The Impact of Food Safety Standards on an Export-Oriented Supply Chain: Case of the Horticultural Sector in Guatemala

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1. Introduction:
In recent years, food safety standards have become a more prominent issue for global trade in agricultural and food products (Jaffee and Henson, 2005; Josling et al., 2004). Of particular concern is the potential impact of food safety standards, whether promulgated by governments or private sector buyers, on the ability of developing countries to gain and/or maintain access to export markets for agricultural and food products, especially in industrialised countries. In part this reflects the growing preponderance of these standards, but also more widespread recognition of the degree and manner in which trade flows can be affected, reflecting the typically weaker compliance capacity of developing countries.

An increasing number of studies highlight the challenges faced by developing countries in complying with food safety standards in export markets for agricultural and food products (see below). However, it is recognised that more in-depth analysis is needed that focuses on the challenges and successes and failures of particular countries, drawing lessons for developing nations more generally. That is our objective here.

The present case study analyses the impact of food safety standards on the horticultural sector of Guatemala, specifically focusing on snow pea and raspberries/blackberries exports to the United States where problems have been experienced with pesticide residues and microbiological contamination. Using the framework proposed by Henson and Jaffee (2006; 2007) we assess the extent to which food safety standards have acted as a barrier to exports versus a catalyst for upgrading and innovation along the supply chain.

The following section provides an overview of the evolution of food safety standards and their impacts on trade in agricultural and food products. A framework for the analysis of the impacts of food safety standards on agri-food exports from developing countries is then proposed. The remainder of the paper focuses on the case study. Following a brief overview of the horticultural sector in Guatemala, focusing on export trends, the broad challenges faced with food safety standards are examined. We then analyse in some depth the experiences with snow pea and raspberry/blackberry exports to the United States, highlighting the challenges faced and the degree to which Guatemala has been successful in addressing these. In so doing, a strategic approach is employed; we aim to assess the extent to which the efforts by Guatemala represent the optimal response to challenges with food safety standards in exports markets.

In undertaking the case study, information and data have been compiled from secondary sources. Further, a series of interviews was undertaken in Guatemala including government officials, industry organizations and exporters. While the study is broadly qualitative in nature, and would certainly benefit from a further stage of quantitative analysis, it does provide an in-depth assessment of Guatemala’s experiences, in an attempt to draw more general lessons for countries in the region.
The expansion of international trade in high-value agricultural and food products has served to highlight the extent to which national food safety standards diverge, as well as the differential capacities of both public authorities and private sector suppliers to comply. For many higher-value agricultural and food products, international competitiveness is no longer driven by price and quality grades (Jaffee and Henson, 2004; 2005). Rather, safety concerns have come to the fore and the dominant modes of competition in many agricultural and food markets are based around quality rather than price (Busch and Bain, 2004). There is greater scrutiny of the production or processing techniques employed along the associated supply chains (Buzby, 2003; Unnevehr, 2000; 2003) and a number of meta food safety management standards, for example hazard analysis and critical control point (HACCP), have increasingly become global norms through supply chains.

There are various reasons why food safety standards may differ between countries (Unnevehr, 2003; Henson, 2004). First, distinct tastes, diets, income levels and perceptions influence the tolerance of populations towards the potential risks associated with food. Second, differences in climate and the application of production and process technologies affect the incidence of different food safety hazards. Food safety standards, in turn, reflect the feasibility of implementing alternative mechanisms of control, which itself is influenced by legal and industry structures as well as available technical, scientific, administrative and financial resources. For example, some food safety risks are greater in developing countries due to weaknesses in physical infrastructure (for example efficacy of hygiene controls) and the higher incidence of certain infectious diseases. Further, climatic conditions may be more conducive to the spread of particular pests and diseases that pose risks to human health.

The intrinsic risks associated with the production, transformation and sale of agricultural and food products, combined with different standards and institutional capabilities, can pose major challenges for international trade. This is exacerbated by ongoing and rapid changes in the landscape for food safety standards. Over the past decade, there has been increased public awareness and concern about food safety within industrialised countries in the wake of a series of highly publicized food scares or scandals (Henson and Caswell, 1999). In some countries, these events have shaken the confidence of consumers in national systems of food safety regulation. In response, there have been significant institutional changes in official food safety oversight and reform of associated regulations. For long-held concerns (for example, the potential environmental and health impacts of pesticides), there has been a tightening of standards in many countries. At the same time, new standards are being applied to address emerging and/or formerly unregulated hazards (for example, Bovine Spongiform Encephalopathy or heavy metals). Increased emphasis is being given to product or raw material traceability, plus increased resources have gone into border inspections of imported food products.
In parallel with the evolution of regulatory standards and oversight have been efforts by the private sector to address food safety risks and otherwise attend to the concerns and preferences of consumers and civil society (Henson, 2004; 2006; Berdegué et al., 2005; Henson and Reardon, 2005). Much of the motivation behind this trend has been the mitigation of reputational and/or commercial risks. Further, for some products private food safety standards have become the basis of competitive processes of market differentiation. This has resulted in a rapidly expanding plethora of private standards and other forms of supply chain governance. While these efforts have been especially prominent among major food retailers, food manufacturers and food service chains in industrialized countries, such systems of private food safety governance are also being applied more widely in middle-income (and even some low-income) countries. This later phenomenon reflects, in part, the investments undertaken by multinational retail or food service chains and the broader development of the supermarket sector in developing countries (Reardon and Berdegué, 2002).

The food safety standards ‘landscape’ faced by exporters of higher-value agricultural and food products thus consists of distinct, although inter-related, public and private systems of control, with related standards and conformity assessment mechanisms. In most industrialised countries, the evolution of these systems is driven as much by consumer concerns as advancements in science and technology (Pelupessy and van Kempen, 2005). This process of evolution is seemingly taking place at an increasingly rapid pace (Henson and Jaffee, 2007), such that the process of compliance with food safety standards is always a ‘work in progress’. At the same time, standards do differ between markets (and between buyers therein), such that exporters do face choices as to the standards regime with which they comply. While markets with less strict standards may be less lucrative (Pelupessy and van Kempen, 2005), the associated costs of compliance are also lower. In turn, while we might typically characterise lower-income countries as ‘standards takers’ in the global systems of food safety regulation, there may be some scope for strategic choices and positioning; we discuss both of these issues below.

During the Uruguay Round of multilateral trade negotiations, agricultural exporters voiced concerns that food safety, as well as animal and plant health measures - generally referred to as sanitary and phytosanitary (SPS) measures - were sometimes used to restrict import competition to domestic producers and that such protectionist measures would likely increase as traditional trade barriers declined (Henson and Wilson, 2005; Marceau and Trachtman, 2002). The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) was negotiated in order to provide a set of multilateral rules that would both recognize the legitimate need for countries to adopt SPS measures and, at the same time, create a framework to reduce their potential trade-distorting effects. The SPS Agreement sets out broad ground rules for the legitimate application of food safety standards, many of which could affect international trade. Yet, the Agreement gives countries fairly broad latitude in setting and applying such measures. Thus, it is perhaps not surprising that concerns about the impact of food safety and other SPS measures on
trade, and accusations of the misuse of such measures as ‘unjustified’ restrictions, has not gone away.

