

Trade and Environment Dimensions in the Food and Food Processing Industries in Asia and the Pacific

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I. Introduction

This study examines the linkages between trade and environment that need to be taken into account in the quest for trade and growth in developing countries. The linkage between trade and environment is as follows: International trade drives the patterns of production, which in turn impact the domestic environment. Trade has dual effect: while trade can provide necessary resources for environmental conservation, cross-border movements of merchandise can have damaging impacts on the environment as well. The multilateral and domestic environmental concerns can further intensify such impacts and influence the pattern of trade through regulations and standards. This is the case especially when natural resources are inputs to many exported products. This study observes various dimensions of the inter-relationship between trade and environment in the context of the food and food-processing sector, which has significant backward and forward linkages with the rest of the economy in any developing country. The recent trend indicates that emerging economies in the Asia Pacific region rely on growth in food and processed food exports for their development. Hence, the trade and environment linkage has far reaching implications for sustainable development in the region. The analysis in this study will thus contribute to the complex yet crucial debate on trade, environment and sustainable development.

World trade in food and processed food has witnessed an impressive growth during the last few decades. In particular, world exports of processed food grew at the rate of 8.5% per annum during 1970-2003. As a result, the share of processed food in the total agricultural exports increased from less than a half in 1980 to nearly two-thirds in 2003. The performance of developing countries in the exports of processed food has been better than that of developed countries. Following rapid growth, there has been a compositional change in food and processed food exports. This pattern is particularly noticeable in developing countries. In developing countries, while shares of some segments of processed food exports, such as fish and fish products, fruits and beverages, have increased, there has been a significant level of deceleration in the share of certain products, such as processed meat products, dairy products and processed coffee. Performance has varied significantly across countries. Broad trends indicate that higher income developing countries have performed relatively better than low income countries in sectoral exports. This is evident in a number of Asia and the Pacific economies which are emerging as successful exporters of food and processed food products in the region. Thus, ample opportunities exist for developing countries to reap benefits from growing global trade in food and processed food products. However, there are certain challenges that need to be addressed.

There remain key environmental challenges, which add to challenges related to market access, the production processes, as well as infrastructure and transactions costs. Given the importance of sanitary and phytosanitary regulations for the food and food processing industry under investigation in this study, frequent reference is made to international standards and regulatory frameworks for guiding food safety, such as the WTO Agreement on Sanitary and Phytosanitary Measures (SPS), the joint Food and Agriculture Organisation (FAO) and World Health Organisations (WHO) Codex Alimentarius Commission (Codex) for food safety, the International Organisation for Standardisation (ISO). Compliance with international and domestic food standards is one of the key determinants of ensuring export markets. The idea of multilateral standards is attractive, especially from the perspective of exporters. Market access is greatly facilitated through the development of as predictable, transparent and cost effective standards as possible.

Recent decades have seen a proliferation of environment-related standards – both voluntary and mandatory – in response to increasing public awareness and concern about sustainable development. The WTO Agreements on SPS and Technical Barriers to Trade (TBT) aim to ensure that environmental standards do not have an unnecessarily adverse impact on trade.

Environmental issues are assuming increasing prominence in the domestic policymaking process, including legislating for greener investment, introducing environment-friendly technology and producing environmentally preferable goods. In a market-driven world, consumers determine the nature and standard of products for consumption. In response to consumer demand and increasing regulation, there has been a surge in product standards in industrialised countries. Similar developments are also slowly emerging in developing countries. Due to lack of harmonisation of standards, exporters from developing countries often find it difficult to comply with the plethora of standards required for access to the markets of developed countries. Notably, developing country exporters are not reluctant to comply with standards, if these standards are non-discriminatory and transparent.

Exporters in developing countries are gradually realising the importance of complying with various food safety standards to gain access to developed country markets. In this context, it is vital to bridge the information gap which at times acts as crucial deterrent to export-led growth through trade. Private sector and government need to work together to create mechanisms to disseminate information to exporters on emerging standards in key export markets, especially to small and medium-sized enterprises (SMEs). Information dissemination would help to reduce the rate of rejection or detention of export consignments, and avoid the costly process of returning or destroying them. However, policy restructuring and complying with global standards involve significant costs, which are often detrimental to competitiveness and growth of trade. The role of international organisations in supporting programmes of developing countries to balance their trade objectives with environmental concerns could usefully be strengthened. These organisations have an important role in guiding policy restructuring through capacity building initiatives and technical assistance.

The structure of the paper is as follows. The second section presents an analytical framework of trade and environment issues in the food and processed food sector. An overview of the experiences of Asia and Pacific countries regarding their export performance in the sector is presented in section three. The fourth section focuses on best practices in the sector. Broad conclusions and policy recommendations are presented in the final section.

II. Trade and Environment Linkages in the Food and Food Processing Industry: An Analytical Framework

In the Asia Pacific region, there has been a tremendous growth in the food processing industry. The share of processed products showed a clear upward trend throughout the 1990s, rising from 42% in 1990-91 to 48% of global agricultural trade in 2001-2002 (AP, 2004). A WTO study on identifying potential markets for food producers states that the largest shifts towards more processed agricultural products was observed in certain Asian developing countries, such as China, Indonesia, Malaysia and Thailand.

However, with the rise of Foot and Mouth Disease, SARS, Avian Bird Flu and others, developing countries will have to make a special effort to realise these prospects. For example, recent avian influenza outbreaks in Europe, the Middle East and Africa have caused dramatic swings in poultry consumption, increased trade bans and price declines in the global market.

Processed food exporters in developing countries continue to find compliance with standards an arduous and complex task, with the proliferation and diversity of standards often imposing non-tariff barriers (NTBs) on their exports. The increasing use of NTBs, it is argued, provides developed countries with a powerful instrument to protect their domestic industries, and discriminate against developing country imports. Increased participation by developing countries in the international standards setting processes would help to ensure the enactment of transparent and equitable standards.

II.2 Environmental Concerns

There has been a phenomenal increase in awareness of local and global environmental issues in the past couple of decades, most notably embodied in the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 and the Millennium Development Goals. Multilateral environmental agreements have been negotiated to deal with transboundary environmental concerns. At the domestic level, there has been a clear shift in the demand patterns of consumers in developed countries. With the growth in income, developed country consumers, especially in the EU and the US, prefer to make a conscious choice to support sustainable consumption patterns.

Use of pesticides and fertilizers

Consumers in developed countries reveal a preference for ready-to-eat food, provided it is environmentally safe. Due to frequent contaminated food episodes, they prefer to pay more and purchase brand-name products from well-known multinational food chains. As a result, environmental labelling is being promoted in many countries to encourage cleaner production processes and raise awareness among consumers of the environmental implications of consumption patterns. This trend has also reinforced the market for organics, which has emerged as a big business. The European organic market was worth €20.7 billion in 2004, and has been growing at a rate of 26% per annum since 2001 (Nutra, 2006). Growing concern about the environmental impact of artificial fertilizers and pesticides has been a factor on spurring growth in organics. Major supermarket chains have also been quick to tap mainstream concerns about the consumption of potentially dangerous chemicals.

Sustainability of the Livestock Sector

In many countries in the Asia and the Pacific region, the food and food processing industry is largely relying on expanding international trade in livestock and livestock products. Owing to consumer-driven demand, exports of meat and milk products grew at a rate of 5% per annum, while egg output expanded at a rate of 7% per annum in the 1990s (FAO, 2004). If this advance in trade is sustained, the region's livestock sector has the potential to spearhead sustainable agriculture and place rural development on a fast track. The Asia and the Pacific region accounts for the largest animal population worldwide, and sustainable progress in sectoral production would contribute substantially to promoting exports, raising employment, alleviating poverty and enhancing empowerment of people.

The region also possesses the biggest pool of farm animal genetic resources. However, such diversity also poses some important down-sides. There is an increase in the risk of pest outbreaks and transboundary diseases, including zoonotic/epizootic diseases. Unsustainable production practices in the livestock sector have resulted in serious environmental degradation stemming primarily from inadequate livestock policies and faulty application of new technologies, particularly in intensification, feeding and disease control.

Biodiversity Concerns

Some of the leading consumer organisations have been raising concerns about the implications of genetically modified food on biodiversity. Various food crops have been genetically modified for greater productivity or nutritional value, or for resistance to pests or diseases. Examples of genetically modified (GM) food are tomatoes, grains, cassava, corn and soybean. The use of biotechnology in creating new strains of seeds raises questions about possible contamination of non-GM species, apart from the health-related implications. This issue will be discussed in detail in the next section.

Consumer Concerns

Consumers may not necessarily be able to assign appropriate tribute or blame to firms that supply safe and unsafe food. When a food contamination incident occurs, instead of identifying an unsafe food supplier, consumers may stop purchasing a specific food category altogether.

Moreover, clear policies are necessary to guide consumer behaviour. An example in the fisheries sector is revealing of the linkages between trade and environmental policies. Asia and the Pacific accounts for 55% of the world's fish catch, but a worldwide decline in fisheries production has had a negative impact on Asia and the Pacific (FAO, 2004). Almost two-thirds of the major fish species are either fully exploited or overexploited. In order to maintain production volume, fishermen try to capture more "trash fish", which compromises the nutritional quality expected by consumers. This development, if not effectively regulated, can damage fishing grounds severely.

The market on its own may not fulfil the social responsibility of providing safe food, and thus government needs to regulate the market and provide incentives for the sustainable development of the fisheries sector.

II.3 Health and Food Safety Concerns

With the growth in the incidence of contamination in processed food products, consumers, especially in developed countries, prefer to pay more to increase standards and even buy organically grown, branded products. Therefore, health concerns have led to increasingly stringent environmental regulations on process and production methods (PPMs) to control the manner in which products are brought to the market – as opposed to regulations on the characteristics of the product *per se*. Similar concerns also drive the urge to avoid food products made from genetic modification.

The increasingly complex and stringent regulatory framework in the food and food processing sector has increased compliance costs significantly.

Novel Food including GM Food

As set out in the IUCN guidebook to the Cartagena Protocol on Biosafety, the commercial use of genetically modified organisms (GMOs) in agriculture to date is limited to varieties from four crop species: soybeans, maize (corn), oilseed rape (canola), and cotton. In 2001, 99% of the global crop area planted with GMOs was grown in four countries: 68% in the US, 22% in Argentina, 6% in Canada and 3% in China. Of the total global area of soybean acreage, 46% was sown with GM varieties, and for maize 7% of the total crop area was sown with GM varieties (IUCN, 2004). In the past decade, the number of GMOs that are marketed as human food has increased – over 52 approved crop varieties (from 13 different species) in the US;¹⁵ 43 (six different species) in Japan;¹⁶ 12 (five different species) in Australia and New Zealand;¹⁷ five (two different species) in the EU;¹⁸ and four (three different species) in South Africa.¹⁹ Only a few GMOs have been approved for direct use as food. However, products from approved GMOs – notably flour from GM maize, and oils extracted from GM soya and oilseed rape, are used in the production of processed foods. It is not uncommon to mix GM products with products derived from non-GMOs.

Consumers are concerned about the health and environmental implications of novel food, particularly genetically modified (GM) food. The leading food agencies define a novel food as a food or food ingredient which does not have a significant history of consumption. For example, in the EU the time frame defined is prior to May 1997. This helps in addressing the growing public concern about the potential risks of introducing biotechnology to human health. These concerns affect the future development of agro-food production.

Consumption Shocks

In some, albeit rare cases, consumer fear can have dramatic effects on consumption. In the recent bird flu crisis, for example, in Europe, consumption shocks ranged from a dramatic 70% decline in Italy in mid-February 2006 to 20% in France and 10% in northern Europe (FAO, 2006).

These responses are similar to the European situation in late 2005 when widespread consumer concerns about bird flu outbreaks contributed to a 1% decline in poultry consumption per annum in 15 countries in the EU. Similarly, in the US, export prices for broiler cuts, after rising to record levels in October 2005, dropped by 13% as a result of declining shipments to Eastern Europe and Central Asia between November and December.

II.4 Impact of Health and Environmental Standards on Trade

Over the years, the shift from trade in primary agricultural products to trade in value-added, ready-to-eat processed food products has made the food production chain more complex and contributed to an increase in health and environmental concerns. As a direct result, the regulatory framework for food safety has expanded exponentially. Notwithstanding the many benefits to producers and consumer with respect to providing information on products, there are serious trade implications of these diverging standards. The development of international standards is put forward as a way to ensure transparency and equity. Several multilateral bodies are engaged in the process of standardsmaking in the food sector, such as the joint FAO-WHO Codex Alimentarius. MEAs have also been negotiated to deal with specific environmental issues of relevance to the food and food processing sector, such as genetically modified organisms in the Cartagena Biosafety Protocol (2003).

While the WTO is not a standards setting body, the SPS Agreement supports the use of international standards for the benefit of harmonised food safety standards; WTO Member countries can choose to establish their own level of protection at higher levels provided it is justifiable and non-discriminatory. Given the trade implications of environmental standards, the WTO Committee on Trade and Environment (CTE) launched broad ranging discussions on this issue over a decade ago, notably on the market access impacts of eco-labelling. In this section, we provide an overview of the state of the discussions in international fora in this regard.

II.4.a Nature of environmental and health-related requirements

Standards may be mandatory or voluntary in nature. When the standards are mandatory in nature, they qualify as technical regulations, such as pesticides residual warnings.

Mandatory Standards

Eco-labels provide information to the consumer on various environmental impacts during the life cycle of a product. Several national governments in the Asia and the Pacific region have responded to the mandatory labelling schemes in their export markets by establishing their own standards. However, at this point, very few of them cover the food sector. The Singapore government launched the *Green Labelling Scheme* (Government of Singapore, 1998) and the Indian government prepared *Eco-mark* labelling criteria (Government of India, 1992). In Singapore, only 5 food products are included in a total of 26 product categories, whereas in India 7 food products are covered in 14 product categories. Indonesia has initiated timber certification and eco-labelling to encourage sustainable forest management and ensure markets for its timber in developed countries (Government of Indonesia, 1995).

Voluntary Standards

The voluntary standards originate from environmental certification programs, which may be of various environmental categories. The voluntary standards are of recent origin, and they are generally meant to inform consumers of specific environmental production characteristics or environmental attributes associated with certain products (CEC, 2000). According to ISO 14020, “environmental label means a claim that indicates the environmental aspect of a product, which may take form of a statement, symbol or graphic on a product or package level in product literature, in technical bulletins in advancing or in publicity among other things”.

