Meeting Standards, Winning Markets

Trade Standards Compliance 2010

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Acknowledgements

The Trade Standards Compliance Report is the result of a major collaborative effort to present new approaches to the analysis of the compliance challenges related to trade standards that developing countries face in international trade relations and of the status of their capacity to comply with these.

This endeavour was proposed by UNIDO to a high-level team of experts and international institutions who then generously provided their expertise and time to producing this unique report, which fills a major gap in the current literature on the trade standards compliance challenges faced by developing countries.

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Any comments on the report and the analyses presented are welcome and should be addressed to tcb@unido.org.

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Acronyms

ACP	African, Caribbean and Pacific countries
ADB	Asian Development Bank
APHIS	Animal and Plant Health and Inspection Service (US)
BIP	Border Inspection Post
BIPM	International Bureau of Weights and Measures
BOI	Board Of Investment
CA	Competent Authority
CAC	Codex Alimentarius Commission
CEACR	Committee of Experts on the Application of Conventions and Recommendations (ILO)
CFHC	Ceylon Fishery Harbour Corporation
CHF	Swiss francs
CIPM	International Committee for Weights and Measures
DFAR	Department of Fisheries and Aquatic Resources
DG SANCO	Directorate General for Health and Consumers (EC)
EAC	East African Community
EC	European Commission
EEC	European Economic Commission
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organization
FDA	Food and Drugs Administration (US)
FRP	Fibreglass reinforced plastic
FVO	Food and Veterinary Office (EU)
GAO	Government Accountability Office (US)
GAP	Good agricultural practice
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GHG	Green house gas
GHP	Good hygienic practice
GMP	Good manufacturing practice
GNPL	Globally networked private laboratory
GOSL	Government of Sri Lanka
GSP+	Generalized System of Preferences Plus
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HACCP	Hazard analysis and critical control point
IAF	International Accreditation Forum
IBS	International Basic Standards
IDS	Institute of Development Studies
IEC	International Electrotechnical Commission
IFOAM	International Federation of Organic Agriculture Movements
ILAC	International Laboratory Accreditation Cooperation
ILO	International Labour Organization
IMS	Information management system
IPPC	International Plant Protection Convention
ISO	International Organization for Standardization
IT	Import tolerance
ITI	Industrial Technology Institute
ITU	International Telecommunications Union
IUU	Illegal, unreported and unregulated fishing
LDCs	Least Developed Countries
LKR	Sri Lanka rupees
LOPL	Locally owned private laboratory
LPI	Logistics Performance Index
MFAR	Ministry of Fisheries and Aquatic Resources
MOU	Memorandum Of Understanding
MRA	Mutual Recognition Agreement
MRL	Minimum residue level
MT	Metric tonne
MUSSD	Measurement, Units, Standards & Services Department
NA	Norwegian Accreditation
NAB	National Accreditation Board
NABL	National Accreditation Board for Testing & Calibration Laboratories, India
NAFIQAVED	National Fisheries Quality Assurance and Veterinary Directorate
NAPPO	North American Plant Protection Organization
NARA	National Aquatic Resources Research and Development Agency
NGO	Non-governmental organization
NMI	National Metrology Institute
NOP	National Organic Program (US)
NORAD	Norwegian Agency for Development Cooperation
NPV	Net present value
NQS	National Quality System
NRCP	National Residue Control Plan
NSB	National Standards Body
OASIS	Operational and Administrative System for Import Support (US FDA system)
OECD	Organisation for Economic Co-operation and Development
OIE	World Organization for Animal Health
OIML	International Organization of Legal Metrology
PCA	Principal Components Analysis
PIP	Pesticide Initiative Programme
PPP	Plant protection products
QMS	Quality management system
RASFF	Rapid Alert System for Food and Feed (EU)
RRRI	Relative Rejection Rate Indicator
RVA	Raad Voor Accreditatie (Dutch Board for Accreditation)
SCCI	Standards Compliance Capacity Index
SI	International System of Units
Sida	Swedish International Development Agency
SLAB	Sri Lanka Accreditation Board
SLSI	Sri Lanka Standards Institution
SMTQ	Standards, metrology, testing and quality
SPS	Sanitary and phytosanitary measures
STC	Specific trade concern
STDF	Standards and Trade Development Facility
SWEDAC	Swedish Board for Accreditation and Conformity Assessment
TA	Technical assistance
TBT	Technical barriers to trade
TPI	Trade Performance Index
UN COMTRADE	United Nations Commodity Trade Statistics Database
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization
WTI	World Trade Indicators
WTO	World Trade Organization

Foreword

Villa Kulild

Director General
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This first edition of UNIDO's Trade Standards Compliance Report is most welcome, and Norad has gladly supported its development. Clearly, more trade focus and, at the same time, more trade-related technical assistance call for a better basis for policy choices, both at the level of developing countries and with development partners. If Aid for Trade is to be efficient and effective, the policy choices need to draw on the wealth of available information, and need to use new, innovative analytical tools to identify and assess investment options for capacity-building.

The Trade Standards Compliance Report gathers, for the first time, an overview of current and emerging trade compliance challenges and offers in-depth comparisons of challenges faced by developing countries when exporting to major international markets, and of the estimations of resulting export losses. It also sketches out innovative approaches to measuring standards compliance performance and to improving trade related technical assistance.

I am very pleased to see that the Trade Standards Compliance Report has attracted the interest of important international organizations and conventions that have shared their perspectives on the changing trade standards landscape. I would also like to thank the Institute of Development Studies, Brighton, UK for its key substantive contribution to this Report.

This periodic Trade Standards Compliance Report fills an important gap for informed policy decisions on the development of trade capacity by governments, private sector exporters and donors. I especially thank UNIDO for having proposed and conceptualized this innovative contribution to the enhancement of trade development efforts, trade-led economic growth and ultimately to poverty reduction.

Preface

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Integration into the global trading system is valuable to each and every developing country and is crucial for securing economic growth and prosperity. A number of efforts have taken place at the international, regional and national levels to support the participation of such countries in trade – for example, the Aid for Trade Initiative and the Enhanced Integrated Framework. But much more needs to be done if lower- and middle-income countries are to fully reap the benefits of global trade and secure a high impact on wealth creation and poverty reduction.

More and better support is also needed from development partners. In order to shape efforts in trade capacity-building and trade development, a sound basis for informed, strategic decision making is needed. Compliance with international and private trade standards is an important pillar in achieving this. UNIDO's Trade Standards Compliance Report will support such policy choices through new innovative analytical tools and findings, coupled with guidance on where investment in capacity-building is most rewarding.