The proliferation and enhanced stringency of food safety standards has fermented considerable concern among developing countries and development agencies aiming to promote trade as a means to agricultural and rural development (see for example Henson et al., 2000; 2004; 2006; Unnevehr, 2000; Wilson and Abiola, 2003; Otsuki et al., 2001a; 2001b; Wiig and Kolstad, 2005). Indeed, there is a widespread presumption that food safety standards are used as a protectionist tool, providing ‘scientific’ justifications for prohibiting imports of agricultural and food products, or discriminating against imports by applying higher and/or more rigorous regulatory enforced standards than on domestic suppliers (Henson and Loader, 2001). Such concerns have become heightened as traditional barriers to trade, for example tariffs, have been eroded through progressive rounds of multilateral trade negotiations. Even where standards are not intentionally used to discriminate against imports, there is concern that their growing complexity and the lack of harmonization between countries impedes the efforts of developing countries to gain access to potentially lucrative markets in industrialised countries.

There is also concern that many developing countries lack the administrative, technical and scientific capacities to comply with strict food safety standards, presenting potentially insurmountable barriers into the medium-term (Henson et al., 2000). Further, the associated one-off and recurring costs of compliance can undermine the longer-term competitive position of exporters and/or diminish the profitability of high-value agricultural and food exports. It is argued that the combined effects of these institutional weaknesses and costs of compliance costs contributes to the further marginalization of smaller and/or poorer countries and weaker economic players therein, including small-scale producers and micro and small enterprises (Wilson and Abiola, 2003).

In the realm of food safety there is a hierarchy of inter-related functions (Figure 1) (World Bank, 2005). In this hierarchy, the foundation of any food safety management system is awareness and recognition, in both the public and private sectors and from the level of decision-makers to implementers and operatives, of the importance of effective food safety controls to export competitiveness and recognition by each party of their own role in this system. It is unlikely that any system of food safety management can be effective without broad-based appreciation of its functions and roles. The next stage is the application of established risk and quality management practices through the supply chain from production to distribution, most notably HACCP, good manufacturing practice (GMP) and good agricultural practice (GAP). Regulatory action may be required to compel implementation of these practices if there are insufficient market-based incentives to do so in the short to medium term. With broad awareness and common application of good practices, many potential food safety risks can be managed effectively at the farm or firm level. However, there are other risks that are more systemic in nature, and that are not confined to particular production or processing operations, such that they cannot be fully controlled on a decentralized basis and require broader oversight or collective action. This
can entail research and analytical functions, surveillance systems and emergency management arrangements. These more technically-demanding functions often require sophisticated skills, specialized equipment and well-defined organizational structures, supported by recurrent funding. Some of these functions need to be legally mandated to ensure that they are implemented appropriately. Finally, at the top of the pyramid is ‘SPS diplomacy’, which relates to engagement with the WTO and Codex Alimentarius, as well bi-lateral relations with trading major partners.

Figure 1. Hierarchy of Trade-related SPS Management Functions:

It is evident that established systems of food safety management in countries such as Guatemala lack many of the critical elements of Figure 1, while attempts to enhance capacity have often not focused on establishing the critical (and often ‘softer’) foundations before turning to investments in ‘hard’ infrastructure, such as laboratories. Such capacity weaknesses have profound implications for Guatemala’s position in global systems of food safety regulation and their impacts on trade. First, efforts towards compliance are often curtailed by lack of critical food safety control functions, whether in the public and/or private sectors. While in some cases such capacities can (and have been) established in
response to food safety standards in international markets, costs of compliance are commensurately higher, acting to jeopardise competitiveness. Second, some of the weakest capacity is observed at the peak of Figure 1, relating to ‘SPS diplomacy’ (Unnevehr, 2000; Hart, 2003). Thus, both the Guatemalan government and private exporters are often forced into the position of ‘standards takers’ such that, even where there is scope for negotiation with trading partners, their ability to capitalise on such opportunities is often constrained. Further, while in principle it may be possible to predict and follow the promulgation of new food safety standards by major trading partners, and indeed have some influence on their eventual form, the inability to engage bilaterally and multilaterally means that new standards often ‘creep up’ and catch exporters and regulatory authorities in developing countries (such as Guatemala) unawares.

An alternative and less pessimistic view, however, emphasizes the potential opportunities provided by evolving food safety standards and the likelihood that certain developing countries can utilize such opportunities to their competitive advantage (Jaffee and Henson, 2004; World Bank, 2005; Henson and Jaffee, 2007). From this perspective, public and private standards are viewed, at least in part, as a necessary bridge between increasingly demanding consumer requirements and the participation of international suppliers. Many food safety standards provide a ‘common language’ through the supply chain, in turn reducing transaction costs, and promote consumer confidence in food product safety, without which the market for these products cannot be maintained and/or enhanced. Indeed, there is increasing evidence that developing countries have benefited from food safety and other SPS measures through access to new export markets (Unnevehr, 2000; Roberts et al., 2004).

The costs of complying with food safety standards may also provide a powerful incentive for the modernisation of export supply chains in developing countries. Compliance with stricter food safety standards can also stimulate capacity-building within the public sector and give greater clarity to the appropriate management functions of government. Further, through increased attention to the spread and adoption of ‘good practices’ in the supply of agricultural and food products, there may be spillovers into domestic food safety systems, to the benefit of the local population and domestic producers. Thus, the associated costs of compliance are offset, at least in part, by an array of benefits, both foreseen and unforeseen, from the enhancement of food safety management capacity. Rather than degrading the competitiveness of developing countries, therefore, the enhancement of capacity to meet stricter food safety standards can potentially create new forms of competitive advantage. While there will inevitably be losers as well as gainers, this view suggests that the process of standards compliance can conceivably provide the basis for more sustainable and profitable agricultural and food exports in the long-term. In turn, it redirects the debate to the conditions under which developing countries are able to derive gains from evolving food safety standards.

Despite the technical capacity constraints faced by the public and private sectors in developing countries such as Guatemala, there is scope for collective action that leverages
the capacity that has been established and limited resources. This reflects the fact that, while many of the problems faced with compliance are at the level of the individual firm, and in some cases these may be the basis of a firm’s market competitiveness, there are common interests across firms and/or markets that provide scope for collaboration. For example, government can support research, development and extension services to augment actions by exporters in their own supply chains. Exporters can pool information on evolving food safety standards and share experiences with compliance. Here, close relations with buyers in strategic export markets may play a critical role (Wilk and Fensterseifer, 2003), acting to by-pass weaknesses in public institutions aimed at ‘SPS diplomacy’. Governments can also appeal for technical assistance from their trading partners, as facilitated through the SPS Agreement, although concerns have been raised about the effectiveness and sustainability of such interventions (Wiig and Kolstad, 2005).

This rather crude dichotomy between ‘standards as barriers’ and ‘standards as catalysts’ suggests a complex reality in which close attention is needed to the specifics of particular markets, products and countries to understand how food safety standards are providing challenges and opportunities for developing countries. Further, there is a need to understand the strategic options and patterns of performance of developing countries in meeting these challenges and their ability to exploit emerging opportunities. The result is a varied picture, partially supporting both of these opposing perspectives. In turn, this highlights the dangers of making overly generalized conclusions and the need to differentiate analyses and strategies in relation to food safety standards.

3. Food Safety Standards as a Strategic Issue:
The complexity of the food safety standards environment highlighted above poses enormous challenges for developing countries in general, and stakeholders involved in export-oriented agricultural and food supply chains in particular. These challenges include the scope to anticipate and influence food safety standards as they evolve over time and the ability to make the necessary institutional changes and investments in order to achieve compliance while maintaining international competitiveness. Reflecting weaknesses in prevailing food safety management capacity and acute resource constraints that impede efforts towards capacity enhancement, countries such as Guatemala inevitably face an ‘uphill battle’ in achieving compliance with exacting food safety standards in export markets. Embedded within the associated challenges, however, is the need for decision-makers in the public and private sectors to make strategic decisions in order to ‘make the most’ of their existing capacity, such that opportunities are maximised and threats abated. In so doing, they must trade-off the available options through which compliance can be achieved and manage the chosen processes of capacity-building and adjustment. The notion of ‘strategic options’ is quite novel in the context of food safety standards and trade, especially in the context of developing countries (Jaffee and Henson, 2004; Henson and Jaffee, 2007). This certainly counteracts the notion that developing countries are strict ‘standards takers’, facing essentially ‘all-or-nothing’ decisions regarding compliance with few, if any, alternative approaches to achieving their trade goals. Rather, this perspective
focuses on the ‘room for manoeuvre’ available to developing countries in complying with food safety standards, focusing on what such can do rather than what they can not.