Private Standards

Private sector voluntary standards are also emerging as market reality. They are imposed informally by the importing super market chains and other major importers on agricultural exporters. Often, importers use these so called voluntary standards to pay lower prices for imports that have not been certified, paying a premium for certified products. While this offers an incentive for exporters, overly burdensome requirements to meet voluntary standards can effectively bar them from the market. For instance, several foreign buyers pay lower prices for grapes if they are not in compliance with Eurepgap (Euro-retailer produce working group for good agricultural practices). India's experience with export of flowers to Japan is a similar case. It is apparent from the experiences of countries that the cost of compliance is substantial and often beyond the competence of many of exporters, especially SMEs. Establishing a moderate-sized lab for testing and analysing samples of spices costs approximately 4 million Rupees in India (US\$ 88,000). Furthermore, the technology necessary to comply with phytosanitary standards, for example, may not be easily available in developing countries.

II.4.b Differing standards

This wide variation in agricultural product related standards adopted by different importing countries has led to various problems. For example, different countries follow different norms for aflatoxins and pesticide residue, thus increasing the compliance cost for exporting countries. While the EU countries have gone as far as to adopt a single currency, their standards on pesticide residue vary widely, for instance, from 0.01 particles per million (PPM) in the UK to 0.03 in the Netherlands to 0.10 in Germany for Aldrin and Dieldrin. Many of these standards are imposed in a less than transparent manner and sometimes are accompanied by other requirements, such as good manufacturing practices (GMPs). Consignments of Indian spices have been detained in Spain, Italy and Germany without any satisfactory explanation on the changes made in the importing regulations on microbial contamination and pesticide residue despite the transparency obligation under Article 7 of the WTO SPS Agreement.

There is considerable discretion available to importing countries to impose their own rules regarding these standards and other regulations such as inspection of imported products, specific treatment or processing of products, fixing of minimum allowable levels of pesticide residue, labelling and packaging requirements, and good manufacturing practices. The flexibility provided in the SPS and TBT Agreements to chose higher standards than those developed multilaterally has been exploited by developed countries to impose stringent norms and standards that acting as a significant barrier for agricultural exports of developing countries. For instance, very often on very flimsy grounds and very minute risk assessments are used to justify imposition of these higher standards. For instance, adoption of a new aflatoxin standard in the EU would reduce health risk by approximately 1.4 deaths per billion a year. While there are not a billion people in the whole of the EU, African exports of cereals, dried fruits and nuts to the EU are expected to decline by 64 per cent as a result of the adoption of these standards, with an estimated loss of export earnings in the order of US\$ 670 million per annum.

Even though international standards, such as Codex are developed predominantly by developed countries, they themselves do not adopt them. The SPS Agreement allows importing countries to impose sanitary and phytosanity standards that are higher than international standards, provided there is a scientific basis. This flexibility has been used by various developed countries to limit the market access of specific countries. A case in point is non-manufactured

tobacco where Japan insists on a DDT residue level of 0.4 particles per million (PPM) while the international standard is 6 PPM. Indian tobacco has a DDT residue level of 1-2 PPM, which is well below the internationally permissible level. However, Japan does not allow tobacco imports from India on phytosanitary grounds.

II.5 Domestic Environmental Constraints and Impact on Competitiveness

Countries in Asia and the Pacific face several constraints in coping with the demands of environmental considerations, which affect their competitiveness in a major way. These constraints may relate to financial, institutional or infrastructural factors. This poses an additional cost in the production process. Increase in the production cost makes the processed products export from the developing countries non-competitive at the international market, whereas producers in developed countries are better equipped with modern technology, cheaper power, besides the advantages of receiving high level of subsidies from their governments.

The domestic environmental implications may well be assessed according to various criteria discussed in Table 2.1. Some of key considerations are discussed in the next section.

Agriculture under Pressure

In the ESCAP region, a continuous increase in the cropping intensity in the agricultural sector and on livestock and aquaculture has led to land degradation, pollution and the compounded risk of pests and diseases apart from water pollution. This stress is reflected in other problems: from widespread topsoil erosion and desertification, salinization of aquifers, agricultural pollution of aquifers and water bodies to eutrophication from high levels of nitrogen use and loss of biodiversity. These developments not only threaten agricultural sustainability, but also challenge the competitiveness of agricultural produce from countries in the Asia and the Pacific region.

Putting in place a regulatory framework that supports sustainable agriculture and encourages sustainable management practises can assist the sector in maintaining and improving its ability to compete on the world market.

Challenges and Constraints of Biotechnology

The EU has introduced mandatory labelling of GMO products. Developing countries, without being able to market their products with GMO free ecolable, are thus disadvantaged in the EU markets. The experience of the American GMO corn in Mexico highlights the point that with greater inflow of GMO, there is a fear that the insects free GMOs will result in elimination of a number of existing local plant varieties. As the GMO does not provide the scope for seed culture for future use, the few multinational companies controlling the GMO seeds will control the entire crop pattern in the future, and thus making the farmers dependent on the few seed companies for their future cultivation. The EU, for example, does not allow the import of GMO products. This leads to trade conflicts in GMO based processed food products. The developing countries can experience substantial loss in international trade, if GMO based products are not allowed to be traded.

PPM Criteria

The shift in focus from primarily product-based criteria to criteria that follow a product through its life cycle – including the process and production methods (PPMs) has added

magnitude to the large canvas of constraints faced by developing countries. PPMs of relevance to the food and food processing sector are linked with sanitary and phytosanitary measures, such as hygiene requirements in the production units, safeguarding the maximum permissible limit on the contamination of microbiological pathogens, veterinary residues, metals, food additives, packaging methods, limit on the use of pesticides, and traceability requirements.

Complying with food safety standards and cater quality food to the consumer implies raising the cost structure in the production process. The Hazard Analysis and Critical Control Point (HACCP) requirements have become central to national food safety programmes, comprising a sizeable share of additional costs in meat and poultry processing plants (Boland, et. al., 2001; Antle, 2000). Zarrilli (1999) argues that the SPS standards are powerful tools to protect domestic producers by demanding exacting requirements involving costly tests and duplicate conformity assessment measures from importers, which are particularly burdensome for developing country SMEs.

Access to Technology

Access to technology remains a major problem for developing country exporters. The shifting goal syndrome posed by stringent and ever-changing SPS regulations in the EU and the US, coupled with emerging initiatives, such as EurepGAP, leave developing country exporters with the risk of detention and rejection of export consignments. At the domestic level, the multiplicity of institutions and lack of linkages in the food processing industry with the relevant ministry results in a significant information gap; information on the standards in place in key export markets is key to maintaining export competitiveness.

Infrastructure Constraints

Testing facilities require infrastructure, investment in technology and trained man-power, which are not easily available in developing countries. Testing has become a key requirement for market access in the food and food processing sector.

II.6 Multilateral Institutional and Policy Arrangements

The WTO has occupied the centre stage in terms of policy debates on trade and environment. After lengthy debate in the WTO Committee on Trade and Environment for over a decade, the current Doha Round includes negotiations on trade and environment. The negotiations underway pursuant to Paragraph 31 of the Doha Declaration includes liberalisation of environmental goods and services.

WTO Negotiations on Trade and Environment

The Doha negotiating mandate embodied in Paragraph 31(iii) calls for the expedited liberalisation of trade in environmental goods and services. At the World Summit on Sustainable Development in 2002, countries called for voluntary but WTO compatible market-based initiatives for the creation and expansion of domestic and international markets for environmentally friendly goods and services. This includes organic products, which maximise environmental and developmental benefits. Emphasis was placed on the need to enhance capacity building and technical assistance to developing countries in order that they can take advantage of the opportunities offered by liberalisation of environmental goods and services.

Paragraph 31(iii) of the Doha mandate calls for “the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services”.

The promised market access through the WTO Agreement on Agriculture remains elusive for developing countries. As discussed above, the emergence of standards, especially private standards, has become a potent trade barriers, threatening a substantial proportion of agricultural exports. While the SPS and TBT Agreements aim to ensure that these standards and regulations are not used for protectionist purposes or create unnecessary obstacles to trade, the reality is that developing countries are faced with an intricate complexity of regulations and standards in their export markets. This situation has caused significant market disruption and adverse impacts on trade.

Trade and MEAs

There are more than 200 multilateral environmental agreements (MEAs) out of which about 20 contain trade measures (UNEP). One of the most relevant MEAs for the food and food processing sector is the Cartagena Protocol on Biosafety, which regulates the treatment of living modified organisms. The Cartagena Protocol was negotiated under the United Nation’s Convention on Biological Diversity (CBD), which refers to precautionary measures in the face of threats to biological diversity.

Some countries adopt ‘sound science’ as a basis for restricting trade in products that are derived from genetic engineering, while some promote the use of ‘precaution’ in decision-making when there is a lack of scientific certainty. The EU and the US have contradictory approaches to risk - the former advocates the precautionary approach as a principle that should be incorporated into the international legal framework, while the latter proposes the adoption of ‘sound science’ in risk assessment. The US and several other members of the WTO are concerned that countries would use the precautionary principle¹ as a trade barrier (Chaturvedi and Rao 2004). Specific reference to precaution has been outlined in more than ten MEAs and regional environmental agreements. Precaution is an underlying principle of the Biosafety Protocol. The Biosafety Protocol came into force on 11 September 2003.

Table 2.1 Environment (health) based Market Access Constraints for Food Exports

Food safety (SPS)	Animal/plant health	Product quality	Environmental Criteria	Social criteria	Voluntary instruments
(1) maximum residue permissible limit (MRPL) of: (a) pesticide content (b) chemical content (c) heavy metals (d) microbiological pathogens (e) food additives (2) sanitation & hygiene in the plant (3) product	(1) risk assessment (2) disease prevention (3) sanitation (4) fumigation (5) vaccination (6) quarantine (7) banned livestock feeds (8) antibiotics (9) product	(1) product content (2) cleanliness (3) ingredient specifications (4) grading (5) nutritional content (6) packaging (7) labelling	(1) contaminants in water, air and soil (2) safeguard to endangered species (3) protection of flora & fauna (4) waste disposal (5) Recycling (6) eco-labels (7) GMOs (8) organic production (9) precautionary	(1) labour standards (2) “fair trade” (3) labour welfare (3) animal welfare (4) work environment (5) safety measures (6) child-labour	(1) quality assurance (2) eco/organic labels (3) GMO details (4) certification

¹ The SPS Agreement permits a country to impose a stricter standard than the Codex standard provided it is based on sound science; WTO Members can also adopt stricter measures on a provisional basis in cases of scientific uncertainty. In the absence of scientific certainty, the precautionary principle is enshrined in numerous MEAs to allow proactive measures to respond to serious risks of environmental harm.

traceability (4) HACCP	traceability (10) bio- security (11) GMOs		principle (10) product traceability	free production	
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III. Environmental Considerations in Trade in the Food and Food Processing Industry in Asia and the Pacific Region: An Overview

III.1. Some Methodological Issues

This study seeks to examine the implications of environment and health-related constraints on the export prospects of Asia-Pacific countries in the food and processed food sector. The broad policy observations are primarily drawn from the empirical analysis. For this purpose, we have used various methodologies to generate a separate database for the study. Broadly speaking, the database used for the current study: (a) identifies ‘processed food products’ at the 6-digit HS level using a new definition of the product; (b) identifies ‘primary food products’ at the 6-digit HS level using a conventional definition; (c) generates exports and import data series for a number of Asia-Pacific countries at the 6-digit HS level, for which there was no data reported by UNCTAD; and (d) identifies what can be considered “environmental products” in the food and processed food sector at the 6-digit HS level using new methodology.

III.1.1. Towards a Comprehensive Definition of Processed Food

This study analyses the performance of Asia-Pacific countries in primary agricultural and processed food products. From the outset, it is important to note that there is no consensus on a definition of the processed food sector. There are some earlier studies, which have attempted to classify products under the category of processed foods.² These studies suffer from a number of limitations. While some studies did not cover most of the categories of products as defined by the Harmonised System to be processed food, some of them used old trade classification systems for listing products. In the present study, we have made two improvements in the classification of processed products. First, the processed food sector is broadened by extending the coverage of processed food products, which were not covered in earlier studies. The present study divides processed food products into twelve sectors. Secondly, the classification of tradable processed food products is structured by using the Harmonised System (HS). In this study, ‘primary food products’ are defined based on modifications to the product classification of Athukorala and Jayasuriya (2005). However, in this study, only food products are considered for the analysis, leaving aside non-food products in the agricultural sector.

III.1.2. Environmentally Sensitive Goods (ESGs) in Food and Processed Food Sector

The study focuses on the environment-related market access constraints faced by food and processed food exports in major importing countries. This requires identification of environmentally sensitive products in the agricultural and other sectors, based on current NTM practices in major importing countries. For this purpose, tradable products need to be identified

² For detailed discussion on the issue, see Athukorala and Sen (1998), Ray and Josling (2003), Henderson (1996), Henderson, et. al., (1998), Pick, et. al., (1997) and Athukorala and Jayasuriya (2005).

at a disaggregated level. For analytical convenience, products are identified at the six-digit HS level for inter-country comparison. We have used criteria developed by the OECD (2001) to distinguish environmentally sensitive NTMs from other NTMs. The list of products subject to various forms of trade regulations is taken from five countries, namely the US, EU, Australia, Japan and Canada, and identified environmentally sensitive products for the present analysis using the joint UNCTAD-World Bank Trade Analysis and Information System (TRAINS) World Integrated Trade Solution (WITS) database.

III.1.3. Generation of Export Data Series for Unreported Countries

For the present study, the PCTAS³ database is used to extract bilateral export data at the six-digit HS level. The database provides bilateral exports and imports data for 138 countries. It is observed that trade data series for a sizable number of countries in the Asia and Pacific region are not reported in the PCTAS database for the period 1998-2002. For some important unreported countries in the region, new export data series are generated from the 138 reported countries covered by PCTAS. Bilateral export data for these countries is generated by data mirroring, and after proper adjustments using cif (cost, insurance and freight) and fob (freight on board) values.

The database indicates that several products are subject to environment-related NTMs in the agricultural sector. We have taken agricultural trade data for 34 Asia-Pacific countries, and considered those commodities which are subject to environment-related NTMs. This becomes the main database for the present study.

III.2. Importance of Food and Processed Food Exports

The participation of Asia and the Pacific countries in the export of food and processed food has been growing significantly in the world market. In the post-Asian crisis period, there have been fluctuating trends in the export performance of the regional economies in certain segments of the food and processed food sector. The current sectoral export performance of the Asia Pacific countries indicates that low income countries have accomplished lower levels of growth than middle or high income countries. In terms of destination, exports increased much faster to the US than other markets, such as the EU and Japan. Among the EU member countries, the UK and France emerge as favourite destinations for exports from the Asia and Pacific region.

Food and processed food products from Asia and the Pacific region face high levels of protection in their export markets. Tariff levels differ significantly across product groups. Tariff escalation is evident as value is added; average import-weighted tariffs are much higher for processed food than unprocessed primary products. However, the level of imports in this sector by developed countries depends largely on the macroeconomic performance of these economies. Since developed countries are picking up after a spell of recession, there are prospects for Asian developing countries to improve their export performance.