This first edition of our Trade Standards Compliance Report is published at a crucial time: More efficient and effective technical assistance is called for by developing countries and donors alike; development partners are searching for ways to better identify the needs of developing countries and better tailor the support to integrate them into the global trading system.

This Report provides all development partners with unprecedented access to product rejection data, presents innovative analyses, and proposes new approaches to better assess developing countries' standards compliance capacities. The impact of non-compliance is addressed and options for a more effective allocation of trade-related technical assistance efforts are identified. At the same time, developing countries can use the Report to benchmark their compliance performance with peers or competitors and will be able to direct their development efforts more efficiently.

Through this Trade Standards Compliance Report, we aim to ensure that the efforts of the international community really meet the needs of the poor and enable the creation of wealth through productive, export-driven employment opportunities. UNIDO is very grateful to its long-standing partner NORAD for making this innovative tool possible. The Institute of Development Studies, Brighton, UK, also greatly contributed to this Report. In addition, the Report was particularly strengthened by the expertise of FAO, ILO, IPPC, ISO, UNEP, and the WTO. It is my hope that those who have cooperated in this Report will be joined by others so that it will become even more beneficial in the years to come.

Rationale and Key Findings

Trade, trade development and trade-related standards have received prominent and increasing coverage in the literature over recent years. Numerous reports from a wide range of international organizations have highlighted specific aspects of compliance challenges faced by developing countries. This publication does not aim to simply add one further contribution to this extensive list. UNIDO felt that something more, and more holistic, could be done.

UNIDO, with its Trade Standards Compliance Report (TSCR), intends to fill a significant gap: this Report focuses on the challenges faced by developing countries in complying with key trade-related standards, technical regulations and private standards in international trade, estimates the resulting export losses and then relates these compliance challenges and losses to an analysis of developing countries' capacity to establish and prove their compliance, and to the cost of strengthening such capacity.

The TSCR thus aims to be an innovative tool for informed policy choices on better and more efficient trade-related development efforts, or "aid for trade" by governments, the exporting private sector, donor agencies and other technical assistance providing development partners. Drawing on expertise available within other organizations, it also aspires to serve as an early warning tool on the changing landscape of trade standards compliance issues.

While some conceptual work, such as the proposed Standards Compliance Capacity Index (SCCI), is generally applicable, the initial focus of the first edition reflects the present trade composition and immediate trade potentials of many developing countries. Agri-food products are a key export area for many developing countries, including Least Developed Countries, and trade standards related compliance challenges are particularly acute for these countries. Future issues of the TSCR will include a further widened scope of coverage.

Some parts of the TSCR are work in progress, and UNIDO would be glad to receive feedback from academia, developing country practitioners and other development partners that would bring a further enrichment of the forthcoming edition of the Trade Standards Compliance Report.

UNIDO believes that such a periodic publication can best advocate the importance of trade standards compliance, periodically assess changes in the fast changing compliance landscape, promote innovative approaches to assessing the impacts of compliance failure, and ultimately guide more effective capacity-building and its funding. UNIDO intends to develop and expand the TSCR in future years. An Internet-based access to the data sets on market entry challenges and compliance infrastructures will then facilitate further easy research, analysis and benchmarking.

Trade as a development opportunity

It has been largely recognized that expanding and diversifying exports can accelerate economic growth; together with tariff reductions these have been one of the main mechanisms for spreading the benefits of globalization. Nevertheless, despite the overall decline in tariff levels in recent years, firms in developing countries have not been able to reap the full benefits of market access opportunities. One explanation for this is the difficulty they face in complying with trade-related standards. Unlocking the full export potential of developing countries requires compliance with both the public regulations and the private standards of the importing countries. The private sector needs to be competitive and produce what buyers and markets require; for this they must have an enabling environment where internationally accepted services for the proof of compliance are easily accessible at an affordable price. Such export-led growth can then become an engine for economic growth, wealth creation and poverty reduction.

Global trade and trade-related standards

The multilateral trade system under WTO leadership has become more and more a rule-based system based on agreements such as those on Technical Barriers to Trade (TBT) or on Sanitary and Phytosanitary (SPS) measures. Such agreements lay the foundation for equitable treatment for all, but they require the capacity to both comply with and provide proof of compliance with the resulting trade-related standards.

Technical standards for products are not new; they have been in existence for well over 100 years. Long before international trade took off, countries developed technical standards to guarantee consumer safety, increase transparency in markets and ensure that products met consumer needs. In many cases, the compliance requirements placed on exporters from developing countries are, in fact, simply the same as the requirements placed on domestic producers – compliance with SPS regulations is good for both importing and exporting countries. It protects human, animal and plant health in the importing country, and provides

exporters with a basis for securing market access. Equally, compliance with technical standards in non-farming sectors ensures transparency and product compatibility.

Developing trade capacity and compliance with trade standards

International agreements envisage Member States assisting other Member States to build up their institutional capacity for standards compliance. Establishing and sustaining such a quality infrastructure is costly and needs technical expertise. UNIDO has long been involved in supporting the development of national and regional capacities to meet technical standards in developing countries. It has supported programmes aimed at improving both the institutional frameworks for standards development and conformity and the technical infrastructure for achieving standards compliance. This has meant assisting governments to create and provide continuing support for national standards institutes, microbiology and chemical testing laboratories, national metrology services, national certification capacity, inspection services and accreditation systems.

Trade standards evolve as trade expands

Developing countries that wish to continue exporting need to continuously update on new trade standards and acquire the capability to conform to the increasing number of new regulations or even to question the validity of proposed regulations that they consider discriminatory.