Figure 2 presents a simple conceptual framework that aims to characterize alternative strategic responses to evolving food safety standards. This framework draws on the concepts of ‘exit’, ‘loyalty’ and ‘voice’ developed by Hirschman (1970). Hirschman’s framework was originally used to examine economic and political behaviour as responses to the decline of firms, organizations and states, but has since been extended to quite different contexts, for example microfinance for micro and small enterprises (Lepenies, 2004). Depending on the context, ‘exit’ could involve leaving an organization, emigrating, or ceasing to buy a company’s products. ‘Voice’ involves protest or otherwise lobbying for changes in rules and laws. For Hirschman, ‘loyalty’ involves deepening one’s participation in, and alignment with, an entity’s goals and processes. A second ‘proactivity’-‘reactivity’ dimension, that is not attributable to Hirschman (1970) relates to the time when efforts towards compliance commence.

**Figure 2. Strategic Response to Food Safety Standards:**

<table>
<thead>
<tr>
<th></th>
<th>Reactive</th>
<th>Proactive</th>
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</thead>
<tbody>
<tr>
<td><strong>Exit</strong></td>
<td>Wait for standards and give up</td>
<td>Anticipate standards, leave particular markets or market segments, and make other commercial shifts</td>
</tr>
<tr>
<td><strong>Loyalty</strong></td>
<td>Wait for standards and then adopt measures to comply</td>
<td>Anticipate standards and comply ahead of time</td>
</tr>
<tr>
<td><strong>Voice</strong></td>
<td>Complain when existing standards are applied or new measures are adopted</td>
<td>Participate in standard creation and/or negotiate before standards are applied</td>
</tr>
</tbody>
</table>

*Source: Henson and Jaffee (2007)*

Besides the two dimensions in Figure 2, a distinction can be made between ‘defensive’ and ‘offensive’ approaches. ‘Defensive’ strategies are aimed at maintaining the status quo and minimizing related impacts. The aim is normally to limit the actions (and often also the investments) needed to achieve compliance. This is often pursued under conditions of resource limitations and risk adversity. ‘Offensive’ strategies involve attempts to utilize standards as a means to gain competitive advantage, even where this may require additional investments beyond the minimum required to achieve compliance.
A final dimension relates to the locus of strategic responses. Measures can be taken within the public or private sectors, involving either individual entities (for example single exporters or producers) or various forms of collective action (Figure 3). Where both the public and private sector are adopting measures, the leadership or driving force behind this process could come from either side. Traditionally, relatively clear distinctions have been made between aspects of food safety management that are the domain of the public and private sectors. Increasingly, however, these demarcation lines are being challenged. For example, the potential role of self-regulation through industry-level ‘codes of practice’ and commercial laboratories for product certification is being acknowledged. Further, there is recognition of the potential efficiencies associated with collective and collaborative actions. These can include inter-ministerial task forces seeking to avoid duplication of efforts where multiple tiers of government are involved and/or trade and industry associations that build on the compliance investments made by individual enterprises. Collective action can also take place across the public and private sectors, for example through joint task-forces. More broadly, it is recognized that both the public and private sectors have a role to play in responding to new food safety standards, and that national standards capacity should be viewed from this holistic perspective.

**Figure 3. Actors in Strategic Response to Evolving Food Safety Standards:**

<table>
<thead>
<tr>
<th>Public</th>
<th>Individual</th>
<th>Collective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specific Ministry or agency</td>
<td>Inter-ministerial taskforces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government to government</td>
</tr>
<tr>
<td></td>
<td></td>
<td>memoranda of understanding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multi-country SPS counter-notification</td>
</tr>
<tr>
<td>Public-private</td>
<td>Subsidies/Co-financing</td>
<td>Joint public-private sector task-</td>
</tr>
<tr>
<td></td>
<td>Joint-ventures</td>
<td>forces</td>
</tr>
<tr>
<td>Private</td>
<td>Firm/farm investments</td>
<td>Trade/industry associations</td>
</tr>
<tr>
<td></td>
<td>Company ‘codes of practice’</td>
<td>Grower associations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partnerships in coordinated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>supply chains</td>
</tr>
</tbody>
</table>

*Source: Henson and Jaffee (2007)*

The predominant dialogue on food safety standards, especially relating to developing countries, presents a single strategic option of complying with (official and private) food safety standards in focal markets, i.e. ‘loyalty’. This can take a variety of forms, including the adoption of legal/regulatory reforms, changes in production technologies, shifts in the structure of supply chains, additional measures for conformity assessment, etc. This
approach to compliance can be implemented at the time a standard comes into force, that is ‘reactively’, or ahead of time in view of expectations as to how standards are likely to evolve in the future, that is ‘proactively’. Everything else being equal, a ‘proactive’ approach affords greater potential to manage compliance in a manner that brings about strategic gain and minimizes any detrimental economic and social spillovers. This relates to the existence of ‘first mover’ advantage, for example through earlier sunk costs or reputational effects, as well as the greater flexibility afforded by longer time periods over which compliance can be pursued. In a ‘pro-active’ mode, there is greater scope to test and apply alternative technologies and employ varied administrative and institutional arrangements.

In practice, however, there are other strategic options beyond ‘loyalty’. On the one hand, countries or individual private sector exporters can ‘exit’, choosing not to comply with the food safety standards being imposed in a particular market. This implies switching customers, in the case of a private standard, or exiting particular export markets altogether. The producer and/or exporter may focus on alternative products for which the food safety standards are less problematic or costly. Such a strategy might be employed where compliance will yield a fundamental loss of competitiveness and/or negative economic and social impacts, where resources might be better spent elsewhere, and/or where profitable alternative markets exist that have less demanding standards, for example the higher quality segments of domestic markets or in other developing countries. Thus, ‘exit’ should not be construed as a loser’s strategy; it can take the form of a carefully considered re-direction of commercial strategy.

In parallel with strategies of ‘loyalty’ or ‘exit’, developing country governments and/or exporters can adopt a strategy of ‘voice’, seeking to influence prevailing rules and/or respond to evolving standards by predicting and monitoring these changes and attempting to negotiate if such changes are judged to not be in their interest. For example, complaints may be raised through the WTO in the form of a cross-notification in the SPS Committee or there may be efforts towards bilateral negotiations with trading partners regarding the specific actions required to achieve compliance. Individual exporters may question the food safety standards being imposed by their customers and attempt to come to some compromise that reflects their own circumstances alongside customer’s demands. Across both ‘exit’ and ‘voice’, being ‘proactive’ is considered more strategically advantageous than being ‘reactive’. Typically in any one industry, a combination of all three types of strategies is likely to be observed, yet in differing proportions and perhaps involving different stakeholders.