Though several Asia-Pacific countries are engaged in the food and processed food sector for export, there are many new entrants in the sector. Except for a few countries, most of them are engaged in selected sectors for export. The motivation of these countries to export is linked

³ Personal Computer Trade Analysis System (PCTAS) of the International Trade Centre (ITC) is a CD-ROM of trade statistics developed specifically for use in market research by enterprises and institutions. PCTAS allows the assessment of trends, market shares and the role of competing countries in major markets either through direct reporting or mirror statistics.

to a number of macroeconomic developments in individual countries. The macroeconomic linkages between food and processed food with certain macro indicators are discussed in the following sections.

III.3. Macroeconomic Linkages

The Asia and Pacific region comprises a heterogeneous set of countries, having significant level of variations in their size and level of development. The divergences between countries in the region are reported by various multilateral agencies (ESCAP, 2005; World Bank, 2005; World Development Indicators, 2005; UNCTAD, 2005). The recent trend shows that Asia is the fastest growing region in the world; the export sector has played an important role towards this end.⁴ Statistics show that export-orientation is stronger in smaller countries than in larger countries. Except for a few cases, the average growth rate of exports has been significantly high for many countries. While several countries in the region are critically dependent on exports of agricultural products, the level of dependency has been declining in recent years. FAO (2005) reports that agricultural exports in most Asian countries are heavily dependent on a selected number of products; variations in the demand for these products in the global market have adverse impact on the total exports proceeds of these countries. Moreover, trade in processed agricultural products is an emerging area of the world market. The proportion of processed agricultural products in the total agricultural exports is growing by leaps and bounds at the global level. Asian countries are catching up with this global trend to improve their global share of agricultural trade.

This section identifies the most important food and processed food industries in the region. Importance is based on each sector's contribution to specific macroeconomic variables, such as GDP, exports and employment. For this purpose, information has been assessed at the disaggregated sectoral level depending upon availability.⁵

In the absence of certain important macroeconomic variables, some studies use trade variables as substitutes while identifying sectors using certain criteria. Frequently, there are strong interlinkages between output, trade and employment, particularly in the era of globalisation (Kumar, et. al., 2005). The choice of trade data for the selection of sectors is due to a number of reasons. Firstly, trade data is more disaggregated than production data, and this can be examined by looking into the Harmonized System (HS) and the International Standard Industrial Classification (ISIC). Secondly, trade data is more reliable than production data. The difference is mostly attributed to data collection procedures in developing countries (National Statistical Commission, 2001). Thirdly, disaggregated trade data is reported by various national and multilateral agencies, and the coverage of countries is also substantial. Fourthly, non-tariff barriers (NTBs) play an important role in the cross border flow of food and processed food exports, and country/product specific NTBs are available under the HS classification from the UN Conference on Trade and Development (UNCTAD). For these reasons, we have used trade data for the selection of important food and processed food sectors in the region.

⁴ For a detailed discussion of the emergence of Asia in the world economy during the last two decades, see Mohanty & Chaturvedi, 2006.

⁵ We have examined various sources such as FAO statistical yearbooks, UNDP World Development indicators, ILO employment statistics, UN national accounts statistics and IMF financial statistics, but there are constraints in accessing information at the sectoral level.

A recent study (Kumar, et. al., 2005) analyses the impact of export-led growth on India's domestic employment. Based on a detailed analysis of both the agricultural and manufacturing sectors, the study observed that the largest employment potential exists in the export of agricultural products. In the corporate manufacturing sector, employment is declining steadily in India, but the export sector has, in turn, reversed the declining employment trend by generating additional jobs in the economy. The study observed that export in the agricultural sector generates more employment than the manufacturing sector.

The experiences of Asia-Pacific countries reveal that the share of agricultural exports in GDP is declining, whereas the proportion of food exports in total agricultural exports is increasing because of the improved performance of processed food exports in recent years. Since countries in the Asia-Pacific region have attained different levels of economic development, there are some variations in the experiences of different sub-regions with regard to the overall trend prevailing in the region as shown in **Table 3.1**.

Table 3.1: Importance of Agricultural Exports in Selected Asia-Pacific Countries

(in percentage)

Country	Share of Agricultural Exports in GDP		Share of Food Exports in Total Agricultural Exports		Share of Processed Food Exports in Total Agricultural Exports	
	1989-1991	2002	1989-1991	2002	1989-1991	2002
South Asia						
Afghanistan	na	na	61.15	na	77.17	na
Bangladesh	0.54	0.21	11.73	15.80	9.24	10.85
Bhutan	4.03	2.38	87.91	72.54	23.27	61.39
India	0.97	1.08	38.30	68.76	71.97	68.84
Iran	0.65	1.03	76.58	88.41	8.13	28.58
Nepal	1.51	1.39	83.96	49.02	16.41	58.47
Pakistan	2.79	1.68	38.86	87.13	82.39	75.52
Sri Lanka	8.55	5.86	17.67	18.73	62.39	47.11
Turkey	2.38	1.89	73.88	81.52	59.85	70.65
South-East and North-East Asia						
Brunei	na	na	75.04	52.51	36.49	71.84
Cambodia	3.23	0.91	25.62	10.20	0.00	49.95
China	0.02	0.01	53.21	67.16	57.72	62.49
Indonesia	2.59	3.59	33.74	67.49	56.21	53.29
Korea Rep	0.44	0.35	56.22	60.40	64.08	82.61
Lao PDR	3.98	0.91	60.67	32.43	0.00	4.90
Malaysia	10.27	7.77	66.01	76.53	54.86	56.68
Mongolia	na	7.40	57.86	27.78	2.06	1.40
Myanmar	na	Na	85.49	93.33	33.48	26.67
Philippines	2.81	1.94	80.56	85.09	79.87	69.83
Singapore	7.26	3.09	55.18	47.47	67.92	81.19
Thailand	6.75	6.43	61.35	67.81	85.87	85.09
Viet Nam	8.94	6.03	69.46	63.67	79.00	83.63
Pacific Countries						
American Samoa	na	na	0.00	0.00	100.00	100.00
Fiji	15.04	8.98	97.27	87.40	96.47	92.97
French Polynesia	0.19	na	62.60	81.20	82.76	na

New Caledonia	0.07	na	2.28	85.33	0.00	28.79
Papua New Guinea	7.10	9.91	46.69	69.09	46.99	43.81
Samoa	7.55	2.03	89.19	74.68	64.20	90.46
Tonga	7.32	7.04	97.99	85.14	7.10	8.87
Vanuatu	7.36	4.29	89.71	85.56	80.20	86.55

Source: FAO (2004), *Statistical Yearbook*, FAO, Rome.

na – data not available

South Asian countries have witnessed a decline in their share of agricultural exports in GDP between 1989-1991 and 2002, with India as the notable exception to this trend. However, the proportion of food exports in the agricultural exports is increasing in most of the countries in the region. There has been a mixed response with regard to the trend in the share of processed food exports to total agricultural exports in the region. Most of the larger countries witnessed a decline in their share of processed food exports in the total agricultural exports between 1989-1991 and 2002. Smaller countries, particularly least developed countries (LDCs), have performed better than larger ones during this period.

The broad trends in the sector are rather distinct in North and South-East Asian countries. In this sub-region, there has been a persistent decline in the share of agricultural exports to their GDP between 1989-1991 and 2002. However, the trend in the share of food exports in total agricultural exports is not obvious. While the proportion of food exports in total agricultural exports is increasing in large countries, such as China and the original ASEAN member countries, it is decreasing for Indo-China countries and countries having low agricultural activities in the domestic economy. However, the proportion of processed food exports in the total agricultural exports increased in most countries in the sub-region during the last decade.

The Pacific countries exhibit similar trends to those in other sub-regions with regard to trade in the processed food sector. The contribution of agricultural exports to GDP is declining in a number of important countries, except for Papua New Guinea. The experience of these countries with regard to the composition of food exports to agricultural exports has been mixed. However, the share of processed food exports in total agricultural exports has increased in a large number of countries during the last decade. The experience of Asia Pacific countries is consistent with the structural transformation taking place in different parts of the world.

Athukorala and Jayasuriya (2003) have observed for many developing countries that export of processed food to developed country markets has emerged as a major new source of dynamic export potential in recent years. Moreover, the increase in the share of processed food exports as a percentage of total agricultural trade from developing countries is becoming sharper than that of developed countries. In general, the export basket of developing countries indicates that there is a substantial shift from exports of traditional primary products to processed food exports, over time (Henderson, *et. al.*, 1996; Watts and Goodman, 1997; Athukorala and Sen, 1998). The experiences of countries in the region suggests that the agricultural sector has a high growth export potential, but it requires substantial domestic restructuring, taking into account the changing demand structure in the global economy. Towards this end, choice of appropriate sectors in individual countries is required for exports. A surge in agricultural exports would not only lend support to growth in income in the domestic economy, but would also be critical for employment generation and poverty alleviation in the region.

III.4. Environmental Issues in the Food Sector

Agricultural exports from Asian countries are adversely affected by NTBs in major importing countries on environmental grounds. There are several studies available to substantiate the economic impact of NTBs on Asian economies (Hussain, Rahman and Khalilur, 2001; Henson and Loader, 2001; Chaturvedi and Nagpal, 2003). Hussain, Rahman and Khalilur (2001) discuss the stringent environmental standards that are faced by exports of plants and plant products during the period 1993-1998 from Bangladesh. The authors have identified various factors pertaining to SPS/TBT stifling the growth of various export sectors from Bangladesh. There are few studies, which have quantified the impact of environment-related trade measures (ETMs) on global trade in general, and South Asia, in particular. The issue of compliance costs equally concerns developing countries. For example, the costs of upgrading sanitary conditions in the Bangladesh frozen shrimp industry to satisfy the EU and the US hygiene requirements is estimated to have been US\$ 17.6 million in 1997-1998 (Cato, 1998). The total industry cost required to maintain the Hazard Analysis Critical Control Point (HACCP) is US\$ 2.2 million per annum. The European standards are more stringent than the HACCP. In the case of marine products, the EU regulations concerning the implementation of food safety systems, additive requirements and other process standards are of a high order. As a result, many Indian companies were required to upgrade their facilities, involving huge expenditures. Consequently, a number of companies were forced to close down their factories for a long duration to enable them to upgrade their facilities with heavy investments. Currently, only 90 out of 404 plants in India have received approval to export fish and fish products to the EU (Cato, 1998).

While there is increasing genuine demand by consumers across countries for environmentally safer processed food, there are protectionist attempts to restrict exports from developing countries through NTBs. It is a fine line to distinguish between the two motives in many cases. With respect to the former, the Doha negotiating mandate in Paragraph 31(iii) seeks to eliminate tariff and non-tariff barriers to trade in environmental goods and services (EGSs). This would help agriculture exporting countries to develop long term strategies to restructure their domestic production base to meet global demand. The Special Session of the WTO Committee on Trade and Environment is undertaking negotiations to identify environmental goods and services relevant to the food and processed food sector.

Earlier studies have highlighted that NTBs are more prevalent in the agricultural sector than the manufacturing sector (Mohanty and Chaturvedi, 2005; Chaturvedi and Nagpal, 2003; Mohanty and Manoharan, 2002). The lists of EGS submitted by the OECD and APEC are too narrow to cover agricultural products for further trade liberalisation. In practice, most of the commodities in the agricultural sectors are subject to single or multiple NTBs in industrialised countries. However, there are few credible sources which provide detailed information on country-specific NTBs.

UNCTAD (1996) has compiled a comprehensive classification of NTBs, which are analysed in detail in other studies (Mohanty, 2006; Mohanty and Chaturvedi, 2005; Mohanty and Manoharan, 2002). An OECD (2001) study has listed the environment-related NTBs which are subject to food, drink and tobacco sectors, as well as the number of tariff lines affected (OECD, 1996) by industrialised countries.⁶ UNCTAD provides a list of non-tariff measures (NTMs) that

⁶ The OECD (2001) indicates that the number of product lines subject to NTMs in the food, drink and tobacco sectors is 5,916 in Argentina, 3,659 in Brazil, and 4,115 in Chile.

affect the food and drink sector. From this list of NTMs, environment-related NTMs are determined based on notifications to the WTO Agreements.

Environment-related NTMs are reported at the most disaggregated level of national tariff lines. As reported in the database, these national lines differ from one country to another. After listing environmentally sensitive individual products for each country, we have aggregated them at the 6-digit HS level to prepare a comprehensive product list. The list of environmentally sensitive NTMs identified from the OECD (2001) is presented in Annex I.

Table 3.2: Structure of Food Products subject to Environment-related Trade Measures: by HS Chapter

(Tariff lines in 6-Digit HS)

HS Chapter	Description of HS Chapters	No of HS Lines Subject to Env trade measures	Total Tariff Lines	NTM Frequency Ratio (%)
1	Live Animals	17	18	94.4
2	Meat and edible meat offal	53	63	84.1
3	Fish & crustaceans, molluscs	87	87	100.0
4	Diary produce: birds, eggs	27	28	96.4
7	Edible vegetables & certain roots	56	57	98.2
8	Edible fruits & nuts: peel or melon	55	59	93.2
9	Coffee, tea, mate and spices	32	34	94.1
10	Cereals	16	16	100.0
11	Products of the milling industry	27	27	100.0
12	Oil seeds and leguminous fruits	28	28	100.0
15	Animal or vegetable fats & oils	45	50	90.0
16	Preparations of meat and fish	26	26	100.0
17	Sugars and sugar confectionery	16	17	94.1
18	Cocoa & cocoa preparations	11	11	100.0
19	Prep. of cereals, floor, starch, etc.	17	17	100.0
20	Prep. of vegetables, fruit, nuts, etc.	44	45	97.8
21	Miscellaneous edible preparations	16	17	94.1
22	Beverages, spirits & vinegar	20	21	95.2
23	Residues & waste from food industries	25	25	100.0
24	Tobacco & manufactured tobacco	7	7	100.0

Source: Compiled by the author based on UNCTAD and the World Bank, TRAINS/WITS (World Integrated Trade Solution); OECD, 2001; and Athukorala and Jaysuriya, 2005.

The results show that the food sector⁷ (including primary and processed food products) is subject to a high level of environment-related NTMs, as shown in **Table 3.2**. Except for a few Chapters, most of the product groups are subject to a high level of restrictions to gain market access in major industrialised countries on environmental grounds. This is evident from the structure of the NTM frequency ratio in various sub-groups in the primary and processed food sectors.

⁷ This Table does not include non-food products, such as agricultural raw materials.