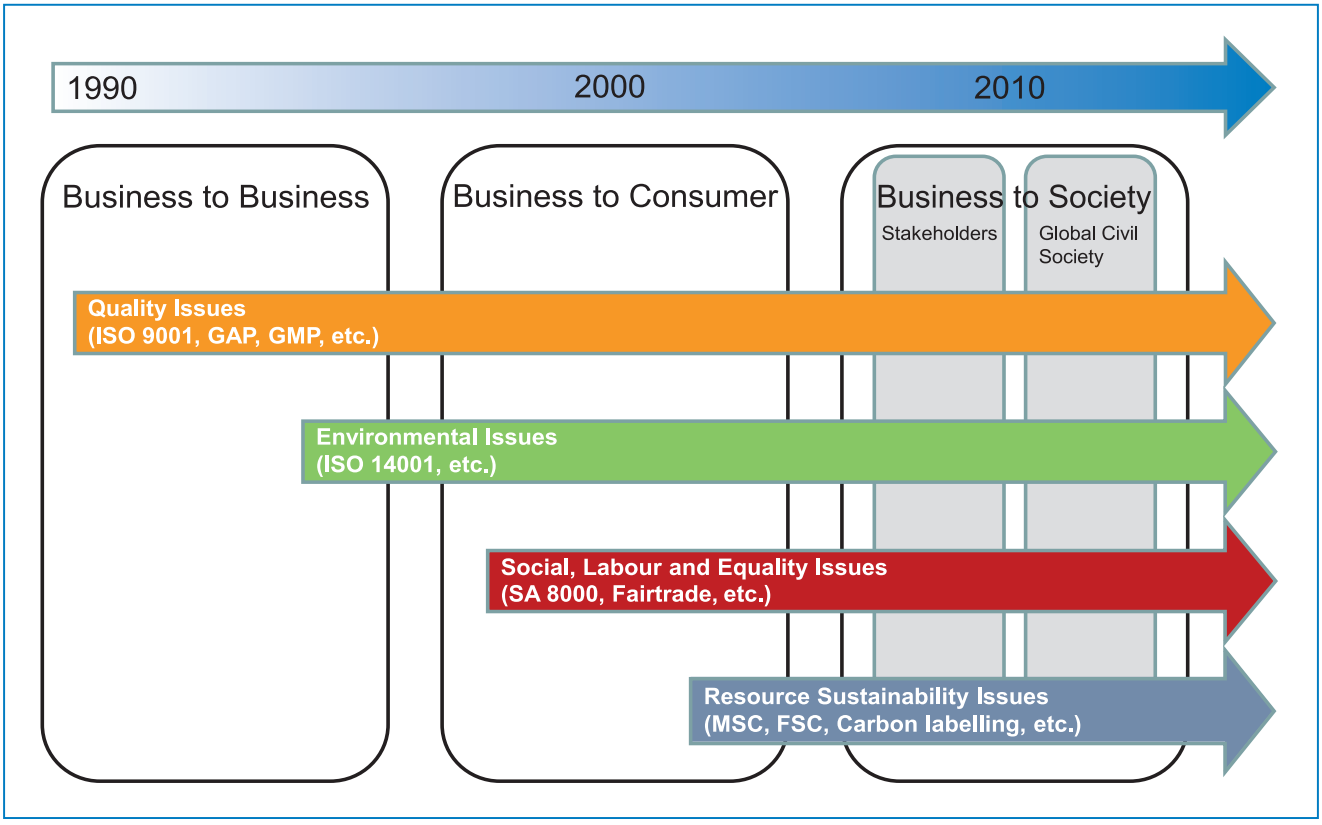
The need to remain abreast of developments in the area of trade standards applies equally to public regulations and to private standards. In many cases, private standards have been introduced by leading companies as a means of ensuring conformity with public regulations because of the perceived threat of non-conformance to their brand image or as part of their commitment to the "triple bottom line" (profit, planet and people).

While quality and product safety-related standards have dominated trade relations for a long time, more recently environmental, social, labour, equality and resource-sustainability issues have gained prominence as consumer and society lead drivers for the development of trade standards and the resulting certification requirements (see Figure 1 below).

There is a widespread sense that compliance challenges are becoming more complex – non-tariff measures are proliferating and becoming more difficult for developing country exporters to meet. This is particularly true for "sensitive" products such as food and children's toys. In the case of food, continuing research on food and plant safety and more sophisticated analytical techniques have resulted in stricter or more extensive regulation and stricter compliance controls on imported products.

In certain areas, such as pesticide residues, there has been a distinct tightening up of requirements by developed country governments, and in the case of food products, for example, whole new categories of risks to consumer safety have been identified in recent years, such as heavy metals contamination, while existing controls have become more sophisticated. Additional controls over how products are grown, harvested, transported and processed have been introduced. For example,

Figure 1. Evolving trade standards drivers



Hazard Analysis and Critical Control Point (HACCP) procedures are now incorporated in food safety management systems along the lines of ISO 22000 standards, while "Farm to Fork" traceability is a new challenge for developing countries and is becoming a key requirement for accessing global markets.

The proliferation of private standards puts a particular challenge on many developing countries. In 2007, the WTO estimated that there were over 400 private standards schemes in operation, and that the number was rising (WTO, 2007). The same WTO report identified concerns raised by developing countries as including multiplication of schemes, lack of equivalence between schemes, lack of scientific justification for certain requirements, and the costs associated with third-party certification. Nevertheless, the pressures for further development of both public regulations and private standards will continue to be felt, particularly in the area of climate change mitigation and sustainability more generally.

Exporting firms in developing countries may find that these requirements act as barriers to accessing new markets. They impose start-up costs on new businesses because the standards have to be first understood and then met. To the extent that import standards in developed countries are more demanding than those in the domestic markets, these firms may need to acquire new capabilities and implement new systems. Further, meeting the standards frequently involves not only producing products to meet particular technical specifications, but also using particular types of processes and procedures and providing documentary proof that these have been put in place. Once met, these standards, however, allow access to large markets based on common requirements.

Aid for Trade as an opportunity to develop trade capacity

As concern about standards and regulations as barriers to trade has increased, so technical assistance programmes in this area have expanded. The WTO-led Aid for Trade Initiative has given a boost to such trade-related technical assistance. The initiative was developed to facilitate export-led growth by addressing supply-side domestic constraints on and compliance challenges to exporting countries. Substantial, but still insufficient, resources are being devoted to a broad range of activities aimed at enabling developing countries to gain access to markets where requirements may be more demanding than those facing companies in their domestic markets. The substantial resources recently devoted to Aid for Trade and trade capacity building initiatives have, however, not been accompanied by equivalent levels of effort aimed at identifying challenges, quantifying costs and identifying best practices in overcoming barriers. More knowledge and research is required about:

- which particular trade compliance challenges are important for developing country exporters;
- how trade compliance challenges are changing and evolving and what capacity issues this raises in developing countries;
- the areas where compliance failures impose particularly high costs on developing countries' exporters;
- the effectiveness of different approaches to trade capacity building for standards compliance.

Key findings

While it is difficult to meaningfully summarize in a few lines or pages the wealth of innovative and detailed analyses, new conceptual proposals and case studies in the TSCR, several major findings can be highlighted.

"Border rejections provide a good broad indicator of key trade standards compliance challenges"

Chapter 1 presents the first in-depth comparison of border rejection data of agri-food products for two international export markets, namely the US and the EU. The Report has also analyzed rejections for specific commodities and across both markets.