In the context of this framework, the most positive and potentially advantageous strategy combines ‘voice’, ‘proactivity’ and ‘offensive’ orientations. Everything else being equal, this approach is most likely to turn the challenges associated with new food safety standards into a competitive opportunity and to yield positive social and economic spillovers. Conversely, the most negative approach is a combination of ‘exit’, ‘reactivity’ and ‘defence’. Indeed, there may be considerable costs associated with such an approach
related to ‘sunk’ investments and the social and economic consequences for supply chains that are export-oriented. Thus, the aim of capacity-building should be seen as maximising the strategic options for developing countries and, more particularly, enhancing the scope to implement strategies that are ‘offensive’, ‘proactive’ and involve negotiation.

In conclusion, while the ability of developing countries such as Guatemala to predict, influence and/or comply with evolving food safety standards is inevitably constrained by weaknesses in prevailing food safety management capacity, by taking a strategic perspective it is possible to identify the most advantageous responses within the set of ‘what is possible’. This is not to dismiss the hardships that such countries often face in complying with exacting food safety standards, but rather to focus our attention on their scope for action and how this can be enhanced rather than what they are unable to do. It also allows us to learn lessons from where developing countries have achieved successes in complying with evolving standards and consider what we can learn that is of more general relevance to the issue of food safety standards and trade competitiveness.

4. Horticultural Sector in Guatemala:
The agricultural sector is highly important for Guatemala’s economy, accounting for 22.9 percent of Gross Domestic Product (GDP) in 2005 (World Bank, 2007). The bulk of agricultural exports are still composed of coffee, sugar and bananas (Banco de Guatemala, 2007). Nevertheless, with the promotion of non-traditional agricultural exports (NTAE) since the 1980s as a strategy to increase exports and alleviate poverty (see for example von Braun, 1989; Hamilton and Fischer, 2003; Krznaric, 2006; Carletto et al., 2007), the horticultural sector has become of increasing significance, both in terms of contribution to GDP and to exports (Julian et al., 2000a; 2000b). Fruit and vegetables exports have grown accordingly, both intra-regionally and internationally (Figures 4 and 5). According to the Banco de Guatemala (2007), total extra-regional fruit and vegetable exports in 2006 were valued at US$193 million and US$86 million, respectively.1 Including trade within the Central American region, fruit and vegetable exports in 2006 were valued at US$285 million and US$115 million, respectively.2

Traditionally the United States has been Guatemala’s main agricultural trading partner. According to the US Department of Commerce (2007), agricultural exports from Guatemala to the United States were valued at US$924 million in 2006. Over time agricultural exports to the United States have grown significantly (Figure 6), but remain dominated by traditional exports, most notably coffee and bananas.

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1 Excluding bananas and exports to Central America. Includes some processed products.
2 These figures should be treated with caution given the level of aggregation reported by the Banco de Guatemala.
While fruit and vegetables represent a relatively small part of total agricultural exports, they have grown appreciably over time. In the case of vegetables, exports have expanded from US$39.8 million in 1993 to US$103.8 million in 2005 (Figure 7). Guatemala’s main export markets are the United States and El Salvador, representing 63.4 percent 22.7
percent of exports, respectively. Exports of fruit have likewise exhibited impressive growth from US$119.5 million in 1993 to US$369.4 million in 2005 (Figure 8). The United States is the dominant export market for Guatemalan fruit, accounting for 92.0 percent of exports in 2005.

Figure 6. Guatemalan Agricultural Exports to the United States, 1989 to 2006:

Source: Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics (2007)

Figure 7. Guatemalan Edible Vegetable Exports by Destination, 1993 to 2005:

Source: UN COMTRADE (2007)
There is evidence that horticultural exports have had positive economic impacts on Guatemala, both macro-economically and in key production areas, for example in terms of income generation and employment (von Braun, 1989; Hamilton et al., 2002; Hamilton and Fischer, 2003; 2005). However, other studies consider that the development of the fruit and vegetable sector has had limited only negligible effects on poverty rates, especially among small-holder producers (Krznaric, 2006). Other studies have raised concern about the sustainability of horticultural production (Carletto et al., 1999; 2007).

**Figure 8. Guatemalan Edible Fruit Exports by Destination, 1993 to 2005:**

![Graph showing Guatemalan Edible Fruit Exports by Destination, 1993 to 2005]

*Source: UN COMTRADE (2007)*

5. **Challenges Faced with Food Safety Standards:**

One of the major challenges faced by Guatemalan exporters of fruit and vegetables is compliance with food safety standards in major markets, most notably the United States. On the one hand, non-compliance with food safety standards can be the cause of export consignments being denied access to export markets through border inspection, imposing costs on exporters in terms of freight charges and product disposal or re-export. On the other, the costs of compliance with food safety requirements can exacerbate broader competitiveness issues, for example product quality, freight rates, etc.

Jaffee and Henson (2005) estimated the total trade affected by border rejections associated with food safety standards over the period 2000 to 2001 as US$3.8 billion, of which US$1.8 billion corresponded to exports from developing countries. Just over the period January to May 1999 the US Food and Drugs Administration (FDA) reported 1,991 detentions of vegetables and vegetable products and 962 detentions of fruit and fruit products. The leading countries subject to detentions were Guatemala (73) for vegetables and Mexico (36) for fruit (Unnevehr, 2000).
The two food safety issues of most relevance to Guatemalan fruit and vegetable exports to the United States are microbiological contamination and pesticide residues. In both cases FDA lays down product standards that dictate acceptable levels of contamination (maximum pathogens counts in the case of microbiological contaminants and maximum residue levels (MRLs) in the case of pesticides) in the end product. While compliance with these standards implies the need to employ rigorous systems of control through the supply chain, and in particular appropriate practices in agricultural production, the United States does not require the employment of specific protocols of ‘Good Agricultural Practice’ (GAP). Enforcement of the associated product standards is through border inspection, generally related to the assessed food safety risk associated with the product, and/or market surveillance.

FDA undertakes a programme of pesticide residue monitoring for domestic and imported fresh produce. In 2003, 7,234 samples were analyzed, of which 2,344 were domestically-produced and 4,890 were imported. For domestic vegetables, 62.9 percent of the samples were free of pesticide residues, 28.9 percent had residues at permissible levels and 1.9 percent had residues at violative levels. For domestic fruit, 48.6 percent of the samples were free of pesticide residues, 49.2 percent had residues at permissible levels and 2.3 percent had residues at violative levels. Overall, greater rates of violation of limits on pesticide residues were observed for imported produce. In the case of imported vegetables, 72.5 percent of the samples were free of pesticide residues, 20.8 percent had residues at permissible levels and 6.7 percent had residues at violative levels. Among samples of imported fruit 63.6 percent were free of pesticide residues, 31.1 percent had residues at permissible levels and 5.3 percent had residues at violative levels. Across all food products analyzed, 2.4 percent of domestic samples and 6.1 percent of imported samples had residues at violative levels (FDA, 2003).

Athukorola et al. (2002) provide an analysis of FDA detentions of agricultural and food product exports over the period May 2001 to April 2002. Over this period there were a total of 11,634 detentions within total imports of agricultural and food products valued at US$30,486 million. Thus, there was an average of one detention for every US$2.62 million of agricultural and food product imports. Of the detentions, 54 percent corresponded to imports from developing countries, with an average of one detention for every US$1.99 million of imports. The average rate of detention among imports from industrialised countries was much lower at one detention per US$3.37 million of imports.

Tables 1 and 2 present a breakdown of US border detentions of agricultural and food products from Guatemala over the period 2002 to 2006. Fresh fruit and vegetables accounted for 63 of 102 detentions in 2006, with detentions of fresh peas and beans being most common. There were also significant detentions of a wide range of processed and packaged food products including beverages, cereals, sauces and seasonings, fishery products, meat products, etc. The main reasons for product detentions were missing
information (predominantly for processed and packaged food products) and violation of MRLs for pesticides. Incidences of microbiological contamination over the period 2003 to 2006 were rare.