III.5. Export Performance of ESCAP Countries in Food Exports

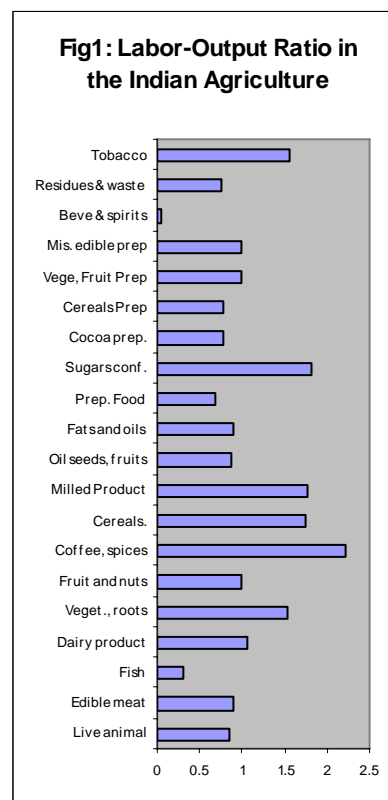
Agricultural products have been the major source of exports for most developing countries and the level of dependency increases for those that are at a lower level of development than others. One of the most important aspects of agricultural exports has been its effects on employment. Recent studies suggest that the agricultural sector has a high potential to grow, but it requires substantial domestic restructuring, considering the demand patterns in the global economy. Considering changes in the pattern of global food consumption, and the general preference for ready-to-eat processed food, there is ample scope for the food sector to experience manifold growth, with large employment generation in the sector. A recent Mckinsey (2004) study highlights that, compared to 30 years ago, the Japanese are now consuming a lower proportion of cereals and pulses and more dairy and meat products. Similarly, Koreans are eating more dairy products, while they have reduced their cereal consumption. In urban India, there has been a shift in consumption from cereals to dairy products and meat. This shift in food consumption is even more substantial in rural India. The Mckinsey study estimates that the food industry has the potential to create more than five million jobs by 2005 in India. Kumar (2005) estimated job creation linked to agricultural exports, and found that this sector has contributed 12.7% of India's total exports and 56.6% of total employment in the export sector in 2004-2005. This study has further observed that the processed food sector (HS Section IV) has contributed 21.5% of agricultural exports and 17.5% of employment linked to agricultural export activities.

Since much agricultural activity occurs informally, there is a dearth of credible statistics regarding employment generation in the agricultural sector. Furthermore, statistics are weak for cross-country comparisons of employment elasticities in agricultural exports.

As a case study, labour per unit of output is presented for India in **Figure 1**. The labour-output statistics are estimated for various HS chapters in the food sector. The results indicate that different sub-sectors have diverse capabilities to generate employment while augmenting domestic output through exports. For example, while sectors, such as sugar confectionaries, milled products, cereals, beverages, spices, vegetables and roots, have more capacity to generate employment, the reverse effects are felt in many other sectors. While developing strategies for augmenting agricultural exports, employment generation needs to be kept in mind. However, the most significant determinant of the appropriate agricultural sector for exports could be the supply factor in the domestic economy and the nature of global demand for specific products.

The global trends in agricultural exports indicate that profit margins for processed food exports are more than that for primary food products, including semi-processed food products. While examining the implications of environmental regulations on food and processed food, we have to take into account the dynamics in these sectors.

For identification of important sectors, which are critical to member countries of the region and also the region as a whole, we have to take note of the importance of specific export sectors in each country. The structure of food product exports in different countries of the region is presented in Table 3.3. The food export

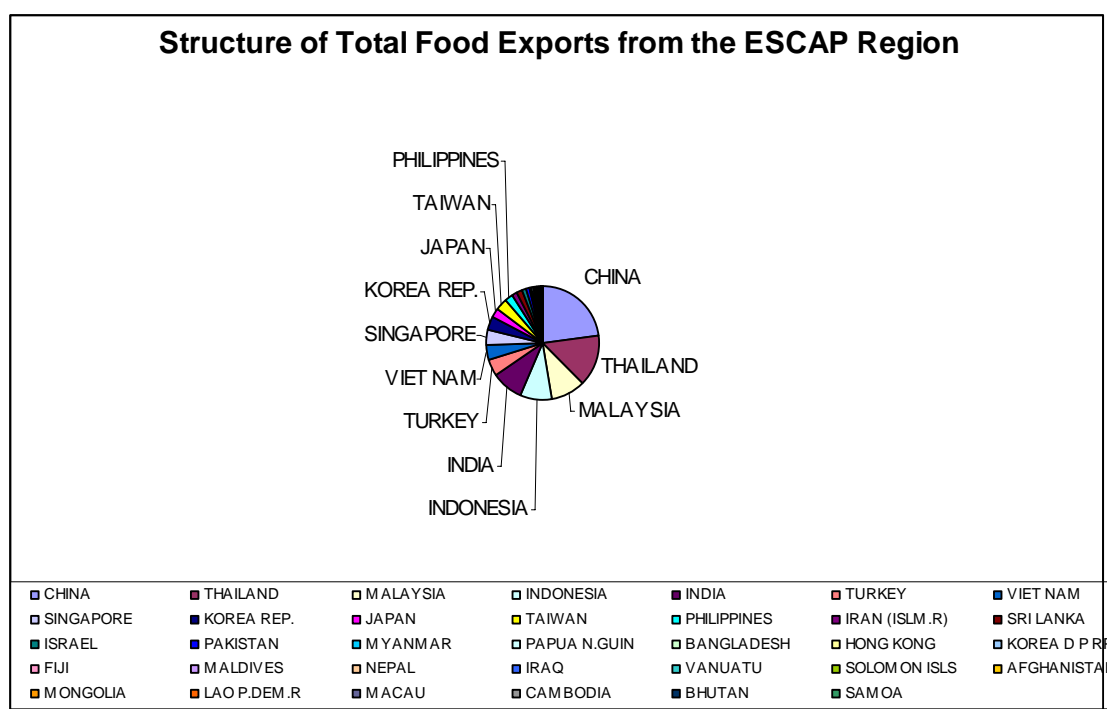


of the region covers both primary food products and processed food products in 2002.

The results show that food product groups (classified under HS chapters), such as fish, edible fruits and nuts, coffee, tea, spices, cereals, fats and oil, edible vegetables and roots, prepared meat and fish, edible preparation, are important for the region from the point of view of production and exports. While some countries have a diversified export base in the food sector, others have few sectors for export.

The dominance of certain countries in the export of food products in the Asia-Pacific region is presented in **Figure 2**. In the region, China is emerging as the largest exporter of food products, followed by Thailand and Malaysia. These three countries are almost contributing half of the region's total food exports. Other countries such as Indonesia, India, Turkey and Vietnam share another 25% of the region's trade. Other important countries in the region are Singapore, South Korea, Japan, Taiwan and the Philippines.

Figure 2: Structure of Total Food Exports from the ESCAP Region



In terms of identifying the key agricultural product groups for the region as a whole and for the sub-regions, there are two issues that emerge from the analysis. Firstly, while Asia-Pacific countries trade in the food sector, trade in the processed food sector has been low, concentrated in certain specific sectors. Therefore, the food and processed food sectors are considered together, while important sectors are considered for the region and the sub-regions separately. Secondly, a few countries dominate food and processed food exports, while many other countries are exporting food and processed food products in a miniscule manner. For proper representation of the region, the selection of sectors for the region/sub-region should be calculated based on appropriate country weight. **Table 3.3** sets out the export performance of ESCAP countries in the food product sector in 2002.

Table 3.3: Performance of Asia-Pacific Countries in the Export of Food Products in 2002: By HS Chapter
(% of total food exports)

Chp	Description	AFG	BGD	BTN	KHM	CHN	FJI	HKG	IND	IDN	IRN	JPN	PRK	KOR	LAO	MAC
C01	Live Animals	0.2	0.0	0.0	14.6	2.2	0.0	0.0	0.0	0.5	0.3	1.1	0.0	0.0	22.2	0.0
C02	Meat and edible meat offal	0.0	0.1	0.0	0.0	4.2	0.0	0.0	4.4	0.3	0.6	0.2	0.0	0.9	0.0	0.0
C03	Fish & crustaceans, molluscs	0.0	91.9	0.0	44.9	18.0	16.9	2.8	22.2	21.9	2.6	24.8	89.7	32.5	0.0	11.3
C04	Diary produce: birds, eggs	0.2	0.0	0.0	5.4	1.2	0.0	0.5	1.1	1.6	1.5	0.2	0.0	0.2	2.0	0.0
C07	Edible vegetables & certain roots	0.0	3.6	15.4	2.7	11.8	4.2	0.0	4.0	0.7	10.7	1.1	6.7	3.4	0.0	0.0
C08	Edible fruits & nuts: peel or melon	91.0	0.7	30.4	0.0	3.5	0.3	0.0	9.3	2.1	60.3	1.7	0.3	5.2	0.0	0.0
C09	Coffee, tea, mate and spices	3.2	1.0	9.2	0.0	3.4	0.3	0.1	10.9	8.2	7.0	0.9	0.1	0.5	67.7	0.0
C10	Cereals	0.4	0.1	0.0	23.3	10.4	0.0	0.0	25.5	0.2	0.0	0.3	0.0	0.0	0.8	0.0
C11	Products of the milling industry	0.0	0.0	11.0	0.0	0.5	0.1	0.1	1.1	0.2	0.0	3.9	0.0	0.2	0.0	0.0
C12	Oil seeds and leiginous fruits	4.2	0.0	0.0	0.4	3.8	0.0	0.0	2.3	0.3	0.3	0.1	1.4	0.1	6.0	0.0
C15	Animal or vegetable fats & oils	0.3	0.0	0.0	0.0	0.7	1.7	3.4	2.4	41.8	5.7	3.2	0.1	0.8	0.6	0.0
C16	Preparations of meat and fish	0.0	2.4	0.0	1.3	14.6	22.2	1.2	0.3	1.6	2.3	10.7	1.3	9.9	0.0	0.0
C17	Sugars and sugar confectionery	0.0	0.0	0.0	0.0	1.4	43.6	2.4	6.2	1.1	1.6	2.4	0.0	6.4	0.0	0.0
C18	Cocoa & cocoa preparations	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	11.0	0.3	1.2	0.0	1.1	0.0	0.0
C19	Prep. of cereals, floor, starch, etc.	0.0	0.1	0.0	0.0	2.8	2.1	9.2	0.9	1.4	2.1	7.2	0.0	12.1	0.0	3.9
C20	Prep. of vegetables, fruit, nuts, etc.	0.0	0.0	17.7	0.0	11.0	1.7	1.3	1.0	2.2	3.3	1.5	0.0	4.1	0.6	0.0
C21	Miscellaneous edible preparations	0.0	0.1	0.0	0.3	2.9	0.0	36.7	1.9	0.5	0.6	18.7	0.1	7.4	0.0	4.2
C22	Beverages, spirits & vinegar	0.0	0.0	14.5	0.5	3.5	6.5	7.7	0.3	0.3	0.6	6.8	0.1	7.7	0.0	12.0
C23	Residues & waste from food industries	0.0	0.0	1.7	1.6	2.6	0.3	0.1	5.0	1.7	0.3	3.6	0.0	1.5	0.0	0.0
C24	Tobacco & manufactured tobacco	0.4	0.0	0.0	5.0	1.5	0.0	34.5	1.0	2.7	0.0	10.4	0.1	6.0	0.0	68.4

Chp	Description	MYS	MDV	MNG	MMR	NPL	PAK	PNG	PHL	WSM	SGP	SLB	LKA	THA	TUR	VUT	VNM
C01	Live Animals	1.5	0.0	5.7	2.7	0.5	0.3	0.0	0.3	0.0	0.1	1.6	0.0	0.2	0.9	0.0	0.4
C02	Meat and edible meat offal	0.2	0.0	82.9	0.1	0.0	0.8	0.1	0.0	0.7	0.2	0.0	0.1	6.0	0.4	2.1	0.9
C03	Fish & crustaceans, molluscs	4.3	79.8	0.2	30.7	0.0	14.6	15.9	16.8	45.4	9.7	55.4	8.8	20.4	2.9	28.2	42.4
C04	Diary produce: birds, eggs	1.6	0.0	0.0	0.1	54.9	0.3	0.1	2.8	0.0	6.1	0.0	0.1	1.0	1.8	0.0	1.1
C07	Edible vegetables & certain roots	1.0	0.0	0.0	50.7	20.7	4.0	0.0	1.5	0.6	1.4	0.0	0.7	3.8	9.6	0.3	1.6
C08	Edible fruits & nuts: peel or melon	1.5	0.0	10.5	1.9	0.0	9.0	0.0	26.8	9.0	2.6	0.0	4.1	2.0	35.3	0.0	8.0
C09	Coffee, tea, mate and spices	0.9	0.0	0.0	0.7	8.5	1.7	21.0	0.0	0.0	6.8	0.0	79.8	0.4	1.9	0.2	17.6
C10	Cereals	0.1	0.0	0.0	8.2	0.0	49.1	0.0	0.0	0.0	0.1	0.0	0.1	16.5	2.4	0.0	12.1
C11	Products of the milling industry	0.6	0.0	0.0	0.2	0.0	0.1	0.0	0.1	1.1	0.4	0.0	0.9	0.7	2.2	0.0	0.0
C12	Oil seeds and leguminous fruits	0.2	0.0	0.0	0.8	0.9	1.7	5.4	0.0	15.6	0.4	2.4	1.1	0.2	1.1	46.2	1.2
C15	Animal or vegetable fats & oils	67.0	0.0	0.0	0.5	0.0	0.0	33.9	20.1	0.9	8.3	0.0	0.3	1.0	4.6	11.6	0.4
C16	Preparations of meat and fish	1.4	18.2	0.0	0.1	0.0	0.1	5.5	6.5	0.0	1.3	20.1	0.0	24.2	0.6	1.7	9.9
C17	Sugars and sugar confectionery	1.9	0.0	0.0	0.7	0.0	16.0	1.4	3.8	0.0	1.7	0.0	0.0	8.0	4.5	0.0	0.2
C18	Cocoa & cocoa preparations	3.6	0.0	0.0	0.0	0.0	0.0	16.0	0.6	0.0	6.8	19.3	0.0	0.2	3.0	8.6	0.0
C19	Prep. of cereals, flour, starch, etc.	3.4	0.0	0.0	0.0	5.2	0.2	0.0	2.9	0.0	5.2	0.0	0.1	1.8	4.8	0.0	1.4
C20	Prep. of vegetables, fruit, nuts, etc.	0.7	0.0	0.0	0.1	0.0	0.7	0.0	11.6	3.1	2.1	0.7	0.9	6.5	15.3	0.0	0.9
C21	Miscellaneous edible preparations	3.0	0.0	0.0	0.0	0.2	0.5	0.0	2.4	11.9	9.2	0.0	1.2	3.2	3.8	0.0	0.9
C22	Beverages, spirits & vinegar	1.9	0.0	0.0	0.3	0.0	0.1	0.0	1.2	0.5	13.8	0.0	0.1	1.0	1.2	0.0	0.3
C23	Residues & waste from food industries	2.1	2.0	0.4	0.4	9.1	0.6	0.7	1.8	11.2	2.2	0.3	1.6	2.6	0.4	1.0	0.5
C24	Tobacco & manufactured tobacco	3.2	0.0	0.3	1.9	0.0	0.1	0.0	0.8	0.0	21.6	0.2	0.2	0.1	3.2	0.0	0.2

Source: Calculated by the author based on PC-TAS 2005, UNCTAD, ITC, WTO, World Bank and other documents.