Patterns and trends in border rejections clearly reveal sectors and products where the real compliance challenges and the reasons for missed trade opportunities lie when exporting their products to either the EU or the US or even to both markets. The analysis utilizes border rejection data based on unprecedented access provided by the US Food and Drug Administration (FDA) and the European Commission Directorate General for Health and Consumers (DG Sanco). The TSCR thus complements, and its comparative analysis goes beyond, the information earlier available.

The vast majority of border rejections, both for all agri-food products and for particular commodities, are accounted for by a relatively small number of countries. Some countries have high rates of rejection in both the EU and US, and for all or most of the commodities they export, for example India and China, suggesting systemic weaknesses in compliance capacities. Other countries face significant border rejection rates with exports to particular markets and/or for particular commodities, for example exports to the EU of nuts from Iran and fish and fishery products from China and Thailand, suggesting weaknesses in certain value chains or with specific food safety controls.

While the crude numbers of border rejections are perhaps most headline grabbing, it is more informative to examine and consider how rates of rejections vary across countries and commodities and over time for particular countries. On the one hand, such patterns and trends serve to highlight where particular countries perform relatively well or badly, compared to competitors, in their degree of compliance with regulatory requirements in export markets.

The Report presents a summary measure of relative rates of border rejections, the Relative Rejection Rate Indicator (RRRI), which facilitates such comparisons. On the other hand, the rejection analysis provides an indication of how compliance challenges change over time, perhaps as investments are made in particular areas of capacity and/or in response to particular compliance problems. In this context, the Report therefore proposes, in Chapter 3, a tool for the systematic assessment and benchmarking of countries' compliance capacities. In future issues of the Trade Standards Compliance Report, the values of

the RRRI will be updated as more rejection data become available. The aim is also to further extend the analysis of border rejections to imports into other industrialized countries, for example Canada, Japan and Australia.

"The value of border rejections is lower than expected but constitutes the tip of the iceberg"

Chapter 2 builds on the border rejection analysis and aims to quantify the financial losses that are caused through border rejections and that could be of significant importance for developing countries.

The Trade Standards Compliance Report has been greatly inspired by earlier analyses of border rejections and of estimations of export losses. This work has been of great interest, and the Report builds on it, identifies additional sources of information, and takes those innovative analyses further.

Although the TSCR analysis clearly advocates that the export losses are relatively smaller for most exporting countries than earlier estimated, it is rightly argued that these border rejections constitute the tip of the iceberg of missed export opportunities.

Border rejections provide a clear indication of trade standards compliance challenges that need to be lifted to allow a stronger participation of developing countries in international trade relations. More targeted technical assistance is required as many countries do not export at all as a consequence of past rejections – a fact that cannot be quantified from the current analysis on border rejections.

While the level of border rejections of agri-food products in major industrialized country markets provides a crude indicator of compliance challenges, the value of such losses is actually quite small, in total.

Thus, EU border rejections of fish and fishery products, fruit and vegetables and products, nuts and seeds and products and herbs and spices averaged US$ 72 million per year over the period 2004 to 2008. Rejections were dominated by nuts and seeds, valued at US$ 55 million per annum but accounting for only 1.2 per cent of the value of nut and seed imports to the EU.

US rejections of the same products averaged US$ 71 million per year over the period 2004 to 2008. Rejections were dominated by fish and fishery products and fruit and vegetables and products, averaging US$ 47 million and US$ 21 million per year, respectively. Rejections of both fish and fishery products and fruit and vegetables and products accounted for less than 0.4 per cent of the value of imports of these products into the US.

However, whilst the immediate cost of border rejections appears to be small in a broad trade context, it can have most serious consequences for individual firms and their employees, as well as for the overall perception of a country's capacity to provide safe products for export markets. At the same time, it is important to recognize that the compliance challenges faced by developing countries due to regulatory requirements in major industrialized country markets have far wider consequences.

Thus, the more significant impact (and cost) of border rejections is likely to be the decision of international buyers not to source from that specific country, or of export firms to curtail exports and/or to divert exports to less exacting markets, thus losing out on high-value export earnings simply because of the fear that product consignments might be rejected.

It is also important to recognize that the value of border rejections for some countries, and especially smaller exporters, can be considerable. For example, EU rejections accounted for almost 17 per cent of the value of Iranian exports of nuts to the EU over the period 2004 to 2008.

In future issues of the TSCR, efforts will be made to extend the analysis to other commodities and to other industrialized country markets. A more important focus, however, of both the analysis of rates of border rejections and their value, will be on understanding the underlying compliance problems faced by developing countries and making links between investments in capacity-building and changes in the level and/or nature of border rejections over time. This will be supported by country and product case studies.

"Systemic tools for standards compliance capacity benchmarking are needed"

Chapter 3 introduces two different approaches to how the non-compliance of developing countries can be detected and addressed. The newly proposed Standards Compliance Capacity Index (SCCI) and the Food and Veterinary Office (FVO) Inspection Report analysis offer unique benchmarking opportunities to developing countries, donors and international organizations alike. Both approaches will be significantly strengthened in future editions of the TSCR. Feedback on the concept and the findings of the chapter is encouraged and welcome.

There is widespread evidence that trade standards related infrastructural capacity and services are weak in many developing countries and that such weaknesses strongly impede efforts to establish and/or expand agri-food exports, and at the same time endanger effective local consumer protection. The scale of these weaknesses, which can extend across multiple dimensions of trade compliance capacity, makes apparent the importance of identifying priorities in capacity-building and also of assessing the impacts of previous capacity-building investments on compliance capacities. This suggests the need for a systemic approach to quantifying levels of trade compliance capacity that will enable comparisons to be made across countries and over time, and will also serve to highlight areas of particular weakness, and will ultimately facilitate informed policy choices for investments to strengthen local compliance capacities and services.

In this first issue of the TSCR, a new approach to assessing the trade compliance capacity of developing countries is put forward: the Standards Compliance Capacity Index (SCCI). Taking established approaches to asset indices as its starting point, the SCCI provides a systematic and consistent framework in which to assess capacity across areas such as standards-setting, metrology, testing, inspection, certification and accreditation.

Levels of capacity can be compared for any one country across these areas and for any one dimension across multiple countries. While the analysis is based on a survey involving 28 countries from Africa and Asia, in the current Report, because this is an explorative first attempt at applying the index, data are only provided for illustrative purposes, with the countries remaining anonymous.

The aim is to refine the SCCI and collect more comprehensive and reliable data so that results can be reported for a relatively large number of named countries in the next issue of the Trade Standards Compliance Report. It is also intended that the scope of the SCCI will be extended to other areas and issues that influence trade performance.