Table 1. US Border Detentions of Agricultural and Food Product Imports from Guatemala by Product, 2002 to 2006:

<table>
<thead>
<tr>
<th>Product</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edible Seeds</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Squash</td>
<td>8</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Meats and Seafood</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Sauces/Seasoning</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Beverages</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Cereals and Chips</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Fresh/French Beans</td>
<td>4</td>
<td>16</td>
<td>23</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Fresh Peas</td>
<td>35</td>
<td>33</td>
<td>23</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td>Other Fruit and Vegetables</td>
<td>11</td>
<td>19</td>
<td>18</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>TOTAL</td>
<td>80</td>
<td>95</td>
<td>94</td>
<td>76</td>
<td>102</td>
</tr>
</tbody>
</table>

Source: FDA (2007a)

To discern any trend in the rate of detentions of agricultural and food product exports to the United States we can calculate the detention rate, as described above. The rate of detentions appears to have declined over the period 2002 to 2006. Thus, there was one detention per US$8.6 million of exports in 2002 and one detention per US$9.1 million of exports in 2006 (Figure 9). The lowest rate of detention was in 2005, with a rate of one detention per US$12.1 million of exports. This trend reflects both the types of products being exported (and the stringency of the associated food safety standards) and the compliance performance of Guatemalan exporters. The decline in detentions due to violation of limits on pesticide residues would appear to be a significant factor at play here.

6. Food Safety Standards and Horticultural Exports:
Guatemala has faced on-going problems with fruit and vegetables exports to the United States related to pesticide residues and microbiological contaminants (Hart, 2003). Indeed, a number of studies have highlighted the on-going challenges faced with management of pesticides in horticultural production (Julian et al., 2000a; 2000b; Norton et al., 2003), most notably in leguminous corps. Further, the results of the pesticide residue surveillance programme of FDA indicate relatively high rates (19.1%) of violative products among horticultural imports from Guatemala (Figure 10). A parallel group of studies explore the impact of an outbreak of Cyclospora in the United States and Canada that was traced back to raspberries produced in Guatemala (Calvin, 2003; Calvin et al. 2003; Flores, 2001).
Table 2. US Border Detentions of Agricultural and Food Product Imports from Guatemala by Reason, 2003 to 2006:

<table>
<thead>
<tr>
<th>Reason</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unapproved additives</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Microbiological contamination</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Filthy/Insanitary</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Lack of Registration/Certification</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Missing Information</td>
<td>16</td>
<td>32</td>
<td>22</td>
<td>27</td>
<td>57</td>
</tr>
<tr>
<td>Pesticide Residues</td>
<td>47</td>
<td>50</td>
<td>49</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>95</td>
<td>94</td>
<td>76</td>
<td>102</td>
</tr>
</tbody>
</table>

*Source: FDA (2007a)*

Here we build on the existing literature, focusing on the case studies of snow peas and pesticide residues and microbiological contamination and fresh berries. Collectively, these case studies permit comparison of the problems associated with an acute outbreak of food-borne illness related to a specific Guatemalan export, that relates back to weaknesses in hygiene controls along the supply chain, and concerns about longer-term product safety that can not be related to incidents of human illness per se, but again relate to the efficacy of food safety controls along the supply chain.

Figure 9. Rate of Detention of Guatemalan Agricultural and Food Exports to the United States, 2002 to 2006:

*Source: FDA (2007a) and Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics (2007)*
6.1. Snow Peas:
Snow pea production has been pursued in Guatemala as a strategy towards agricultural export diversification since the late 1970s (von Braun, 1989; Carletto et al., 1999). Indeed, snow peas have been the predominant NTAE focused on smallholder production. It is estimated that about 25,000 households currently grow snow peas, employing 32,000 people (Carletto et al., 2007). There is an estimated 4,550 hectares under snow pea cultivation, with an average area of 0.3 hectares per farmer. According to Julian et al. (2000a; 2000b) only 25 percent of production is on farms operated by exporters, reflecting the labour intensity of the crops that makes it ideal for small-scale production. More recently, however, problems have been experienced such that a significant proportion of smallholders have turned to other crops (Carleto et al., 1999; 2007).

While Guatemala was the fifth largest exporter of fresh vegetables to the United States in 1992, it has since been displaced by competitors (most notably Mexico) and is now thirteenth in the ranking of import suppliers (Julian et al., 2000a; 2000b). However, Guatemala’s exports of snow peas have fared better than fresh vegetable exports as a whole. The volume and value of exports increased through the early 2000s (Figure 11), but have fallen back a little more recently. The value of exports has also increased substantially over time (Figure 12), despite a decline in both the nominal and real price through to 2005 when prices increased substantially (Figure 13). Thus, despite growth in exports from Mexico and Peru, Guatemala remains the main exporter of snow peas to the United States, accounting for 65.8 percent of imports in 2006 (Figure 14). According to SIECA (2007) approximately 83 percent of snow pea production has been exported to the United States.
United States in the last decade, which indicates the Guatemala’s dependence on the US market for fresh peas.

**Figure 11. Volume of US Fresh Pea Imports from Guatemala, 1989 to 2006:**

![Figure 11](image1)

*Source: Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)*

**Figure 12. Value of US Fresh Pea Imports from Guatemala, 1989 to 2006:**

![Figure 12](image2)

*Source: Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)*

With the introduction of non-traditional crops there was also the implementation of new production technologies, many of which involved greater use of agrochemicals such as pesticides. In turn, increasing numbers of violations of US MRLs for fresh vegetables were observed (TED, 1997; Hart, 2003). It is suggested that the pesticide violations
reported by FDA represent the ‘tip of the iceberg’ in terms of the actual proportion of products with excess pesticide residues, indicating a more general problem with pesticide management in production. Indeed, the Environmental Working Group (EWG, 1995) suggested that 41 percent of Guatemalan snow pea imports to the United States were in violation of legal standards in the mid-1990s.

**Figure 13. Value of US Fresh Pea Imports from Guatemala, 1989 to 2006:**

![Graph showing the value of US fresh pea imports from Guatemala from 1989 to 2006. The graph displays nominal and real prices, with real price calculated using the US Consumer Price Index (1982-1984=100).](image)

*Note: Real price calculated using US Consumer Price Index (1982-1984=100)*

*Source: Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)*

**Figure 14. Volume of US Fresh Pea Imports by source, 1989 to 2006:**

![Graph showing the volume of US fresh pea imports from Guatemala, Mexico, and other sources from 1989 to 2006.](image)

*Source: Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)*
Undoubtedly the major competitiveness issue faced by Guatemalan exporters of snow peas is the high rate of detention at the US border (Table 1). Over the 16 months from April 2006 to July 2007, FDA refused 31 shipments of snow peas due to illegal pesticide residues (FDA, 2007b). The main active substances implicated were Chlorothalonil (a fungicide) and Methamidophos (an insecticide), which have zero tolerance for snow peas in the United States. In turn, this reflects a very real problem with excess pesticide residues. Indeed, of the total sample of Guatemalan imports analyzed by FDA over the period 1998 to 2003, with the sole exception of two years, snow peas accounted for the largest proportion of violative products (Figure 15). Further, in some years, snow peas accounted for up to 80 percent of the total food samples taken that were found to be in violation.