Note: Total food exports in thousands of US\$, whereas sectoral figures in percentages.

Note on Country Abbreviations: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; KHM = Cambodia; CHN = China; FJI = Fiji; HKG = Hong Kong; IND = India; IDN = Indonesia; IRN = Iran; IRQ = Iraq; ISR = Israel; JPN = Japan; PRK = Korea DPR; KOR = Korea Rep.; LAO = Lao PDR; MAC = Macau; MYS = Malaysia; MDV = Maldives; MNG = Mongolia; MMR = Myanmar; NPL = Nepal; PAK = Pakistan; PNG = Papua N. Guinea; PHL = Philippines; WSM = Samoa; SGP = Singapore; SLB = Solomon Islands; LKA = Sri Lanka; TWN = Taiwan; THA = Thailand; TUR = Turkey; VUT = Vanuatu; VNM = Viet Nam. Chp = HS Chapters.

III.6. Export Performance of ESCAP Countries in Processed Food Exports

The processed food sector is emerging as one of the important export revenue generating sectors for developing countries. In a gradual process, new countries are entering the sector. However, stringent environmental regulations have lowered the prospects of obtaining adequate market access for these processed food exports in industrialised countries.

Table 3.4: Performances of Asia-Pacific Countries in the Export of Processed Food in 2002: By HS Chapter (% of total processed food exports)

ESCAP Countries	Meat Products	Diary Products	Fish Products and Preparations	Egg Products	Cereals and Flour	Vegetable preparations	Preparations of Fruits	Sugar Preparations	Processed Coffee and Tea	Wine and Other Beverages	Processed Oil	Edible Preparations	Total Processed Food Exports
AFGHANISTAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
BANGLADESH	0.5	0.0	90.2	0.0	3.9	0.0	1.6	0.3	1.8	0.3	0.0	1.4	10360
BHUTAN	0.0	0.0	0.0	0.0	0.0	0.0	55.0	0.0	0.0	45.0	0.0	0.0	4837
CAMBODIA	0.0	0.0	62.4	0.0	0.0	0.0	0.0	0.0	0.0	25.1	0.0	12.4	402
CHINA	11.8	0.1	27.6	0.7	2.3	16.7	13.1	3.8	1.0	9.6	0.8	12.5	5899644
FIJI	0.3	0.0	28.2	0.0	0.8	0.5	1.7	56.0	0.0	8.4	2.2	1.9	175903
HONG KONG, CHINA	1.3	1.4	0.8	0.0	9.5	1.0	1.3	4.3	0.1	6.0	2.3	71.9	192667
INDIA	0.3	0.0	2.2	4.3	3.3	4.9	2.2	45.8	9.0	2.7	16.4	8.8	845015
INDONESIA	0.1	0.1	6.1	0.0	2.7	1.3	7.3	36.6	12.0	1.4	28.6	3.7	1614706
IRAN (ISLM.R)	0.0	0.2	14.6	5.9	9.7	7.8	13.6	10.2	2.1	3.9	24.8	7.3	159950
JAPAN	0.3	0.4	21.3	0.2	7.7	1.7	1.4	4.8	5.6	11.2	4.4	41.1	1076790
KOREA D P RP	30.7	0.0	47.9	0.0	1.6	0.0	0.0	2.1	0.0	4.0	7.7	6.0	4849
KOREA REP.	0.9	0.3	19.6	0.0	6.7	7.5	1.0	13.4	5.2	13.8	0.9	30.8	1179940
LAO PDR	0.0	0.0	0.0	0.0	0.0	30.3	19.9	0.0	0.0	2.4	47.5	0.0	297
MACAU	0.0	0.0	0.0	0.0	19.5	0.0	0.0	0.0	0.0	59.6	0.0	21.0	4160
MALAYSIA	0.9	0.3	4.0	2.3	6.3	0.8	1.8	8.2	14.9	6.2	41.9	12.3	1850078
MALDIVES	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20146
MONGOLIA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
MYANMAR	0.0	0.0	8.1	0.0	0.0	5.6	0.0	70.6	0.0	2.5	13.3	0.0	6040
NEPAL	0.0	0.0	0.0	0.0	32.4	0.0	0.0	0.0	0.0	0.0	0.0	67.6	3811
PAKISTAN	0.0	0.0	0.7	0.2	0.5	1.0	2.6	82.1	0.0	9.4	0.2	3.3	144528
PNG	0.5	0.0	19.0	0.0	0.2	0.0	0.0	61.7	0.0	0.4	18.3	0.0	119977
PHILIPPINES	0.1	0.2	13.3	0.0	3.1	0.2	23.4	7.7	1.7	2.4	40.9	7.1	863712
SAMOA	0.0	0.0	0.0	0.0	0.0	0.0	19.1	0.0	5.1	2.8	5.2	67.8	1588
SINGAPORE	0.2	0.1	2.9	0.0	5.2	1.3	3.6	4.5	23.5	30.8	8.0	20.0	1203360
SOLOMON ISLS	0.0	0.0	50.1	0.0	0.1	0.0	1.7	48.1	0.0	0.0	0.0	0.0	11888
SRI LANKA	0.1	0.0	0.0	1.6	2.7	8.6	24.3	1.7	35.4	5.0	9.8	10.8	24623
THAILAND	8.8	0.2	44.9	0.1	1.8	4.2	10.3	17.8	0.5	1.6	1.0	8.8	4473287
TURKEY	0.1	0.6	1.6	0.3	12.0	20.1	24.0	12.8	8.8	3.5	3.8	12.4	1144827
VANUATU	0.0	0.0	8.0	0.0	0.0	0.0	0.0	39.5	0.0	0.0	52.5	0.0	7338
VIET NAM	0.1	0.0	71.8	1.0	4.6	2.3	4.3	1.6	0.7	1.3	1.3	11.0	434480

Source: Calculated by the author based on PC-TAS 2005, UNCTAD, ITC, WTO, World Bank and other documents.

Note: Total food exports in thousands of US\$, whereas sectoral figures in percentages.

The performance of ESCAP countries in the export of processed food is presented in **Table 3.4**. The results indicate that the performance of countries differs significantly in the region. Countries such as China, India, Iran, the Republic of Korea, Japan, and Malaysia have shown substantial diversification in their processed food exports, whereas small countries have yet to reach that level.

The region has witnessed a surge in exports in certain sectors, whereas other sectors have yet to pick up. Some of the important processed food exporting sectors in the region are fish products, cereal and flour, fruits, sugar preparations, processed oil, and edible preparation.

Empirical results reveal that seven to eight countries in the region have dominated 75% of total food exports in the region. If we use exports of food and processed food as a weight for identifying important sectors in the region, the analysis may be biased towards lead countries in the region. Given the importance of obtaining a regional perspective, we have taken the weight of sectors in individual countries in order to identify sectors of relevance to the region. Those sectors that are highly concentrated only in certain countries are given less priority.

As discussed earlier, the ESCAP region is comprised of a heterogeneous set of countries in terms of their level of development. Though the ‘primary food’ sector is important to many countries, the ‘processed food sector’ is slowly picking up in the region. Therefore, we have taken both the ‘primary food’ and ‘processed food’ sectors into account in the identification of lead sectors in the region.

For the ‘primary food sector’, we have used HS chapters as the basis for product aggregation. For the ‘processed food sector’, 12 sectors are designed to reflect the pattern of trade in the region.

Due consideration is given to represent the region adequately in the sample. From an analytical perspective, we have presented ten sectors which are important for the region as shown in **Table 3.5**. Based on our methodology, we have ranked the key food sectors in the order indicated in the final column in Table 3.5.

Table 3.5: Ten Key Food Export Sectors in the ESCAP Region: By HS Chapter

HS Chapter	Description	Rank
C03	Fish & crustaceans, molluscs	1
C08	Edible fruits & nuts: peel or melon	2
C09	Coffee, tea, mate & spices	3
C10	Cereals	4
C15	Vegetable oils & oil seeds	5
C07	Edible vegetables & certain roots	6
C24	Tobacco & manufactured tobacco	7
C16	Preparations of meat & fish	8
C21	Miscellaneous edible preparations	9
C17	Sugars & sugar confectionery	10

Source: Estimation based on the author’s calculation.

It is observed that the export of products in HS Chapter 10, such as coffee and tea, by some countries in the region is highly significant. Taking into account the skewed distribution of export performance of the sector in relative terms, we lowered the ranking of the sector in the last phase of sector identification.

The ‘processed food’ sector is slowly becoming important for production and trade. It is emphasised in the literature that there are two-way complementarities between the ‘primary food’ and ‘processed food’ sectors. Munisamy, Roe and Shane (1996) have argued that efficiency gains in primary agriculture may be transferred to high valued processed food through supplying cheap inputs. Similarly, efficiency gains in the processed food sector may be transferred back to the primary food sector by raising the derived demand and reversing the decline in latter’s price. Taking into account the linkages between the processed and the primary food sectors, both sectors are considered together in selecting priority sectors for the region. As for the primary food sector, we use country weighted criterion to identify the dominant sectors. In this case, we have chosen the ten most important sectors in the region. **Table 3.6** set out the results from the empirical analysis. The order of sectors, to some extent, is similar to that for the primary food sector.

Table 3.6: Ten Key Food Processing Export Sectors in the ESCAP Region

Sector	Description	Rank
F103	Fish products	1
F108	Sugar preparations & honey	2
F112	Edible products & preparations	3
F111	Processed vegetable oils	4
F110	Wine and other beverages	5
F107	Preparations of fruits	6
F105	Cereals & flours	7
F109	Processed coffee & tea	8
F106	Preparations of vegetables	9
F101	Meat products	10

Source: Estimation based on the author’s calculation.

The above analysis provides insight into the selection of sectors for the present analysis. Identification and ranking of sectors has been based on various considerations as set out above. High preference is given to those sectors where the volume of exports is large and several countries in the region are involved in exporting activities. In the identification of sectors, the export volume of broad commodity groups covering both primary and processed food exports is considered.

Table 3.7: Sectors Included in the Study

Rank	Description of Sector	Related HS Chapters
1	Fish & fish preparations	03 and 16
2	Fruits & vegetables	08 and 07
3	Cereals & edible preparations	10
4	Vegetable oil & oil seeds	12 and 15
5	Beverages	09

Source: Based on the author’s analysis.

Juxtaposing the results of Tables 3.5 and 3.6, key food and processed food sectors are identified in **Table 3.7** as important for the ESCAP region. In terms of priority ranking, fish and fish preparations is at the top, followed by fruits and vegetables. Other priority sectors are cereals and edible preparations; vegetable oil and oil seeds; and beverages.

In different subregions, the importance of the food and processed food sectors varies, to a large extent, despite the fact that the category of fish and fish preparations is emerging as important to all subregions. The important products categories in the different subsectors are presented in **Table 3.8**. In South Asia, apart from fish products and preparations, fruits and their variants, beverages such as coffee and tea also dominate their composition of export. In South and North East Asia, cereals and edible preparations, and meat products are the other two major export products. In the Pacific subregion, in addition to fish products and preparations, sugar preparations and beverages form the major portion of their export basket.

Table 3.8: Strategic Food and Processed Food Export Sectors of ESCAP: By Subregion

Subregion	Export Sector
South Asia	Fish products & preparations
	Fruits & preparation of fruits
	Beverages - coffee, tea, etc.
South and North-East Asia	Fish products & preparations
	Cereals, flour & edible preparations
	Meat products & preparations
Pacific	Fish products & preparations
	Sugar preparations
	Beverages - coffee, tea, etc.

Source: Calculated by the author based on PCTAS, 2005; FAO *Statistical Yearbook*, 2004.

The forgoing analysis reveals that Asia-Pacific countries are not fully prepared to take up the global challenges to enter into the high value processed food market. The countries in the region are more familiar with trade in ‘primary food products’, and have done little restructuring of their domestic policies to take up the challenges of gaining entry to import markets. A few countries in the region have slowly geared up to improve their stake in global trade in processed food, and others need to replicate these efforts to achieve high standards in the production of processed food. A few selected products are emerging as important in the region, as many countries have chosen to trade these products. To improve the stake of the region in the global export of food and processed food, there is a need for coordinated efforts to improve the ability of countries to effectively respond to the rising challenges. Strategic policies need to be evolved to: (a) improve market access; and (b) restructure domestic policies to improve production conditions in individual countries. These policy issues are discussed in the following section.

III.7 Market Access Barriers to Exports from the ESCAP Region

In general, developing countries have performed exceedingly well in improving their stake in the exports of food and processed food products in the global market. Whilst the main markets for these products are located in developed countries, markets in developing countries are also emerging in a robust manner. As indicated by the market trends, the level

of restriction varies to a large extent in developed country markets.⁸ **Annex II** contains a list of environment-related trade measures on imports of selected food and processed food.

Different sectors in the food and processed food industry experience different levels of restrictions in each market. Based on the level of restriction on a number of food and processed food products, Thai exporters place the EU at the top, followed by the US, Canada and Australia of the list of major importing developed country markets. The intensity of restriction varies between sectors in these markets. The level of restriction is very high for tuna exports, as compared with other key exports such as chicken, pineapple, vegetables and fruits. A firm level study on processed food exports from India highlights that while 38% of the surveyed firms reported the US market to be extremely restrictive, 34% felt the EU markets are extremely restrictive (Mehta, et. al., 2005); 32% of the firms considered the access to US markets to be moderately restrictive and 18% felt the EU markets are moderately restrictive. Thus, over 70% of the firms surveyed perceived that developed country markets are more restrictive than developing country markets. This perception, of course, largely depends on the product segment. For instance, in the case of shrimps, more than half of the surveyed units felt that the US market is extremely restrictive vis-à-vis the European, Japan and Australian markets. In the case of mango pulp, only 20% of the respondents found the US and European markets to be moderately restrictive. The same story is reiterated for exports of mushrooms. In the case of poultry products, Japan and Europe are perceived to be extremely restrictive as compared with the US.

For greater market access in industrialized countries, exporting firms are required to obtain certificates to demonstrate their ability to produce food and processed food products to the expected level. The experiences of the exporters indicate that HACCP and GMP (Good Manufacturing Practice) are the two most important certificates, which allow exporting firms to access markets in OECD countries. Exporting firms also show interest in acquiring other certificates, such as ISO 9002, BRC (British Retail Consortium) and EFSIS (European Food Safety Inspection Service) to improve their ability to widen their market access. It is considered that developing their food safety systems to meet the requirements of these standards will increase market access. Nevertheless, the cost of equipping firms in order to be able to acquire these certificates has been high. In India, compliance with food safety standards imposed an additional investment of 10 to 15% for equipment, and in general represented 5% of the FOB (Free On Board) value from export earnings.⁹

Developing countries are willing to comply with stringent food safety standards, but find it difficult to comply with multiple standards in a wide range of countries. The lack of harmonization and inter-country differences in standards among industrialized countries aggravate the inability of developing country SMEs in particular to comply with such exacting standards. An example of the differences in requirements in the export of processed shrimp products across countries is presented in **Table 3.9**. The level of standards differs significantly across developed countries. It is important to note that the standards adopted by the EU are different from some of its own member countries in several critical areas. As the standards differ among countries, without any consistency in the demand pattern of the products in these markets, producers in developing countries find it difficult to maintain production and comply with multiple standards.