Compliance challenges are also driven by specific commodity related requirements. For fish and fishery products, the EU's hygiene requirements provide a convenient point of reference with which to make such comparisons. This is helped by the fact that fairly detailed reports on the inspection of third countries' compliance are made public by the European Commission's Food and Veterinary Office (FVO). It is thus possible to observe the particular problems faced by individual countries and how these compare to other countries at a similar level of development, and also to observe changes in compliance challenges over time.

The analysis of FVO Inspection Reports over the period 2006 to 2008 highlights how developing countries face particular challenges in complying with EU hygiene requirements for fish and fishery products, with weak points notably relating to the local Competent Authorities and laboratories and to hygiene conditions in processing facilities and on fishing vessels. These problems appear to relate to resource constraints and a lack of knowledge and understanding of EU requirements and of how to achieve compliance in both the public and private sectors. Secondary issues are weak management within the fisheries value chain and administrative irregularities and lack of empowerment in the Competent Authorities.

In future issues of the Trade Standards Compliance Report, this analysis will be further developed and extended to other regulatory requirements to enable more generalizable results to be derived.

"Overcoming standards compliance challenges needs innovative technical assistance"

Chapter 4 provides an analysis of how technical assistance interventions can be improved by following a value chain approach and provides conceptual innovation for effective technical assistance in building trade compliance capacity in developing countries.

This chapter shows how a global value chain approach is a useful way to make sense of and structure the compliance challenges faced by developing countries in diverse contexts and to assess the effectiveness of alternative technical assistance strategies. It demonstrates how control and oversight (value chain governance) that have previously been achieved through ownership are – owing to the increasing fragmentation of value chains – replaced by requirements to comply with certain standards.

Subsequently, new challenges and opportunities for operators along the value chain are created: while non-compliance with these standards quickly leads to exclusion, in particular with regard to smallholders, value chains facilitate flows of resources and knowledge that enable compliance.

It is also evidenced that compliance issues vary from sector to sector, and that technical assistance providers need to identify key actors and control points along the value chains as entry point for their intervention. Some key questions are provided to facilitate this process.

This conceptual framework proposal is complemented by a case study provided by COLEACP, which describes the experiences gained through the EU's Pesticides Initiative Programme (PIP). In a number of ACP countries, PIP has worked with both the public and private sectors to support compliance with EU regulatory limits on pesticide residues and private good agricultural practice (GAP) standards such as GLOBALGAP.

"Development partners call for better accountability and effectiveness of technical assistance"

Chapter 5 completes the analyses of the TSCR by introducing the concept of a cost-benefit model for technical assistance. While the concept still needs to be strengthened and the model developed, evidence and success stories are already provided from a case study of UNIDO interventions in Sri Lanka supporting the upgrading and accreditation of public sector laboratories with a view to maintaining and enhancing fish and fishery product exports to the EU.

This chapter sets out the need for economic analysis of trade capacity-building, both generally and with particular reference to trade standards compliance. While the case of Sri Lanka demonstrates that there can be considerable gains from establishing and/or enhancing capacities to undertake core compliance services, there is an evident need for more sophisticated analysis which not only provides more rigorous estimates of costs and benefits but also facilitates more general conclusions that can guide processes of capacity-building across developing countries as a whole.

In the long-term such cost-benefit model aims at the development of guiding principles for donors, beneficiary governments and private sector stakeholders as to which investments are likely to yield the greatest returns, not only in terms of trade performance but also poverty reduction.

"The trade standards compliance challenges faced by developing countries will continue to change over time"

Chapter 6 provides an outlook on some major current and emerging trade standards-related challenges that are likely to hamper the further integration of developing countries into the global trading system.

Some key international organizations and entities have highlighted their views on how the landscape of standards compliance might change over time for areas relating to their specific mandates, and on how such changes will influence countries' abilities to participate in higher-value global markets.

While this outlook does not claim to be exhaustive, it compiles valuable insights on some key areas of trade standard-related challenges such as food safety, plant health, social and labour standards, standard-setting, environmental issues and the multilateral trading system.

Other issues such as intellectual property rights will be taken up in the next edition of the TSCR. A topic that has not been specifically touched upon in the current edition is that of the debates on the carbon footprint of exported products and on food miles. This is clearly a concern that significantly harms the export potential of developing countries because of the unclear international guidelines and the different private sector standards. The debate as to how to measure and handle the carbon footprint of various products and how to ideally enlarge towards a holistic life-cycle analysis based evaluation of climate impact, is still very much ongoing and in itself could constitute a major part of a forthcoming TSCR.

Like an early warning system, this outlook points out how regulatory requirements and standards, and compliance challenges in general, are likely to evolve over time, for instance how hazards are managed, and which new hazards need to be addressed, some of which are only now emerging. In parallel, new trade-related standards compliance issues have been identified along new frontiers, including sustainability, climate change, labour conditions, water conservation, etc., in both public and private standards.

While achieving compliance can open up new market opportunities or competitive positions for developing countries, non-compliance, if minimum environmental or labour standards are not met, would soon lead to market exclusion. Early knowledge of changes in the standards landscape will therefore allow countries and enterprises to take timely measures to adapt to the challenges and devise the business responses that will turn them into trade opportunities.

Many of the perspectives from international organizations presented in the TSCR have also highlighted the need for substantive technical assistance support. In the context of Aid for Trade, but also taking into account competing requests for donor contributions, the issues raised in this outlook will allow for an early policy dialogue on countries' development efforts and their development partners' contributions.

1. What do Border Rejections tell us about Compliance Capacity?

Introduction

Concerns about the challenges that developing countries face in complying with food safety, quality and other requirements in industrialized-country markets, whether under technical regulations or standards, are well documented (see, for example, Jaffee and Henson, 2004; World Bank, 2005; Caswell and Bach, 2007; Holmes *et al.*, 2007). While there is a growing body of evidence that supports such concerns, predominantly this comes from a relatively disparate collection of case studies and econometric analyses (see, for example, Korinek *et al.*, 2008). Indeed, existing empirical studies largely fail to provide a consistent basis on which to compare trade standards related compliance challenges across countries and/or to monitor these challenges faced by particular countries over time. Their utility is to provide evidence that problems exist rather than to guide the setting of priorities for capacity-building and/or to support impact assessment of capacity-building investments, which require more broad-based indicators of trade standards related compliance performance.