**Figure 15. Proportion of Samples of US Imports of Fresh Peas from Guatemala with Adverse Pesticide Residues, 1998 to 2003:**

![Figure 15](image)

Source: FDA(2003)

Guatemala’s problems with pesticide residues started in the mid-1980s. In part this reflected efforts to boost production, that did not take due regard of the need for appropriate use of pesticide. However, concerns about pesticide residues in food among US consumers were also on the rise and, as a consequence, FDA implemented a more rigorous system of control including an on-going system of surveillance and more rigorous border testing. Snow pea imports from Guatemala were found to be one of the most serious violators of US limits on pesticide residues (TED, 1997). Thus:
“In the late 1980s, 27.3 percent of the total NTAE shipments sampled from Guatemala were detained, resulting in losses to producers and exporters. Between 1990 and 1994, these losses reached a total of US$17.7 million due to residue violations that resulted in 3,081 detentions of Guatemala’s exports” (Thrupp, 1995, p. 97)

As a result of the on-going history of non-compliance, in 1992 FDA imposed an automatic detention programme on snow pea imports from Guatemala. Under this programme first time exporters are required to provide a third party certification stating that shipments are free of illegal pesticide residues according to the US regulations. Subsequently, exporters have to establish a history of five shipments free of pesticide before being able to export without detention at the border. Firms that achieve this are subsequently subject to random inspections as a check on compliance. Whenever an exporter has a violative consignment of snow peas they are required to re-establish a history of compliance through this same process.

This automatic detention program has caused considerable problems for exporters. First, they have to assume the cost of pesticide tests at an independent laboratory recognized by FDA. Second, the probability of a pesticide residue violation in six consecutive tests is greater than for random inspections, as usually undertaken by FDA and which usually encompass a small proportion of total import shipments of fresh produce. Finally, if the exporter has a pesticide residue violation, besides full or partial loss of value of the shipment and the associated transport costs, they may jeopardise their reputation and risk losing established customers.

In order to address the pesticide residue problems associated with snow peas, a series of interventions have been undertaken in Guatemala with support from public, private and/or international agencies (OECD, 2005; Hart, 2003). Critically, exporters of snow peas, through the Guatemalan Exporters’ Association (AGEXPORT), established the Snow Pea Committee as a conduit for interaction with government, international donors and the US regulatory authorities. Thus, rather than relying on the government to take remedial actions, the private sector has been active in promoting solutions and promoting industry-wide adoption of ‘good practices’.

One of the most important initiatives taken by the public and private sector was the creation of the Integral Program for Agricultural and Environmental Protection (PIPAA). Initiated in 1991 under the administration of the Ministry of Agriculture but in close collaboration with AGEXPORT, PIPAA³ aimed to implement an integrated and comprehensive programme of upgrading that cut across the public and private sectors in order to address the snow pea pesticide residue problem. The basis for much of the subsequent actions was regulatory requirements and control systems in the United States

³ http://www.pipaa.com
and Canada and international standards promulgated by Codex Alimentarius and ISO. Technical and financial support was provided in the form of grants by the US government, International Fund for Agricultural Development (IFAD), Inter-American Development Bank (IDB) and European Union (EU) donors, often as part of broader efforts towards agricultural development and/or the expansion of trade competitiveness.

Considerable support has been provided to the snow pea sector by international donors, predominantly the United States Agency for International Development (USAID). In 1991, USAID supported the Agricultural Development Project, which was coordinated by the Guatemala’s Ministry of Agriculture, and included the participation of other international and local institutions. The main objective of this project was the promotion of Integrated Pest Management (IPM) practices in order to improve the management of pesticides, reduce pesticide residue problems and avoid the use of illegal pesticides according to US regulatory agencies. Subsequently, in 1994, USAID supported the Integrated Pest Management Collaborative Research Support Program (IPM CRSP). This program has conducted research and extension activities in Guatemala aimed at promoting fully-integrated crop management strategies, including intercropping, scouting, trap cropping, mobile trapping, minimum threshold pesticide applications, optimum crop cultural practices and cultivar selection, in order to promote the sustainability of NTAE production in Guatemala (Sullivan et al., 1999; Sullivan et al., 2000).

During the period 1991 to 2000, IFAD and CropLife Latin America (a member of CropLife International) worked with PIPAA to launch a pesticide management program in Guatemala as part of the Global Safe Use Project. This program conducted wide-scale training on pesticide management to extension agents, farmers, school teachers and pupils, employees of pesticide distributor, technical and sales people and health personnel, including physicians and nurses. However, although the number of people reported to have been trained under this program is high, only a relatively small proportion of farmers were covered, while there are concerns that illiterate farmers were largely excluded (Murray and Taylor, 2001).

PIPAA has also engaged in training related to agronomic practices and pesticide use through the supply chain and implemented a programme of inspection and certification of GAP and GMP. With the collaboration of the IDB and AGEXPORT, PIPAA developed and distributed comprehensive GAP and GMP manuals, including for small-scale growers. Under this programme, third party certification (TPC) is undertaken by PIPAA itself and other accredited bodies, namely David Fresh and Primus Labs, focused on US

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4 The program is still active in many countries. Its web site address is http://www.oired.vt.edu/ipmcrsp/
5 Guía de buenas prácticas agrícolas (2004); Guía de buenas prácticas de manufactura para plantas empacadoras de vegetales frescos (2004); Manual de prácticas de higiene para plantas empacadoras de vegetales frescos (2002).
regulated requirements, and Latu Laboratories, focused on certification to the private EUREPGAP standard in the EU (Flores et al., 2005).

It is recognised that PIPAA has played a significant role in improving use of pesticides in the production of snow peas, as well as other horticultural products. Indeed, GAP and GMP are now employed widely. However, PIPAA faces resource constraints that limit its ability to reach the large base of small-scale horticultural producers. Indeed, its programmes remain reliant on financial support from the Guatemalan government and donors. As a consequence, a large proportion of smallholders continue to produce snow peas without following GAP and, given the continued predominance of spot markets, are able to enter the supply chains of exporters (Julian et al., 2000a; 2000b).

Most of the financial assistance to PIPAA comes from public and external donor funding, which the government sources in terms of loans and grants with the assistance of private sector organizations such as AGEXPORT. Within this, donor support remains critical, creating challenge for the sustainability of PIPAA and the use of considerable time and resources spent searching for the next tranche of support. Thus, PIPAA is making efforts to become self-sustaining, for example by providing private TPC services. Although PIPAA still does not have the reputation of other certifiers, such as Primus Lab and David Fresh, PIPAA certification is more affordable and is gaining the recognition of private companies, for example retailers in Guatemala (Flores et al., 2005).

Alongside the activities of PIPAA, the private sector has made efforts to promote appropriate use of pesticides. For example, subsequent to the IFAD/CropLife initiative, the private Guatemalan pesticide association (AGREQUIMA) continued supporting pesticide management activities. These included training and promotion against the re-use of empty pesticide containers (Murray and Taylor, 2001).

The snow pea export sector faces on-going challenges with the management of pesticides that largely reflect the fragmented nature of the supply chain. While many exporters have their own production facilities and/or organised outgrowers, around 60 percent of supply continues to be sourced through spot markets (known as ‘night markets’) that are controlled by traders. Here, the scope to trace back supply to production to ensure that appropriate practices are followed, remains limited. Further, given that there is a tendency for exporters to mingle their supplies, the scope for ensuring that any export consignments conform to GAP and meet regulatory pesticides limits in the United States is weak (Julian et al., 2000a; 2000b).

Exporters continue to make efforts towards integration of the export supply chain for snow peas, increasing their own production and contracting small-scale farmers to achieve traceability and control over production practices. Indeed, there is a strong economic incentive to do so; although exporters pay a lower unit price for snow peas in spot markets, the unit cost of procuring export quality peas is greater that for own and/or contract
production due to the high rate of out-grading (Julian et al., 2000a; 2000b). At the same time, US buyers are making efforts to integrate their supply chains back to Guatemalan exporters. Currently, around 80 percent of snow peas are exported to US brokers and only 20 percent direct to supermarkets. Increasing the proportion of supply through direct sourcing is seen as a mechanism for ensuring that appropriate production practices are employed and for securing traceability. This is supported through the provision of technical assistance and promotion of particular third party certifiers in which they have confidence.