⁹ Free On Board refers to the obligation of the seller to deliver the goods on board a vessel designated by the buyer.

**Table 3.9: Maximum Permissible Limits of Selected Contaminants in Processed Shrimps
(in parts per million -ppms)**

	Pesticides			Poly Chlorinated Biphenyls (PCBs)			Toxic Metals	
	Chlordane	Aldrin	Endrin	Tri	Penta	Hepta	Mercury	Lead
Codex	0.3	0.3	0.3	2	2	2	0.3	1.5
US	0.3	0.3	0.3	2	2	2	0.3	1
EU	0.3	0.2	0.05	2	2	2	0.5	0.5
Germany	0.05	0.2	0.01	0.008	0.08	0.008	0.5	0.5
France	0.3	0.2	0.05	2	2	2	0.5	1
Netherlands	0.02	0.05	0.02	0.1	0.08	0.12	0.5	0.5
UK	0.3	0.2	0.05	2	2	2	0.5	1
Japan	0.3	0.3	0.3	2	2	2	0.4	1
Australia	0.05	0.1	0.3	0.07	0.07	0.07	0.5	2.5

Source: Vadakan, 2005.

The experience of Thailand shows that large farmers consider HACCP and GMP certificates as mandatory to access export markets. Other certificates are treated as secondary to widen market access further. The perception of medium size firms is similar to that of large exporting firms. Taking the cost of obtaining these certificates into consideration, and the size of the available market, small firms consider HACCP and GMP certification important. However, acquiring these certificates depends on other considerations, including the availability of financial resources.

There are several new certificates which are gaining importance in the food and processed food exporting industry. The wide range of certificates – including HACCP, GMP, BRC and EFSIS - are designed by various bodies and differ significantly across export sectors. The experience of Thai exporters reveals that, with the advent of new certificates, the sectors affected the most are fruits, vegetables and shrimps.

The brand name of the exporting firm is emerging as a new market strategy to deal with close competitors in the food and processed food sector. While large firms can develop brand names over time, the task is more difficult for small firms. The importance of the use of brand names is not uniform across sectors and is more relevant in sectors such as poultry, tuna, shrimp and pineapple than fruits and vegetables. Large firms find it important to develop their brand name to improve market access and venture into new markets.

Frequently, export consignments from developing countries are detained for various reasons, including health and environment. However, some of the developing countries, which have performed better in the exports of food and processed food, have much lower level of detention than competitors in the same market (Athukorala and Jayasuriya, 2005). Even exports from more experienced exporting countries, such as Thailand, are subject to detention. There are some critical areas where the incidence of detention is very high. Ninety percent of Thai food and processed food exports face detention as a result of six SPS-related provisions of the US Food and Drug Administration (FDA), including ‘not processed’ and salmonella. A serious response needs to be adopted by exporters to overcome such

difficulties. Between 2001 and 2002, 50% of mushrooms exports and 8% of shrimp exports from India were detained by the US.

Despite numerous constraints to access the global market in food and processed food, there are strong incentives to venture into new markets. Considering the level of market constraints and size of market for each sector, firms have specific choices. Preferences differ from one exporting country to another. To diversify their market opportunities, Thai exporters would choose the EU, Australia, the US and Japan. There are also initiatives to access the substantial market potential in the Middle East and Asia for fruits, vegetables and shrimps. Indian firms have diversified their export destinations over the years. On account of stringent SPS and environmental regulations in developed country markets, Indian processed food exporters have increased exports to the Gulf region, in addition to Asia.

In a recent study, Nidhiprabha and Chutisiriwong (2005) constructed a Food Safety Standard Index (FSSI) to examine the attainment of food safety standards by individual firms in different sectors of Thailand based on firm level survey data. The index comprises three components: quality control systems; quality assurance; and food safety standard awareness. The econometric study reveals that the FSSI index is proportionately related to the level of the firm size. This shows that food safety standards are high among large firms, but decline proportionately based on the size of the firm, with smaller firms having lower levels of standards. The results of the study strongly support the assertion that small exporting firms are encountering significant difficulties in equipping themselves to attain higher levels of food safety standards. The results also show that the level of food safety standards achieved by firms differs from one sector to another.

III.8 Domestic Environmental Impact

Food and processed food exports to the global market face challenges and opportunities. The current trade practices in this sector indicate that better performing firms are those who have formed strategic alliances with partners in importing markets. While the formation of strategic alliances is expensive, it has proven to yield greater returns in the long run. The Thai experience highlights that large exporting firms are engaged in strategic alliances with import partners, whereas SMEs invariably lack the capacity to take advantage of these opportunities. The practice of strategic collaboration with importing firms differs from one sector to another. For example, while foreign alliances are more prominent for pineapple and chicken, they are relatively less common for shrimps and vegetables.

Outsourcing has remained the common practice to ensure the timely delivery of products and to maintain the product standards in export markets. While searching for credible agencies to deliver quality products, various sources are considered for outsourcing. Thai firms give high priority to reliable firms who have a good track record of delivery with quality output. It is invariably found that 'reliable suppliers' are the most important source of outsourcing for most food and processed food products.

The extent of compliance costs to meet environment and health standards has been a key issue in empirical studies. The surge in these costs has a lasting impact on the profitability of the exporting firms. For various reasons, firms need to comply with the numerous environmental and health-related standards in exporting to the global market. Firms comply with consumer requirements in the importing market, to maintain uninterrupted market access and to gain access to new markets. Compliance costs diverge significantly across firms and sectors. The Thailand experience indicates that compliance

costs for a substantial number of firms can reach up to 5% of sales. In the case of a few firms, it exceeds 15% of total sales. Compliance costs in India can range from 5 to 15% of the FOB value. Large firms in this sector are generally better placed, and their compliance costs are much lower than for SMEs. The bulk of investment to maintain food safety standards and product quality control is spent to upgrade equipment, install new food contaminant detecting machines, improve infrastructure and train personnel in good manufacturing practices. Investment is also earmarked to up-grade laboratories and sanitation conditions – hygiene management, which are crucial for the survival of firms in export markets.

In several production markets, exporting firms report declining profit margins. This issue is discussed in the literature. Some of the identified factors are demand constraints, cost escalation, compliance cost and falling prices. The experience of exporters in India and Thailand suggests that rising production costs are the most important reason for declining profit rates of profit, followed by decreasing import demand, food safety requirements and declining prices.

Information on food safety standards is critical for exporters. Exporters receive information from various sources, the most crucial being the government. Industry associations and foreign buyers are key actors in providing critical information on food safety standards to exporters. Industry associations play a vital role in helping exporters attain market access in different countries as efficiently and cost effectively as possible. The experience of exporting firms in India and Thailand shows that large exporters generally make use of market information from industry associations, in addition to their own market surveys. In Thailand, most if not all large firms participate in the industry association. However, the rate of participation declines with the decline in the size of the firms.

Private sector strategies are very often sector specific. With the changing market demand for shrimps in OECD countries, Thai shrimp exporters have changed their production strategy from black tiger to white shrimp. While antibiotics were initially used in the cultivation of shrimp, this practice has been replaced by probiotic farming in response to consumer concern for environmentally friendly techniques. These capital intensive changes in shrimping production have been undertaken in response to current and potential standards in several importing countries.

IV. Best Practices to Improve Export Competitiveness and Environmental Sustainability in the Food and Food Processing Industries

This section examines the extent to which emerging environment-related measures are acting as potential trade barriers to exports from Asia and the Pacific region. As discussed above, the SPS and TBT Agreements aim to ensure that standards and regulations are not used for protectionist purposes and do create unnecessarily barriers to trade. However, there is considerable discretion available to importing countries to impose their own standards and regulations on imports, such as through border inspection procedures; treatment or processing of products; fixing of minimum allowable levels of pesticide residue, packaging and labelling requirements and good manufacturing practices. It can be argued that the flexibility in these Agreements has been exploited by developed countries to impose stringent environmental norms and standards that are acting as a significant barrier to developing country exports.

There is an urgent need to mitigate the adverse effect of these emerging environment-related trade barriers for Asia-Pacific countries. In this chapter, we provide an inventory of selected success stories and policy responses at the national, regional and international levels.

IV.1 Multilateral Efforts

Groundnut Production in India

Groundnut production in India covers about 8 million hectares, which is the world's largest groundnut crop area (Basu and Radhakrishnan, 2002). Production is mostly undertaken by small and marginal farmers. The presence of aflatoxin has been a major concern for groundnut exporters following the rejection of several groundnut consignments due to the presence of high levels of aflatoxin. UNDP launched a project to promote groundnut as a food crop for sustained nutritional security while initiating steps to address SPS and environmental issues. UNDP worked with the government authorities and farmers to improve production techniques and prevent aflatoxin contamination in the production process. This project established the possibility of producing aflatoxin-free groundnuts for the first time in Andhra Pradesh, India. At the end of three successive years of the program, 80% of the samples (after three months of storage) had aflatoxin levels of 0-5 ppb as compared with the permissible limit of 15-20 ppb in developed countries (e.g., Australia, Canada and the US), and 20-30 ppb in developing countries (e.g., India and China). The distribution of aflatoxin control varied from 46-150, ppb in normal cases. Delayed harvest and over-maturity resulted in a very high level of aflatoxin content.

South Asian countries have a natural advantage in organic farming, which has yet to be exploited fully. For example, the region has used vegetable dyes, such as indigo, for centuries in the textile industry. The WTO negotiations to liberalize trade in environmental goods and services offers an opportunity to promote the region's exports of environmentally friendly textiles, organic agricultural products, herbal medicines, natural cosmetics and eco-tourism.

The private sector has an increasingly important role to play in developing and implementing export competitiveness and environmental sustainability in the food and processed food industry. The involvement of the private sector in certification and labelling procedures, for example, has the potential to make these processes faster and more effective. Private sector involvement can have a positive impact in the promotion of environmental goods and services.

IV.4 National Government Initiatives

EurepGAP in Thailand

Thailand exports many kinds of agricultural products. The Department of Agriculture (DOA) was assigned by the Ministry of Agriculture and Cooperation (MOAC) to set up good agricultural practices (GAP). The National Bureau of Agricultural Commodity and Food Standards (ACFS) was founded as a national regulatory body for food safety. The Thai government also declared 2004 to be "Food Safety Year". The DOA set up a food safety

program with 4 strategies on: 1) agricultural inputs and raw materials; 2) production at the farm level; 3) controlling crop processing plants; and 4) quality crop production.

The DOA encourages farmers to register under its food safety program for GAP certification. There are 29 target crops with 12 main crops for export and 17 potential crops (Nidhiprabha & Chutisiriwong, 2005).

EurepGAP is only required for some EU markets, which are not the main markets for Thai agricultural products. Presently, if the produce passes the importing country requirements for food safety, most of the importers, including those from EU countries, will give priority to pricing before EurepGAP certification (Nidhiprabha & Chutisiriwong, 2005). During periods of shortage of products, the importers may also ignore the EurepGAP certification requirement. EurepGAP in Thailand is regulated in only some areas where the exporters aimed to export their commodities to some EU markets which strictly required EurepGAP.

Export of Durian Fruit from Thailand

Durian (*Durio zibethinus* Murr.) is a spiky, odoriferous fruit, highly valued by many Asians for its exotic flavour (OECD, 2002). Native to the tropical rainforests of the Malay peninsular and the island of Borneo, its range has spread throughout South-east Asia, and most of the durian harvested in that region comes from wild trees. Seeds take as long as 15 years to become trees that will bear fruit, which explains in part the fruit's high production costs and retail prices. A medium-sized, two-kilogram fresh durian can fetch up to US\$ 20 in Asian city markets. Thailand is the world's leading producer of the fruit, followed by Malaysia and Indonesia. More than 90,000 families are engaged in durian cultivation in Thailand, producing on average close to one million tonnes of the fruit each year. Between 6 and 10% of its total production is exported, fetching about an annual average of US\$ 80 million in foreign exchange earning.

Australian Governments have consistently adopted a highly conservative approach to risk management, which they assert is both transparent and scientifically based, but not a zero-risk approach. However, SPS measures can take their toll on even the exotic species, such as durian. For Thai exporters of durian, even the willingness of Australia to review its stringent SPS measures on durian brings hope of impending prosperity. However, the Australian bio-security authorities are sceptical about Thailand's ability to comply with SPS measures. Nevertheless, Australia is keen to finalise bilateral arrangements with Thailand, so that inspections of packing houses and orchards could begin in Thailand and import permits issued. With the willingness of both the countries to cooperate on research into non-destructive fruit sampling techniques, there is hope for the durian growers in Thailand.

Overcoming Structural Constraints: Sugar in Fiji

Sugar occupies a distinct place in the Fijian economy. The 125 year-old sugar industry in Fiji produces sugar in a major way, catering to both domestic as well as international markets. At present, it contributes 6% to GDP with an export share of 19% of total exports, apart from generating jobs for about 51,000 people. Recent rejection of its sugar consignment by Japan on the grounds of poor quality has created a furore in the

industry and the government. This has brought the Fiji Sugar Corporation (FSC) under fire for overlooking the need to improve its efficiency and provide leadership to the industry. It was thought that the practice of burning sugarcane by the farmers before harvesting may have resulted in poor quality sugar. This is despite the fact that Fiji gets three times the price for its sugar because of the Lome Convention with the European Union.

Later it was found that the issue of poor quality sugar does not have anything to do with burnt cane, but the inability of the FSC, over the last decades, to develop Fiji's capacity to mill cane within 24 to 48 hours of it being burnt and harvested. Another constraint facing the sugarcane sector relates to poor transport infrastructure. As there is no rail network, harvested cane cannot be transported on time and delivered to the mills for processing. This situation was completely different from the world's leading producer of sugar, Brazil, where an efficient transport system delivers cane to the mills within 36 hours.

The Government and the FSC attempted to change the situation and overcome these structural constraints by contributing additional resources of nearly US\$ 86 million borrowed from the EXIM Bank of India. The intention is to reform the institutional infrastructure in order to reduce inefficiencies in production, harvesting, transportation and milling processes. The reform agenda has included extensive consultations with all industry stakeholders. This institutional reform would also help to address environmental problems involving soil erosion and soil fertility conservation. The Australian owned Colonial Sugar Refining Company (CSR), which managed the sugar industry, used vetiver grass over a 50-year period as a vegetative soil conservation technique to prevent soil erosion. After the takeover by a government owned company in the 1970s, it continues to be abandoned and remains overlooked.