In the search for a consistent set of data to explore patterns of compliance across developing countries and/or trends in compliance by individual countries or groups of countries over time, attention has been given to border rejections of agri-food products in major industrialized country markets (for an example of an application, see Ababouch *et al.*, 2005). Given that these records relate to specific and actual instances of non-conformity, specifically those that result in a consignment being refused entry, they can be used intuitively to highlight areas where developing countries face compliance problems across export markets, products and/or areas of compliance; for example:

- Identifying products and/or hazards that are the cause of persistent rejections and thus where capacity-building needs are most acute;
- Ascertaining the extent to which compliance problems are a widespread and endemic problem for agri-food exports, suggesting fundamental capacity constraints, or specific to particular products, hazards and/or export markets, suggesting more localized capacity development needs;
- Monitoring the impacts of capacity-building investments in terms of patterns of non-compliance with food safety and other requirements that are enforced through border inspection.[1]

[1] Some analysts have gone further and inferred the value of rejected consignments (see for example Ababouch *et al.*, 2005; Diaz Rios and Jaffee, 2008); this type of analysis is explored later in this report.

In turn, such an analysis can have great utility in identifying priorities for compliance-related capacity-building in benchmarking the efficacy of public-good elements of compliance capacity across developing countries and in monitoring the impacts of capacity-building investments on compliance capacity over time, which is the main focus and interest of the Trade Standards Compliance Report (TSCR). It is important to recognize from the outset, however, that rejection data does not focus on losses of export opportunities, but rather highlights instances of trade standards related compliance problems where trade actually happens. It should thus be interpreted alongside other indicators in order to build up a full picture of the ways in which compliance capacity facilitates or impedes trade.

Most analyses of detention data to date have presented a rather cursory examination of patterns and trends in detention and within short time periods, whilst there has been little or no attention given to comparing rates of detentions across major export markets. This chapter presents the most comprehensive analysis of border rejection data to date, specifically for the European Union (EU) and the United States (US) and covers the longest time span – the period of 2002 to 2008. This has been made possible by the willingness of the EC Directorate General for Health and Consumers (DG Sanco) and the US Food and Drug Administration (FDA) to make their raw border rejection data available to UNIDO. This innovative analysis aims to:

- Derive and assess alternative measures of non-compliance that can be derived from border rejection data;
- Identify broad patterns in border rejections across developing countries, food product exports and areas of non-compliance;
- Explore trends in the trade standards related compliance performance of developing countries, including broad groups of countries by income and individual countries, over time.

While this analysis has value in and of itself, for example as an initial guide to capacity-building needs in developing countries, a more general and important objective of this first issue of the TSCR is to explore the utility of border rejection data for assessing trade standards related compliance performance in agri-food product trade and to provide themes that can guide developing country policy makers. Thus, the intention is to expand specific areas of the analysis and to expand the scope to other industrialized countries.

Indicators of trade standards related compliance problems

In identifying the compliance challenges faced by developing countries in international trade, the challenge is to relate specific weaknesses in compliance capacity to the ability to meet food safety, quality and other requirements in export markets. In practice, we rarely have a complete data set to accomplish this task; for example, assessments of compliance capacity are often undertaken in isolation from analyses of specific trade problems and/or longer-term trends in exports flows. Thus, almost inevitably, we are forced to 'piece together' sometimes disparate evidence and infer inter-relationships that may be somewhat tenuous. That having been said, there is a growing body of data that can conceivably be used to establish indicators that could throw some light on the status of compliance capacity in developing countries and the consequences for export performance, if used with care.

Henson and Masakure (2009) distinguish between three broad indicators of trade-related compliance performance for agri-food products (Figure 1). Although this taxonomy is defined with sanitary and phytosanitary (SPS) measures as its main focus, it can easily be extended to compliance issues more generally, for example relating to labelling requirements and/or social and environmental standards:

- *Capacity-based indicators* focus directly on weaknesses in SPS controls, either in the broad areas of food safety, animal health and plant health, or with respect to particular SPS control functions, for example laboratory capacity. Standard capacity assessment instruments have been developed by FAO (FAO, 2006), OIE (OIE, 2008) and the IPPC (FAO, 2005) for this purpose that effectively benchmark national capacity to international norms. This group of indicators does not, however, explicitly relate weaknesses in compliance capacity to trade problems and/or export performance.
- *Compliance-based indicators* focus on evidence of non-compliance with SPS requirements in export and/or domestic markets. Examples include inspection reports, such as those undertaken to assess the efficacy of veterinary controls in developing countries by the European Commission, and official lists of approved countries and/or exporters maintained by importing countries, such as those maintained by the US Animal Plant Health and Inspection Service (APHIS) for imports of animal and plant products. Typically, these indicators are based on a relatively objective assessment of capacity, for example in the form of an audit schedule or pest risk assessment (PRA). The focus of such indicators is on system compliance, whether through the value chain for particular products or official systems of SPS control.
- *Trade-based indicators* provide ex post evidence that trade is impeded due to non-compliance with export-market SPS requirements. The focus of such indicators is on the compliance of products. Examples include data on import rejections (for example, as is available for the EU and the US), analysis of trade flows, administrative actions in importing countries (for example, bans), reports from exporters of import problems, etc. A key challenge with some of these indicators, however, is isolating the impact of SPS compliance issues from other trade impediments.

Figure 1. Categories of indicators of SPS capacity building needs

Type of Assessment	Examples of Indicators
Capacity-based	Benchmarking
	Ad hoc capacity assessments
Compliance-based	Inspection reports
	Approved import lists
Trade-based	Import rejections
	Trade flow trends and disruptions
	Administrative actions in import markets
	Reports of trade problems from exporters
	Exporter and/or importer interviews and surveys
	Ad hoc problem reports/questionnaires

In principle, many of the compliance and trade-based indicators in Figure 1 are available for developing countries that already engage in trade with the US, the EU and some other industrialized countries. However, these data are not always publicly available, and, even where they are, there has typically been little systematic analysis across countries and/or time. While capacity-based indicators exist for many developing countries, predominantly these remain ad hoc and, at least until recently, have employed inconsistent methods. The initiatives of FAO, OIE and IPPC in establishing a common framework for such assessments is an important initiative in this regard.

Both the compliance and trade-based indicators in Figure 1 will generally be missing for countries that do not have established exports of a particular commodity, but do have aspirations of exporting. Thus, for example, rejection data are only created when a product consignment is exported and fails an instance of border inspection. While capacity-based indicators may be available for such cases, it can be difficult to relate these to potential export performance; latent exports can be constrained by a multitude of factors, including transport infrastructure, production efficiency and SPS capacity, and care must be taken not to over-attribute export problems to SPS issues.