Within the snow pea export sector a sub-set of leading firms is emerging. These firms have more integrated supply chains and are working towards the application of GAP and GMP throughout their supply chains. Such exporters are also establishing private laboratory facilities to undertake pesticides residue testing. Such strategies towards enhanced food safety controls are often accompanied by efforts to target higher-value niche markets (for example organic) and value-addition (for example packaging). Some are also working towards EUREPGAP certification as a means to gain inroads to European supermarkets.

Snow pea exporters have also made efforts to bring about changes in US regulatory controls on pesticide residues in snow peas. This has taken the form of a petition to the US Environmental Protection Agency (EPA) for a MRL to be determined for Chlorothalonil in snow peas. Currently, the legal limit is set at the limit of determination (LOD). In both Guatemala and the United States, Chlorothalonil is used for horticultural products as an economically affordable and very effective agent for the control fungal infections. Most pesticide substitutes are not as effective as Chlorothalonil. In July 2007, the petition by Guatemalan exporters was accepted and an MRL established at 5ppm (EPA, 2007). According to PIPAA and AGEXPORT, this tolerance level is manageable and would substantially reduce the rate of detentions that rarely reach this level.

The approval of an MRL took several years and considerable investments of time and financial resources in order to be accomplished. Public and private actors lead this request through the Snow Pea Committee of Guatemala, AGEXPORT and PIPAA. The initial request was filed in August 2004, with the US-based GB Bioscience TM Corporation serving as agent to provide scientific evidence supporting the request (EPA, 2007). In order to approve the MRL, the EPA had to evaluate the validity, completeness and reliability of scientific support. Thus, private and public actors had to work together, with the assistance of private consultants, to gather the information needed. For developing countries with only limited experience in undertaking negotiations with sophisticated and well-resourced agencies such as EPA, completing this process is a daunting task.

Using the strategic analytic framework outlined above, it is possible to appraise the way in which the government and private sector in Guatemala have approached the problems of pesticide residues in snow peas. Predominantly the actions taken have can be categorised
as ‘reactive compliance’; most initiatives were only implemented once problems had been experienced with US border detentions and were fundamentally driven by the demands of the US authorities. Once the need for action had been recognized, however, stakeholders engaged in an active process of ‘voice’ with the US regulatory authorities, to establish a recognised system of control and to petition for the establishment of an MRL for Chlorothalonil. Both of these efforts were successful. Guatemala’s actions also provide a very good example of effective collaboration and appropriate division of responsibilities between the public and private sectors. Finally, such efforts have served as a ‘catalyst’ for the ‘proactive’ move towards implementation of GAP in the horticultural sector as a whole.

It is evident that the actions of exporters and the public authorities in Guatemala have contributed to maintaining exports of snow peas to the United States. Indeed, as noted above, Guatemala remains the major supply of this product to the United States. At the same time, however, the number and rate of detention recorded by Guatemalan exporters is significantly higher than for its two main competitors, Mexico and Peru (Figures 16 and 17). This serves to seriously undermine the competitiveness of Guatemala in the US snow pea market and translates into a significant price discount (Figure 18). Thus, imports of snow peas from Guatemala offset the costs and risks associated with border detentions by paying a lower price and are mainly destined for wholesale markets. Put another way, Guatemala only maintains its position in the US market by undercutting its competitors, which in turn serves to diminish export revenue. At the same time, its ability to access more lucrative exports markets, for example direct to supermarket chains, is limited. These higher-value markets are mainly supplied by Mexico and Peru.

The final impact of the MRL is still unknown, since Guatemala has had pesticide residue problems in snow peas for about 15-20 years, largely because about 60 percent of the supply is controlled by middlemen in spot markets, where there is no control about production practices. The pesticide residue problem was motivating exporters to increase coordination and improve integrated crop management practices to guarantee a safe supply. However, a tolerance level of Chlorothalonil may incentivize exporters to continue using the spot market which is not appropriate for complying with SPS regulations and facilitating a traceability system. It is evident that Guatemala exports of snow peas face ongoing challenges complying with US controls on pesticide residues. While the success of exporters in petition for an MRL for Chlorothalonil will undoubtedly go a long way in reducing the rate of US border detentions, this does not offset the need for supply chains to become better integrated and for rigorous systems of food safety control and traceability to be implemented from production through to the export destination. The reward from such efforts may, however, be significant; there is plenty of scope for Guatemala to reposition itself in US markets towards higher quality segments such that unit prices are brought more in line with its international competitors.
Figure 16. Number of FDA Detentions of Snow Peas by Source, 2002 to 2006:

Source: FDA (2007a)

Figure 17. Value of Snow Pea Exports per Detention by Source, 2002 to 2006:

Source: FDA (2007a) and Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)
6.2 Raspberries:
This second case provides an example of the trade effects of a very different and more dramatic food safety problem associated with fresh horticultural products, namely Cyclospora in raspberries. In the early 1990s, the Guatemalan raspberry industry was considered a very promising non-traditional export. Indeed over the period 1994 to 1997, the volume of exports of raspberries and other berries doubled from 1,693 tonnes to 3,220 tonnes (Figure 19). The value of exports exhibited similar impressive growth from US$1.7 million in 1994 to US$3.9 million in 1997 (Figure 20). In 1997, the United States accounted for around 76 percent of exports, in both volume and value terms, although its share of the US market was very small (Figure 21) especially alongside the dominance of Mexico.

![Figure 18. Unit Price of Fresh Pea Imports to the United States by Destination, 2000 to 2006:](image)

*Source: Department of Commerce, US Census Bureau, Foreign Trade Statistics (2007)*

The demise of the Guatemalan exports of raspberries to the United States in the later 1990s was as dramatic as the growth in the earlier part of the decade. Thus, a series of well-documented outbreaks of Cyclospora US and Canada over the period 1996 to 1998 that were associated with imported raspberries from Guatemala practically resulted in the demise of the industry (Flores, 2001; Calvin *et al.*, 2002; Calvin, 2003). Contamination with Cyclospora is generally associated with the quality of drinking water and hygiene, including use of use of toilets and hand washing (Bern *et al.*, 1999). As a result, the value of fresh berry exports halved over the period 1997 to 1999, due both to loss of markets in the United States and Canada and in the rest of the world (Figure 19). After a period of stabilisation through 2000 and 2001, exports declined further to a low of US$785,000 in 2004. Currently, no fresh raspberries are exported by Guatemala to the United States.
The first Cyclospora outbreak purportedly associated with raspberries occurred in 1996, causing the illness of 1,465 people in the United States and Canada (Herwaldt et al., 1997; Calvin et al., 2002). In 1997, there was a further outbreak affecting 1,012 people (Herwaldt et al., 1999), followed by a less widespread outbreak in 1998 (Powell, 2000). The link between these outbreaks and Guatemalan raspberries has, however, been
controversial given the difficulties faced in attempting to trace the origin and mode of contamination (Powell, 2000).