Policy Focus and NGO involvement to Improve Tea Exports from Nepal

The 142-year old tea cultivation in Nepal is estimated to produce 10.6 million kg of CTC (cut, tear and curl) and 1.2 million kg orthodox tea, annually. However, Nepal constitutes only 0.01 percent as a share of total global tea exports. The export destinations for orthodox tea are Germany, Japan, and the US, and that of CTC are India and Pakistan.

Nepalese orthodox tea was rejected by Germany as it contained levels of tetradifone beyond the permissible limit. Similarly, Germany also rejected another consignment of tea from Nepal as it contained excessive ethion residue. The malpractice of misbranding Nepalese tea have also taken their toll on Nepalese exports to international markets. With unaffordable expenses involved in testing for pesticide residues, Nepalese SMEs do not commonly undertake any pre-testing of tea prior to export. In the absence of certification standards, such as GAP, GMP, GHP or HACCP, and as there are no established Codex standards for tea, there is scope for developed countries to set arbitrary standards. Inadequate information on standards and packaging requirements limits the growth of tea exports from Nepal.

In an effort to improve the export performance of the tea sector in Nepal, several initiatives have been undertaken in recent years. With food safety and quality as a high priority, Nepal has taken initiatives to curb adulteration of foodstuffs, provide laboratory facilities and issue certification on inspections and licensing. Nepal has set up Department of Food Technology and Quality Control (DFTQC) with Quality Control and Standardization divisions. By involving NGOs, Nepal has initiated programs to train tea growers in GAP, GMP, GHP, HACCP and adhere to international health and environmental standards.

R&D to address Environmental Issues in Sri Lanka's Tea and Coconut sectors

Tea Sector in Sri Lanka:

Tea exports from Sri Lanka account for about 12.8% of total exports, providing employment for nearly 650,000 workers and contributing 4.2% to its GDP in 2005. The Middle East, Russia and Europe are the major export markets for Sri Lankan tea.

Only a few larger exporters have been able to follow the mandatory HACCP procedures in Sri Lankan export markets. Certification agencies include the Sri Lanka Standard Institution (SLSI) and some accredited foreign agencies. Efforts are being made to implement HACCP in the tea processing and packaging industry. Some private entrepreneurs have taken the initiative to provide expertise to further compliance with HACCP and other health and environmental standards.

In order to eradicate nematodes, weeds and pathogens, methyl bromide was used to fumigate the tea nurseries in the past. As methyl bromide has ozone depleting potential and is extremely hazardous to humans and animals, the Ministry of Environment, with the funding from UNDP and technical collaboration of the Sri Lanka Tea Research Institute (TRI), has developed a cost effective solution. Alternative pest control methods and pest management techniques were developed. Efforts have also been made to modernize tea factories through the Tea Stabilization Fund and the Tea Development Fund. Intergovernmental efforts are also being made between India and Sri Lanka to harmonize standards for tea. The ADB has contributed towards efforts in soil conservation through crop diversification.

Coconut Sector in Sri Lanka

The coconut industry consists of 60% of large scale exporters and 40% SMEs and employs 10,000 persons. The major export destinations for Sri Lankan coconuts are India, Egypt, the UAE, Saudi Arabia, France, Germany and Spain.

As the EU is not the major export destination, not all desiccated coconut exporters follow the expensive HACCP procedures. Given the lack of coconuts during certain seasons, millers face the problem of excess capacity.

The Coconut Development Authority (CDA), in coordination with the Sri Lanka Standard Institution (SLSI), regulates laboratory testing, supervises warehouse standards of exporters and provides certification. CDA also provides training and encourages exporters to follow HACCP procedures through financial support. SLSI with the help of CDA is conducting training programs for coconut millers. In order to address environmental issues in this sector, the National Engineering Research and Development Centre (NERD), through biogas technology, has developed a cost effective and environmental friendly anaerobic granular system to treat coconut waste water. NERD has obtained a patent for this technology and will commercialize it. A full scale prototype of this system is being tested by the Industrial Service Bureau.

Policy Initiatives to Improve the Export Performance of Processed Food Products in China

Although the contribution of Chinese food and processed food exports to its GDP has declined over the years, the labour intensive, rural based and SMEs dominated food processing sector still plays a significant role in the Chinese economy in terms of employment generation. At the same time, the presence of a large number of SMEs in this sector also poses environmental problems. With liberalization, due to low production cost,

many Chinese processed food products have gained export competitiveness. Some of the major processed food exports include vegetables, fruits, and fisheries products. The major destination for Chinese food and processed food exports include the US, the EU and Japan.

TBT and SPS standards are said to be the main constraints for Chinese food exports. For example, fisheries exports to the EU require labelling with the identification of species name, production method and catch area. The Japanese complain of excessive presence of pesticide residues in vegetable and fruit imports from China. Chinese frozen shrimp and honey exported to the US have been reported to contain disproportionate antibiotics and chloramphenicol residues.

In an effort to boost processed food exports, both the Chinese government and private sector have made consistent efforts to address health and environmental issues. The Chinese government, for example, has set up five ministries to improve market access for food and food-processing industries. The Chinese have introduced advanced technologies to reduce input of fertilizers, pesticides and growth hormones in order to ensure food safety and secure environmental sustainability. They have also banned some food additives in the food processing industry. Hygiene regulations are strictly monitored. In order to limit pesticide and veterinary drug residues, and environmental pollutants in processed food, inputs and imported intermediate products are being scrutinized. An information system on food safety standards was developed in 70 information stations located in 18 Chinese provinces. Moreover, 12 provincial labs to test environmental and health requirements were set up. Food producers were given training in the rational use of fertilizer, pesticide, veterinary drugs, additives and animal and plant hormones. They encouraged vertical integration of farmers, food-processing enterprises and marketing agencies in food processing industries, which not only helped to increase economic efficiency, but also standardized production approaches and maintain the quality of products. Chinese food and food processing enterprises have made efforts to obtain various official certifications on environmental and health grounds. Encouragement is also provided for “Green Food” production.

Pro-active Role of the Government: Seafood Exports from Viet Nam

The US\$ 2 billion food processing sector, comprising of 21 percent of agricultural value added products in Viet Nam, contributed 4 percent to its GDP in 2005. The export of seafood products accounted for 9 percent of Viet Nam’s total exports bringing in an export earning of US\$ 2.7 billion from as many as 105 countries around the world during the same period. The four major export destinations for seafood exports, namely, Japan, the EU, the US and China, accounted for more than 70 percent of Viet Nam’s seafood exports. With a pursuit to increase production and achieve greater productivity, the fisheries in Viet Nam began to utilize chemical and biological products for breeding, processing and preserving. However, on account of the health and environmental implications of the use of chemical and biological products, the fast growing seafood sector in Viet Nam encountered market impediments. The major problem was its inability to comply with SPS measures to cater to the developed country markets.

In 2003, the National Assembly promulgated a Decree on Food Hygiene and Safety, which formed an overarching of various ministries, each with a distinct role, to facilitate in compliance of food safety standards during culture, processing and exports of seafood. The involved ministries comprise of the Health, Industry, Fisheries, Agriculture and Rural Development, Science and Technology, Trade, Police, Information and Culture, Finance,

along with the People's Committee at all levels in a professional manner. Some of the overlapping functions of different ministries were also carefully untied, and National Fisheries and Quality Assurance Centre (NAFIQACEN) was created to coordinate and certify seafood quality and hygiene in all activities of the fisheries sector.

It is mainly due to the creation of structural and institutional mechanism that the volume of seafood exports grew rapidly during the past few years. In addition, National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) was established in 2003 to monitor the feed, veterinary drugs, chemicals and bio-products serving aquaculture. As a result, the traceability criterion was maintained, and the entire seafood chain was regulated. The Government of Viet Nam also played a proactive role in terms of collecting and updating information on standards, environmental hygiene requirements in importing markets etc., and disseminated the information to the firms and actively supported the seafood exporting units. Further, the workshops and training courses organized by the Fisheries Ministry in collaboration with various exporters' bodies, annually, helps in imparting the finer elements of food safety standards and compliance requirements in specific markets. With greater understanding of Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP), application of HACCP, etc, the number of successful private enterprises also augmented with increased investment in food hygiene, safety and environment management system, thus boosting the export performance of the seafood sector.

IV. 5 Public-Private Partnership (PPP)

There is a great scope for public private participation to address the challenges emanating from the environmental standards. Multilateral agencies such as UNIDO, UNCTAD and APCTT may help in establishing public-private partnership with an international partner and use this is to achieve breakthroughs in key issues such as: Food safety and in linking buyers and local sellers and upgrading standards and practices along the supply chain. However, there are some preconditions for PPP which must be met. The challenge is to make such public-private collaboration a regular feature of the business environment for the investing community, rather than relying on ad hoc and unpredictable measures. The key yardstick is usually the development policy impact of the measure proposed. Partnership projects should make a major contribution to national development, for example, by raising training standards, and have a beneficial impact on the environment and society as a whole. As already mentioned, the branch of the industry or the size of the company is not important. What is important is the will, and the financial, technical and staffing capability of a company to invest successfully in the medium and long-term.

Private sector on the one hand can finance some part of certification costs, and on the other public sector can subsidize the rest. This will make it possible for small producers to implement *several of* these standards.

V. Conclusions and Recommendations

The global trade witnessed a surge in food and processed food exports during the last three decades. The export from the sector increased at an average rate of 8.5 per cent per annum during this period. Developing countries have emerged as the most active players in this new area of trade. Food and processed food exports witnessed a structural change in the demand for them. There has been a sharp increase in the exports of certain product groups like fish products, poultry, fruits, beverages, etc., and decline in meat, dairy products, coffee & tea etc. between 1970-2003. The impact of increase in trade in food and processed food is becoming favourable for developing countries.

The experiences of Asia-Pacific countries reveal that the proportion of food and processed food exports is increasing in the total agricultural exports, though the share of agricultural exports in their GDP is declining in substantial number of countries, thus, restricting stiff decline in agricultural exports ratio to the GDP. However the contribution of food and processed exports to total agricultural exports is mostly rising in the region. There are variations in the performance of different sub-regions of the ESCAP region during 1989-2002.

The surge in food and processed food exports is due to the growing demand for 'ready to eat food' in industrialised countries. At the same time, the occurrences of a number of diseases such as Foot and mouth disease, SARS, Avian Bird Flu, etc. from time to time have led to imposition of stringent restrictions on food and processed food products. In the industrialised countries, consumers still prefer 'ready-to-eat' but environmentally safer food. They prefer to pay more and purchase branded products from known food chains. In order to ensure availability of safer food, different standards are in place based on existing scientific knowledge (presumably).

As large food and processed food markets are located in industrialised countries, and preferences of consumers rule the market, developing countries have shown their preparedness to comply with the standards of these markets, despite incurring huge compliance cost. The resource-poor entrepreneurs in developing countries find dual problems of addressing (a) differing food safety standards in different developed markets for the same products, and (b) adjusting to the changes in the standards in different developed countries, from time to time.

The current trend in agricultural trade, particularly food trade, indicates that the sector is subject to high level of environmentally sensitive trade barriers in industrialised countries. Nearly 90 per cent of the product lines in each sub-sector are subject to various forms of environmentally sensitive NTBs. Some of the sub-sectors including fish and crustaceans, cereals, oil seeds, leguminous fruits, prepared foods, etc. are entirely subject to one or more environmentally sensitive NTBs. A few other sectors such as edible meat, fruits & nuts, fats & oil, sugar confectionery, etc. are subject to relatively low level of tariff.

Various firm level studies indicate that conformity with stringent standards is mostly suitable to large firms because of the high compliance cost. The scale economies make it possible for them to remain competitive, due to their size, and various other externalities. On the contrary, the SMEs find it difficult to comply with newer standards.

The Asia-Pacific countries have gradually, but substantially progressed in the exports of food and processed food, in recent years. Most of the regional countries find it appropriate to export fish and fish preparation to the global market. But they differ significantly in term

of their exports in other products. By and large, the geographical location of countries determines the competitiveness of products for exports in these sectors. The study has broadly classified the countries into three regions on the basis of their geographical locations. These sub-regions export different group of products on the basis of their competitiveness.

Compliance of environment standards has paved the way for the developing countries to undertake reforms in the domestic production sectors. Such reforms have brought some success in improving the level of exports to the global market, mostly to developed countries. Some of the success stories in Asia are discussed in the study. Environmental standards compliance has helped them in gaining wider market access in developed countries.

Many countries are slowly entering into exports of food and process food exports. In these countries, exporters are mostly dominated by the SMEs, who lack the required information on the ever changing food and environmental standards, technology, training etc. Therefore, many developing countries require assistance for capacity building, training in Good Agricultural Practices etc. The multilateral organizations can play an important role in areas such as capacity building, dissemination of information on standards, availability of appropriate technology, transfer of technology, etc. The interaction of these bodies with the domestic Governments would speed up the process of restructuring the domestic policies which would promote the production of greener and safer agro-products for global exports. After examining various dimensions of trade and environment linkages, the study has the following recommendations:

V.1. Government Policy:

Improving Export Competitiveness:

- The domestic governments need to play a proactive role in international negotiations on SPS and Environmental measures, and ensure adequate participation in standard setting bodies such as Codex. Evidence indicates that harmonization of standards across countries will make processed food trade transparent, and make conformity assessment easier for suppliers.
- The involvement of developing countries and least developed countries in standard setting bodies may enable them to influence the standard setting process by restricting unwarranted standards, which are not scientifically very sound but work as a deterrent to export prospects of these countries.
- Improving the infrastructure in sectors such as power, road / rail / air / port transport can help in timely delivery of export commitments.
- The present web of multiple government regulatory departments tends to stifle private participation in infrastructure development. Participation of private sector in infrastructure development may speed up the process and support improvement in competitiveness of domestic suppliers.
- Simplification and rationalization of export procedures is another important area which requires immediate attention. In this regard, various trade facilitation initiatives taken by domestic governments with the support of multilateral agencies are commendable in improving competitiveness of domestic exporters.
- Traditionally it is argued that FDI is necessary for maintaining economic growth in developing economies, but current literature emphasizes on quality of FDI as an influential factor for improving domestic competitiveness in core sectors. With the expansion of global trade in food and processed food sector, most of the Asia-Pacific

- countries have shown their interest in developing these sectors for external trade. In this core sector, FDI is very much warranted in order to acquire resources, technology apart from having expertise to venture in to external markets. The government needs to pursue export-oriented FDI inflow in the food processing sector with various incentives. This involves simplification of procedures, time-bound and single window project clearance for private participation. Foreign investors may find it attractive to invest in host countries if they are accorded domestic treatment. Priority may be given to technology intensive multinational food-chains, who are willing to comply with export targets as well as aiming at domestic market for their business expansion.
- The government can also play a greater role in promoting closer linkages between industry, university, research institutions and government agencies for improving quality of exportable products. Such an effort may result in product innovation, information dissemination and maintain export competitiveness.