Looking across the potential indicators of trade-related compliance performance in Figure 1, rejection data are evidently the most comprehensive of those available at the current time. These data are captured and assembled on a systematic basis by most industrialized countries and are available at a relatively disaggregated level across agri-food products and by year. Subject to the limitations and provisos detailed below, these data thus permit patterns and trends in compliance-related trade problems to be identified across countries and products and through time. Indeed, rejection data have been employed in a number of previous studies of food safety compliance in international trade (Allshouse *et al.*, 2003; Ababouch *et al.*, 2005; Holmes *et al.*, 2006; Buzby *et al.*, 2008; Buzby and Regmi, 2009; Jaud *et al.*, 2009).

While previous studies demonstrate the potential utility of rejection data for assessing compliance problems, their scope tends to be rather limited. Thus, they generally focus on particular commodities (for example fish and fishery products) or on rejections of agri-food exports more broadly but in a particular export market (notably the US). For the purposes of identifying capacity-building needs, more comprehensive analysis of patterns in border rejections across products, countries, hazards and time is required.

As part of the compilation of the TSCR, UNIDO has undertaken the most comprehensive analysis of border rejection data to date, notably with respect to agri-food imports to the EU and the US. In future issues of the TSCR, this analysis will be further extended to other industrialized markets for which rejection data are available, such as Japan, Australia, and Canada. This chapter presents a summary of the results of this analysis[2]. In particular, it highlights some of the key patterns and trends that emerge from the analysis of EU and US rejection data and outlines the ways in which these results can be used to identify trade standards related compliance problems and capacity building needs at the country level.

Measures of border rejections in the EU and the US

Both the EU and the US have systems for collecting and collating data on rejections of imported agricultural and food products. These systems provide data on import consignments that are refused entry because they are judged not to conform to regulatory requirements. A record is provided for each consignment that details the commodity, the border where inspection was undertaken, the country of origin, the reason for the rejection and the date of rejection. Various other data may be recorded, including the name and/or address of the exporter and the volume of the consignment, although this is often not made publically available for reasons of confidentiality.

The EU's Rapid Alert System for Food and Feed (RASFF)[3] provides a platform for the exchange of information between Member States on measures taken in response to food and feed products that pose an immediate risk to human health, both in the EU internal market and with respect to imports from Third Countries. All EU Member States plus Norway, Liechtenstein and Iceland are members of RASFF. Members are required to make a notification through RASFF of[4]: (i) immediate measures aimed at preventing products being placed on the market, or forcing the withdrawal of products from the market or the recall of products in order to protect human health; (ii) recommendations or agreements with suppliers of products, whether voluntary or obligatory, laying down conditions on the placing on the market or the use of products that pose a serious risk to human health; and (iii) border rejections of product consignments that pose a direct or indirect risk to human health. The first two of these scenarios relate to so-called 'market notifications': products on the EU's internal market that are found to pose an immediate risk to human health. The third scenario relates to products that are the subject of a border rejection and never enter the EU, but rather are sent back to the country of origin, destroyed or diverted to another destination. The primary focus of the analysis below is on this latter category of rejections.[5]

Over time, the number of notifications of border rejections of food and feed products has increased appreciably, reflecting an increase in the rate of rejection greater than growth in the volume of exports. Thus, over the period 2002 to 2008 the annual number of notifications increased by 110 per cent, from 1,049 to 2,203, while the volume of food and feed imports only increased 49 per cent. Predominantly, this reflects an appreciable increase in the number of the rejections in the period to 2005. On the basis of the information available, it is not possible to say whether this trend reflects higher rates of border inspection and/or lower rates of compliance.

Table 1 details the number of EU rejections of food and feed product imports by commodity. Over the period 2002 to 2008, fish and fishery products, fruits and vegetables, nuts and seeds, and herbs and spices accounted for 74 per cent of total rejections, with nuts and seeds alone accounting for 35 per cent. (Henceforth, 'fruits and vegetables' will be understood to include fruit and vegetable products, and likewise with 'nuts and seeds'.) There are notable trends in the number of notifications over this period, for example an increase in rejections of nuts and seeds and food contact materials, and a decline in rejections of fish and fishery products.[6]

Of the total rejections of food and feed product imports to the EU over the period 2002 to 2008, lower middle-income and upper middle-income countries accounted for 54 per cent and 26 per cent, respectively.[7] Developing countries as a whole accounted for 88 per cent of rejections. Over this same period, lower middle-income countries accounted for 25 per cent of food and feed imports, and upper middle-income countries for 40 per cent. Developing countries as a whole accounted for 72 per cent of food and feed imports. The fact that lower middle-income countries accounted for a significantly greater proportion of rejections than of food and feed imports provides an initial indication that these countries faced challenges complying with EU food safety requirements relative to other country income groups. In contrast, upper middle-income countries had rejections that were low relative to the value of food and feed imports, suggesting better compliance performance.

The US FDA is responsible for controls on imports of pharmaceuticals, medical devices, cosmetics and food products, with the exception of meat and poultry and their products.[8] Data on border rejections are available through the Operational and Administrative System for Import Support (OASIS), an

[2] The full analysis will be published as a separate UNIDO working paper.

[3] Data portal is available at: https://webgate.ec.europa.eu/rasff-window/portal/

[4] See Regulation (EC) No. 178/2002

[5] While the main focus of the analysis is on border rejections, since this is the main mechanism through which controls are exerted on imports of food and feed products from Third Countries, a relatively small number of market notifications are included. In principle, these instances could be removed from the data so that the focus is entirely on border rejections. In so doing, however, information would be lost on cases of non-compliance. Below, reference is made to 'border rejections', which encompasses all forms of notifications to which food and feed imports from Third Countries are subject over the period 2002 to 2008, including withdrawals of products that are allowed entry but are subsequently subject to a notification.

[6] Note that data for commodities with low rates of rejection should be treated with caution. They generally reflect limited and often sporadic incidences of non-conformity within the context of a large overall number of inspections and rejections.

[7] Country income groupings based on World Bank List of Economies (July 2009). Available at: http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS

[8] Regulation of meat and poultry and meat and poultry products is the responsibility of the Food Safety Inspection Service (FSIS) of the US Department of Agriculture (USDA).