There remains a widespread view in Guatemala that the Cyclospora case was a mechanism ‘invented by the North American competition’ to curtail the growing raspberry industry (Calvin et al., 2003). Indeed, while studies (see for example Herwaldt et al., 1997; 1999) suggest that the source of contamination was Guatemalan raspberries, they have largely been unable to determine the precise mode of contamination. For example, Bert et al. (1999) conducted epidemiological studies to test the prevalence of Cyclospora in raspberry farm workers over the period April 1997 to March 1998. Of 182 raspberry farm workers monitored, six tested positive for Cyclospora. A similar study by Pratdesaba et al. (2001) found no evidence of Cyclospora in workers. Indeed, it was not until 2000 that FDA found positive evidence linking the outbreak to Guatemala raspberries (Ho et al., 2002; Calvin et al., 2003). Thus, several stakeholders in Guatemala still do not accept (or perhaps admit) that the source of the outbreak of Cyclospora in the United States and Canada was Guatemala raspberries. Instead, there is a perception that lack of scientific information and experience in Guatemala prevented the government from making an effective counter response when these ‘accusations’ were originally levelled.

Figure 21. US Imports of Fresh Raspberries and Blackberries by Source, 1989 to 2006:

The economic impact of the Cyclospora outbreaks on the Guatemalan export sector was considerable. In contrast to snow peas that are largely grown by smallholders, raspberry production is a costly operation that tended to be dominated by larger and entrepreneurial farmers (Flores, 2001). In spite of this, many in the industry could not survive the impact
of the outbreak. Thus, while there were around 85 medium and large-scale raspberries growers in the mid-1990s, by 2002 only three remained in production (Calvin et al., 2003). Currently, there are no raspberry exports to the United States and the producers that do remain have looked to alternative markets, for example the EU. It has been estimated by the Guatemalan government that the suspension of raspberry exports represented a loss in income for the country of about US$10 million (Powell, 2000).

In a similar mode to snow peas, the government and exporters collaborated to address the problems created by the Cyclospora outbreak, in this case through the establishment of the Guatemalan Berry Committee under AGEXPORT. Following the first outbreaks in 1996, this committee made efforts to classify its exporter members according to the risk of contamination based on water quality, infrastructure, employment of Hazard Analysis and Critical Control Point (HACCP), Sanitation Standard Operating Procedures (SSOP) GAP and GMP, and maintenance of records. However, this system of classification of farmers was not backed up with any enforcement mechanism or system of traceability (Calvin et al., 2002). Following the second spate of outbreaks in 1997, the FDA and Guatemalan Berry Committee agreed that more stringent measures were necessary. Subsequently, Guatemala voluntarily ceased exports to the United States in May 1997 and FDA issued an import alert denying imports from Guatemala for the next season (Calvin et al., 2002).

In 1998, the Guatemalan government and the Guatemalan Berry Committee implemented a food safety programme for raspberries, entitled the Model Plan of Excellence (MPE), which was mandatory in order to export to the United States. The MPE was implemented by PIPAA, which was originally created to respond to the pesticide residue problems in snow peas, and encompassed a wide range of requirements including HACCP, GAP, GMP, water quality and record keeping. As of 1999, FDA permitted raspberry imports from Guatemala provided that growers followed the MPE (Calvin et al., 2002).

The MPE is generally considered a technical success since the practices it requires are superior to those commonly employed in the production and manufacturing of raspberries in the United States. However, many raspberry growers in Guatemala are of the view that this plan jeopardised the economic viability of the sector in order to re-establish Guatemala’s reputation with FDA (Flores, 2001). Indeed, it is estimated that the MPE increased operating costs by 61 percent during the first year, with recurring costs of an additional 35 percent, motivating growers to exit the sector.

Despite the demise of the raspberry sector the MPE has continued and is now widely applied in blackberry production, the exports of which have expanded over time. While all berry exports from Guatemala have been stigmatised by the Cyclospora outbreak associated with raspberries, this has served to prevent a recurrence of acute food safety concerns in key export markets and supported the evolution of a new export sector. At the same time, however, Guatemala has been unable to meet the demand of importers for a
variety of berries, including raspberries, which has curtailed growth in both the volume and value of exports.

While the predominant market for Guatemalan berries continues to be the United States, exports have failed to recover to the levels of the mid-1990s (Figures 18 and 19). In part this reflects the smaller holdings and lower resource endowments typical of blackberry production, limiting the ability to make the investments required to implement the MPE. Ironically, however, Guatemala’s experiences with Cyclospora have prompted its competitors, particularly Mexico and Chile, to implement more rigorous food safety controls. Thus, these countries have been able to capture a greater share of the US market, free of the stigmatism of the Cyclospora outbreak.

Again employing the strategic analytic framework, we can characterise the actions of the Guatemalan government and exporters to the issue of Cyclospora in raspberries, as well as fresh berries more generally. The clear message is that the actions taken were ‘too little tool late’, characteristic of a ‘reactive’ approach to ‘compliance’. The fact that weaknesses in food safety controls along the supply chain were associated with significant incidences of food-borne disease served to exclude Guatemala from the market for raspberries in the United States and Canada. Subsequent actions aimed at implementing a rigorous system of food safety control were not sufficient to overcome the lack of trust that had been established among importers and their customers. While the food safety controls that were established as a result were then available for adoption by the blackberry sector, the loss of reputation had spread across fresh soft fruits as a whole, such that exports have been unable to recover.

7. Conclusions:
The two Guatemala case studies presented above show the challenges faced by agricultural exporters associated with quite different food safety compliance issues. In one case, there on-going problems have been experienced with controls on pesticides as a key input to agricultural production. In the other case, exports are associated with quite significant outbreaks of food-borne illness, highlighting the lack of basic hygiene controls. Cutting across both, however, are weaknesses in systems of food safety controls and the lack of good agricultural practices such that efforts to exploit potentially lucrative markets for NTAE are jeopardised. Clearly, food safety systems had not been enhanced as the snow pea and raspberry export sectors became established and evolved, suggesting a lack of regard for the role of such systems as part of basic trade infrastructure.

Broadly, we can characterise the responses by the Guatemalan government and private exporters to the problems experienced with exports to the United States as ‘responsive’. In the case of snow peas this has not acted to preclude access to US markets, but has translated into price discounts relative to Mexico and Peru, Guatemala’s key international competitors. The outcome for raspberries, however, has been extremely negative. Not only has Guatemala been excluded from the US market, but attempts to capitalise on
demand for other berries have been severely curtailed. Certainly, the raspberry case illustrates the potentially serious consequences of failures in food safety controls related to acute hazards such as microbiological contaminants. In such instances ‘reactive’ strategies are always suboptimal.

The experiences of Guatemala with snow peas not only illustrate the potential for even smaller developing countries to address the challenges of meeting food safety standards in exacting export markets, but also the scope for responses beyond ‘compliance’. Thus, Guatemala has persisted in its attempts to exhibit ‘voice’, both though negotiations over certification of exporters and negotiations to establish an MRL for snow peas. While undoubtedly taking a great deal of time and effort, these negotiations have ‘borne fruit’. Now that an MRL has been established we might expect rates of detentions to decline. This does not absolve the need for more rigorous controls on pesticides through the supply chain, which in turn may necessitate changes in market mechanisms, but could act to diminish the discounts that Guatemalan exporters face.

At the country level, it is generally considered that the actions taken to enhance food safety controls for snow peas and berries have positively impacted the whole horticultural sector, which now is more conscious of food safety issues. Although capacity within the public and private sectors remains weak, the creation and performance of PIPAA in both cases is a good illustration of how joint efforts between the public and private sectors, often with international donor support, can bring about local capacity development in favour of maintaining competitiveness in the export of horticultural products. Such efforts also illustrate how food safety management should be integral to strategies towards the promotion of non-traditional agricultural exports. To often trade flows evolve without due investments in underlying infrastructure, such that hard earned markets remain precarious and risk disruption due to food safety problems.

8. References:


