

OECD (2002), Sanitary and Phytosanitary Measures and Agricultural Trade: A survey of issues and concerns raised in the WTO's SPS Committee, COM/TD/AGR/WP(2002)21/FINAL, Trade Directorate, Directorate for Food, Agriculture and Fisheries, p. 12

Otsuki T., Wilson, J. and Sewadeh, M. (2001), "Saving Two in a Billion: Quantifying the Trade Effect of European Food Safety Standards on African Exports", *Food Policy*, 26 pp. 495-514.

Pattaconi G., (2004), "Setting up the Quality Infrastructure in LDCs: 40 years' Experience", presentation at 39th Meeting of DEVCO (ISO Committee for Developing Country Matters), Singapore, September 2004.

Plantconsult (2003), "EurepGAP—Introduction Among Small-Scale Producers of Fresh Fruit and Vegetables in Developing Countries", Report to Ministry of Foreign Affairs, Ministry of Agriculture, Central Bureau for Provision Trade, The Netherlands.

Roberts, D. and Krissoff, B. (2004), "Regulatory Barriers in International Horticultural Markets", US Department of Agriculture Available online at: <http://www.ers.usda.gov/publications/WRS04/jan04/wrs0401/wrs0401.pdf>

Roberts, D., Orden D. and Josling, T. (1999), "WTO Disciplines on Technical Barriers to Agricultural Trade: Progress, Prospects and Implications for Developing Countries", paper presented at the Conference on Agriculture and the New Trade Agenda in the WTO 2000 negotiations held in Geneva, 1-2 October 1999.

Steenblik, R. and Andrew, D. (eds.) (2002), "The Development Dimension of Trade and Environment: case studies on environmental requirements and market access", Paris, OECD.

Stephenson, S., (1997), "Standards, Conformity Assessment and Developing Countries" Available online at: www.worldbank.org/html/dec/Publications/Workpapers/WPS1800series/wps1826/wps1826.pdf

Sutton, J. (n.d.), "The Auto-component Supply Chain in China and India: A Benchmarking Study". Available online at: <http://sticerd.lse.ac.uk/dps/ei/ei34.pdf>

Trebilcock, M. and Howse, R. (1999), *The Regulation of International Trade*, 2nd edn, (New York and London: Routledge).

Unnevehr, L. (ed.) (2001), "Food Safety in Food Security and Food Trade", Washington D.C., International Food Policy Research Institute (2003).

UNIDO (2003), "Trade Capacity Building: Supply-Side Development, Conformity and Integration in the Global Market", position paper, and Issue Paper "Making Trade Work for the Poor: Stimulating the Real Economy's Response", both prepared for UNIDO 10th General Conference on "Making Trade Work for the Poor: Stimulating the Real Economy's Response".

UNIDO (2005), "Demand and Supply of Specific Public Goods for Economic Development: With a focus on market efficiency and integration", Part 2, in the Olga Memedovic, 2005, Background Paper prepared for the UNIDO Project: Public Goods for Economic Development.

UNCTAD (2005), "Environmental Requirements and Market Access for Developing Countries: The Case of Electrical and Electronic Equipment, (EEE)", presentation at Bangkok conference, UNCTAD Available online at: http://r0.unctad.org/trade_env/test1/meetings/ctf2/EEE%20Article.pdf

US Department of Agriculture (2004), "Importers Concerned About EU Restriction on Pesticides." Available online at: <http://www.useu.be/agri/pesticides.html>

Williamson, O. E. (1975), *Markets and Hierarchies*, (New York: Free Press).

Wilson, J. (2002), "Standards, Regulations and Trade: WTO Rules and Developing Country Concerns" in B. Hoekman, A. Mattoo and P. English (eds), *Development, Trade and the WTO: A Handbook*, pp. 428-439 (Washington D.C.: World Bank).

WTO (1998a), "Understanding the WTO Agreement on Sanitary and Phytosanitary Measures" Available online at: http://www.wto.org/english/tratop_e/sps_e/spsund_e.htm Accessed 4 July 2005.

WTO (1998b), Statement Made by Bolivia About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/93.

WTO (1998c), Submission Made by Australia About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/61.

WTO (1998d), Submission Made by Senegal, About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/55.

WTO (1998e), Submission Made by Argentina About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures G/SPS/GEN/52.

WTO (1998f), Submission made by Malaysia About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/56.

WTO (1998g), Submission Made by Brazil About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/58.

WTO (1998h), Submission Made by India About the Proposal by the European Community to Introduce Controls on Aflatoxin Contamination, Committee on Sanitary and Phytosanitary Measures WTO doc number G/SPS/GEN/54.

WTO (2003), Submission Made by Colombia About the Proposal by Germany to Introduce Controls on OTA Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/434

WTO (2004a), Submission Made by Colombia About the Proposal by European Communities to Introduce Controls on OTA Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/515.

WTO (2004b), Submission Made by Papua New Guinea About the Proposal by European Communities to Introduce Controls on OTA Contamination, Committee on Sanitary and Phytosanitary Measures, WTO doc number G/SPS/GEN/470

WTO (2005), Annual Report, Geneva Available online at: http://www.wto.org/english/res_e/reser_e/annual_report_e.htm



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