Improving Domestic Environmental sustainability

- The government may review and enforce environmental regulations on farming activities to keep land, water and crops free from environmental pollution. The private entrepreneurs may have limited control over pollution-free suppliers of inputs, but they face difficulty in marketing their produce when contaminated inputs are used in the production process. In this regard, domestic government has a greater role in regulating cleaner environment.
- Empirical evidences suggest that larger firms can withstand stringent international standards and improve their competitiveness, while survival of SMEs is a debatable issue. The intervention of the domestic government may be sought for dissemination of information on standards and trade opportunities in those niche markets. There is a need for developing new institutional mechanism by domestic governments in collaboration with multilateral agencies to deal with these issues. This may help SMEs to comply with the international standards, and improve their competitiveness.
- With the support of various promotional schemes Government can encourage firms to adopt Good Agricultural Practices. The experiences show that several examples of GAP in specific products/regions can be emulated in other countries. Such efforts may help in image building, brand promotion, and a steady improvement in standards compliance and competitiveness.
- The constantly changing food habits in the global markets calls for innovation in product, processing, packaging, marketing methods, etc. Innovation requires greater investment in research in food technology. Greater reliance on the development of R&D may help in cutting down cost and improving quality of products. Financial and institutional mechanism need to be developed to facilitate such activities without depending more on domestic support. Besides, it may be beneficial for emerging exporting countries in the long run to jointly encourage private-government investment in agricultural related research and development activities to promote green food production.
- In the light of changing environmental and SPS standards, customs and excise officials require greater technical understanding of practical issues, and hence capacity building initiatives need to be undertaken within certain institutional

- framework. Such initiatives will help officials to regulate compliance of environmental and other international standards.
- Government needs to play a crucial role in assisting accreditation of domestic testing laboratories with internationally reputed certification bodies. In the absence of accreditation, exporters are required to avail additional certification, apart from obtaining domestic certification.
 - Export of fish and fish preparations is an important export activity in the Asia Pacific region, and the sector is also becoming prominent for the new comers. There are reports of depletion of fish stocks and marine resources because of significant exports of fish and fish preparations, thus threatening long term sustainability of marine resources. The government intervention is required to maintain and improve the competitiveness and environmental sustainability of the sector by promoting in-shore fisheries, aquaculture development, and traditional resource use practices to ensure ecosystem compatibility. Community based management can also address issues among others alternative feeding, post-harvest management, processing and marketing strategies.
 - Choice of cropping pattern is a major policy challenge from the point of view of coordination between raising crops for export and balancing it with environmental concern for national governments in the Asia-Pacific region. Cultivation of rice and sugarcane has a tendency to use excessive water, pesticides and fertilizers polluting the environment, the soil and underground water. Choice of appropriate crops, for example China's experience with GMO rice, may reduce the use of pesticides and chemical fertilizers with rise in rice yield. Propagation on the use of modern seeds may help to address the environmental concerns and the state agencies need to educate the farmers regarding the disadvantages of the excessive use of chemical fertilizers which are a source of pollution in the underground water table. New innovative programmes may be designed to educate the farmers on the significance of bio-fertilizers, organic manures, drip irrigation, use of sprinklers etc. for raising fruits and beverages such as grapes and coffee. The policy emphasis may be restructured to promote water-shed management, water harvesting etc. with a view to minimize over-extraction of water from ground water tables for irrigation.
 - The government may encourage extension and other services to disseminate information and provide training in agriculture, trade and environment. Farmers' associations, in turn, can enlighten their members on good agricultural practices and sustainability of the ecological balance. Government can initiate strategies in environmental management in rural areas which would internalize the environmental costs, in terms of the use of locally available natural resources.
 - In certain Asia pacific countries, upland migration of workers has been significant for raising cash crops for exports by indulging in large scale deforestation. These activities pose serious threat to sustainability of environment. For example the experience of the Philippines with regard to sugarcane production is a case in point. Realising the long term potential threat to the environment, local Government may have to introduce new legislations and extension programmes to address the issue of deforestation and environmental degradation.

V.2. Private Sector Strategy:

Improving Export Competitiveness

- Compliance with International Food Safety Standards (FSS) is necessary to ensure improvement in the ability to compete at the global market. As demand for food and processed food products in the global market is mostly driven by the consumer preferences, private sectors engaged in processed food exports need to pay greater attention to Good Agricultural Practices, Good Manufacturing Practices, Good Hygienic Practices, maintain Hazard Analysis and Critical Control point, and also focus on standard compliance which will augment their market share.
- Considering the intensity of competition among suppliers and rising standards over the years, private sectors need to ensure compliance with regard to the internationally approved food additives, solvents, colourants, etc., and comply with labelling requirements in order to remain competitive in the global market. Specific efforts need to be initiated from business associations to help SMEs in this regard in specific sectors.
- Brand image of firms gives a distinct advantage over other competitors, and the private sector need to embark on creation of brand images in their specific products / sectors. This would help them to access wider market, particularly in niche markets, which have long term trade prospects.
- There are strong evidences from firm level studies that import orders placed by importers, directly, are more attractive than those originating from other sources. For greater export success, domestic firms need to work in liaison with importers in major markets. Towards this end, the domestic firms may participate in international trade exhibitions and other such trade promotional activities to establish their contacts with other countries. By forming strategic partnership with importers and foreign collaboration in marketing, the domestic firms can improve market access in other export destinations and improve their profit margin.
- In the light of recent outbreak of bird flu, foot & mouth disease, and other such epizootic issues, exports of poultry and meat products are adversely affected in the Asia Pacific region. Most of the firms engaged in poultry and meat products are SMEs. This increases the responsibility of private firms to insulate themselves from such occurrences in the future. It requires periodical inspection of their units and greater emphasis on good hygienic practices in their production units through credible private initiatives.
- With persistently rising standards in the niche markets, compliance is a-priori to meet the pressing requirements of these markets. The prices offered to the safe food are much higher than others. However, to comply with the international FSS, persistent investment is required by the firms. Such investment needs may arise for various production-linked initiatives including acquiring testing equipments, training the employees in FSS, recruiting additional employees to maintain quality control, expanding facilities in laboratory, etc., which may go beyond the scope of SMEs. If financial institutions can play a greater role in financing such activities, it will be possible to garner greater market access.
- Information gap is a major disadvantage for the SMEs in the Asia Pacific countries. While demand for new technology to comply with standards is mounting, there is stiff competition between firms/countries to access markets in niche countries. In this context, formation and effective functioning of industry associations to support firms

in obtaining market information is becoming important. Such associations can play a greater role in bridging information gap and assist the smaller firms in the Asia Pacific region.

Improving Environmental sustainability of Domestic Sector:

- Lack of investment to improve production facilities to comply with FSS is a major constraint encountered by the SMEs in the region. The initial investment cost forms an exorbitant amount that small firms avoid entering into specific production process, testing etc., to target the export markets. Formation of consortiums to pool resources for developing infrastructure to meet the SPS and environmental standards is slowly taking momentum in certain countries in the region. More domestic or multilateral support may be needed to bolster private sector incentives to develop a number of consortiums in various food and processed food sectors.
- Very often coordinated efforts of government, NGOs, educational institutions and social organizations play an important role in generating environmental awareness. There is a successful case in Nepal where synchronized efforts of various agencies have produced positive impact in the tea sector, and this has given rise to increase in production and exports. Such environmental awareness programmes may help in other Asia Pacific region to sustain ecological balance and improve export performances in food and processed food sector.

V.3 Regional Cooperation Mechanisms and Modalities

Improving Export Competitiveness

- During the last decade, regional process has been the most important vehicle to foster global trade. Except for a few RTAs, no serious attempt is made to promote environmental standards issues in a regional framework. To promote intra-regional food and processed food trade, certain concentrated efforts are to be made in areas like standard setting exercises, information dissemination with respect to SPS and TBT, environmental standards & technology, etc. to set product standards within the region. Such partnership can help in understanding the pros and cons of production and trade in specific areas such as trade in Genetically Modified Organisms, labelling requirements, methods of waste recycling etc. to remain competitive in country specific products.
- Bringing the environmental issues into South-South based RTAs would help the Member countries in equipping themselves to participate in different standard setting process, particularly in those sectors which are critical for their trade.
- Greater regional cooperation can also help in expanding knowledge and gathering information on the cost and benefit of standards compliance, information on close competitors and their advantages and disadvantages, etc. Trade collaboration in a regional arrangement may be beneficial for regional countries to gain practical export skills, and to take advantage of sectoral liberalization in a limited manner within the region before exposing themselves to the rest of the world.
- As the environmental issues are becoming critical in the global trade, many countries in the region, particularly in the Pacific region, have not prepared themselves to frame environmental policies. Besides some Asia Pacific countries have little expertise to deal with customs and quarantine sections to regulate environmental standards.

Owing to these structural impediments, many countries producing large quantities of sugar, marine products, etc. have failed to convert them into large exports. Under regional cooperation, with certain level of environmental standards, Member countries can adopt themselves to stringent global standards within the region, and slowly graduate them to become competitive to face export challenges with the rest of the world. The regional approach would help them to jointly formulate strategies to access niche markets, and prepare themselves to improve their quality of products for exports.

Improving Domestic Environmental Sustainability

- It has been debated that increasing level of environmental degradation, deforestation, soil, water and air pollution, depletion of biodiversity, etc, manifests in climate changes, where individual initiative may be too small to make any global impact. Regional forum could be an appropriate meeting point to undertake radical reforms which would conserve environment in a sustainable manner. Joint strategy on environmental concerns may help regional trading partners to limit the overexploitation of natural resources.
- Within a regional arrangement, experiences of member countries in maintaining environmental production standards differ significantly in different sectors. Very often, it is easier to emulate good agricultural practices within the RTA because of prevalence of congenial political atmosphere among the Member countries and contiguity of agro-climatic environment within the region. As each country's strengths and weaknesses are different, pooling of strengths among the regional partners can help in achieving common issues of improving environmental sustainability and countering the weakness within the domestic market.
- In number of food and processed food sectors, joint initiative is more attractive because the resource endowments are common to regional partners and level of investment as well as technology requirement are very large. In these ventures, Regional Economic Cooperation can play a vital role. In such a case, regional countries can collaborate and exchange technical know-how and enrich each other, in an effort to improve their competitiveness. For example, countries can form a conclave to promote in-shore fishing, and share each others' skills and techniques to improve fish production, so that the pressure on off-shore fishing can be reduced to a sustainable level.

V.4 International Agencies Approach for Technical Assistance

- In the Uruguay Round of Trade Negotiations, industrialised countries had assured the developing countries to support them in developing their capabilities to deal with the environment-related problems. Non-fulfilment of these commitments was raised from time to time by developing countries. In the Doha Development Agenda, the need for greater technical and financial assistance was discussed but the pledges remain yet to be realized with increasing investment requirements to bring in the costly technology to meet the environmental standards. This issue needs to be pursued to achieve the basic objective of improving environmental sustainability. The international agencies have a greater role by positioning themselves as liaison between developed and

developing countries for transfer of technology, imparting training to SMEs, capacity building activities, etc., in the Asia Pacific region.

- As export of food and processed food sector is picking up in the region, and many countries are slowly entering in to this sector, international agencies need to step in with their technical assistance, training, research etc., to help the SMEs to comply with environmental regulations.

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Annexes

Annex I: Non-Tariff Measures in the Food Sector in Five Developed Countries

UNCTAD NTMs	Description of Measure
6171	Authorization to protect human health
6172	Authorization for animal health protection
6173	Authorization for plant health protection
6174	Authorization to protect environment
6175	Authorization to protect wildlife
6176	Authorization to prevent drug abuse
6271	Quota to protect human health
6274	Quota to protect environment (Montreal Protocol)
6276	Quota to prevent drug abuse
6371	Prohibition to protect human health
6372	Prohibition to protect animal health and life
6374	Prohibition to protect environment
6377	Prohibition to ensure human safety
8111	Product characteristics requirements to protect human health
8112	Product characteristics requirements to protect animal health
8113	Product characteristics requirements to protect plant health
8114	Product characteristics requirements to protect environment
8115	Product characteristics requirements to protect wildlife
8121	Marking requirements to protect human health
8124	Marking requirements to protect environment
8127	Marking requirements to ensure human safety
8130	Labelling requirements
8131	Labelling requirements to protect human health
8134	Labelling requirements to protect environment
8137	Labelling requirements to ensure human safety
8141	Packaging requirements to protect human health
8147	Packaging requirements to ensure human safety
8150	Testing, inspection and quarantine requirements
8151	Quarantine to protect human health
8152	Quarantine to protect animal health and life
8153	Quarantine to protect plant health

Source: Non-Tariff Measures on Agricultural and Food Products: The Concerns of Emerging and Transition Economies, OECD, 2001.

Note: Consolidated general NTBs list is prepared on the basis of NTBs reported by five countries (US, EU, Japan, Canada and Australia using TRAINS WITS database)

Annex II: Environment-related Measures on Exports of Selected Food and Processed Food Products

Barriers	Sub-Barriers	Spices	Nuts	Fruits	Processed Fruits	Vegetables	Cereals	Marine Products	Meat and Poultry	Dairy Products	Fats & Oil	Beverages (Tea / Coffee)
MRL		✓	✓	✓	✓	✓	✓	✓	✓			✓
Micro-Biological Contamination (Mycotoxin)	Aflatoxin	✓	✓		✓	✓	✓			✓		✓
	Ochratoxin	✓	✓			✓	✓					✓
	Patulin			✓	✓	✓						✓
Dioxins							✓	✓	✓			
Nitrates				✓	✓	✓					✓	
Tin (inorganic)										✓		✓
PAH								✓	✓	✓	✓	
Heavy Metal	Lead	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Cadmium	✓	✓	✓	✓	✓	✓	✓				
	Mercury	✓	✓	✓	✓	✓		✓	✓			
Biocol / Ethior				✓						✓	✓	
Hormones	Foot & Mouth disease						✓	✓				
fruit fly				✓		✓						
GMO				✓	✓	✓	✓		✓		✓	
Labelling		✓	✓	✓	✓	✓	✓	✓	✓			✓
Certification					✓	✓						
PPM			✓	✓	✓	✓		✓	✓			✓
Packaging Standards		✓	✓	✓	✓	✓	✓	✓	✓			✓
Production site-environmental standards		✓	✓	✓	✓	✓	✓	✓	✓			✓
Quarantine/Fumigation		✓		✓	✓	✓						✓
Steam Heat Treatment				✓	✓	✓		✓	✓			
Food Additives		✓			✓	✓						✓
Antibiotics								✓	✓			
Poly Chlorinated Biphenyls								✓	✓			