Table 1. Number of EU rejections of food and feed products from Third Countries by product, 2002-2008

Product	Year							Total
	2002	2003	2004	2005	2006	2007	2008	
Nuts and seeds	244	731	777	858	707	619	744	4,680
Fish and fishery products	396	483	372	417	380	344	288	2,680
Fruits and vegetables	110	166	175	244	258	313	353	1,619
Herbs and spices	26	85	159	230	129	113	88	830
Food contact materials	2	12	28	116	109	151	165	583
Cereals and bakery products	3	13	12	27	140	76	114	385
Poultry meat and poultry meat products	112	73	61	39	7	14	22	328
Meat and meat products	37	75	60	71	28	29	20	320
Confectionery	2	19	28	30	34	47	79	239
Dietetic foods, food supplements, fortified foods	8	9	11	24	52	88	41	233
Honey and royal jelly	41	24	18	38	23	24	30	198
Fats and oils	3	2	76	57	8	22	19	187
Soups, broths and sauces	13	31	39	23	30	22	17	175
Feed for food-producing animals	1	0	0	0	12	70	64	147
Non-alcoholic beverages	3	24	15	14	22	33	28	139
Animal nutrition	21	16	11	36	39	0	0	123
Cocoa and cocoa preparations, coffee and tea	15	7	14	8	26	14	29	113
Pet food	0	0	0	0	16	34	47	97
Prepared dishes and snacks	3	5	11	17	14	6	9	65
Other food products/ mixed foods	1	5	4	8	11	9	10	48
Milk and milk products	4	2	8	7	3	4	10	38
Food additives	2	2	0	1	2	6	6	19
Egg and egg products	0	13	1	0	0	1	3	18
Water for human consumption (other than natural mineral water)	0	0	0	5	5	4	4	18
Natural mineral water	1	0	0	4	4	3	5	17
Alcoholic beverages (other than wine)	1	2	1	2	2	2	1	11
Wine	0	0	3	1	4	2	0	10
Feed additives	0	0	0	0	4	2	3	9
Ices and desserts	0	0	1	0	1	0	4	6
Total	**1,049**	**1,799**	**1,885**	**2,277**	**2,070**	**2,052**	**2,203**	**13,335**

automated FDA system for processing and making admissibility determinations for shipments of imported products that come under the jurisdiction of the FDA.[9] Prior to 1998, records were kept of all import consignments subject to rejection regardless of whether these were eventually permitted to enter the US. Since that time, only consignments actually refused entry have been recorded, making the data more directly comparable to those of RASFF.[10] The basis on which imports are regulated is the Federal Food, Drug and Cosmetic (FD&C) Act that lays down requirements not only for product safety but also labelling and quality, at least as it relates to adulteration.

Over the period 2002 to 2008, the number of rejections of food products by the FDA declined 17 per cent, while imports increased 63 per cent, in stark contrast to the trend in the number of rejections recorded in the EU. It is not possible to discern whether this trend reflects changes in the rate of inspection and/or the rate of non-compliance. However, the US Government Accountability Office (GAO) has noted that, while the food safety regulatory responsibilities of the FDA have increased over time, its funding and staffing have not been enhanced commensurately (GAO, 2008). This suggests that rates of border inspection did not keep up with the growth in food imports through the 2000s.

Of total rejections of food products under the FDA's jurisdiction from 2002 to 2008, fruits and vegetables and fish and fishery products accounted for 51 per cent (Table 2). However, rejections of these products declined rapidly over this period, accounting for 53 per cent of rejections in 2002 but only 38 per cent in 2008.

[9] Data portal is available at: http://www.fda.gov/ForIndustry/ImportProgram/ImportRefusals/default.htm

[10] Although see below for certain incompatibilities between the OASIS and RASFF data.

At the same time, rejections of spices, flavours and salts increased appreciably, from four per cent of rejections in 2002 to 11 per cent in 2008. Significant increases in rejections were also recorded for chocolate and cocoa products. Note that nuts and edible seeds, the commodity subject to the largest number of rejections in the EU over the period 2002 to 2008, accounted for less than two per cent of US rejections.

Over the period 2002 to 2008, lower middle-income countries accounted for 33 per cent of US rejections but only 21 per cent of imports. As with the EU, this presents an initial indication of high rates of non-compliance relative to other country income groupings. However, comparing across the EU and the US, the relative performance of lower middle-income countries appears better in the case of the US. Among other factors, this reflects the very high level of EU rejections of food and feed product imports due to mycotoxins, most of which were observed in lower middle-income countries such as Iran, China, Egypt and India. Upper middle-income countries accounted for around 31 per cent of US rejections over the period 2002 to 2008, in line with their share of food imports.

Whilst crude rejection data provide a broad picture of patterns and trends across products, exporting countries and/or destination markets, these data also reflect changes in the volumes and composition of exports over time. Thus, in the analysis of

Table 2. Number of US rejections of food products by product, 2002-2008

Product	Year							Total
	2002	2003	2004	2005	2006	2007	2008	
Fruits and vegetables	3,182	2,800	3,397	3,074	2,660	2,721	1,624	19,458
Fish and fishery products	2,205	2,062	2,196	1,860	1,606	1,731	1,290	12,950
Confectionery without chocolate/chewing gum	592	580	499	678	717	596	633	4,295
Spices, flavours and salts	409	381	443	398	490	632	844	3,597
Bakery products/dough/mix/icing	445	402	592	610	495	486	481	3,511
Multi-food dinner/gravy/sauce	414	436	347	300	299	350	428	2,574
Soft drink/water	293	369	315	273	287	334	388	2,259
Cheese/cheese products	350	379	492	244	195	248	201	2,109
Chocolate/cocoa products	202	148	148	153	154	217	545	1,567
Snack food items	123	97	227	191	271	178	190	1,277
Macaroni/noodle products	413	229	129	96	107	86	118	1,178
Dressings/condiments	137	141	125	142	147	246	165	1,103
Milk/butter/dried milk products	254	252	182	115	91	124	77	1,095
Nuts/edible seed	136	158	168	146	204	158	73	1,043
Whole grain/milled grain products/starch	178	86	109	108	151	157	100	889
Beverage bases/concentrates/nectar	115	121	113	119	101	89	55	713
Coffee/tea	98	50	75	76	81	82	111	573
Soup	189	105	75	42	67	43	51	572
Food sweeteners	74	78	63	49	79	73	70	486
Dietary convenience foods/ meal replacements	39	84	59	56	54	46	37	375
Gelatin/rennet/pudding mix/pie filling	99	38	32	50	44	30	56	349
Vegetable oils	43	44	49	42	39	43	26	286
Cereal preparations/breakfast food	32	41	36	28	30	20	17	204
Food additives (human use)	26	51	18	25	25	18	21	184
Baby food products	35	16	33	26	14	24	10	158
Ice cream products	14	34	10	11	14	23	15	121
Colour additive food/drug/cosmetic	10	16	8	4	13	55	10	116
Alcoholic beverages	7	7	63	7	4	19	4	111
Meat, meat products and poultry	21	17	27	15	18	8	4	110
Vegetable protein products	28	4	4	10	4	18	4	72
Filled milk/milk products	8	16	11	2	9	2	9	57
Egg/egg products	2	8	24	2	3	0	9	48
Prepared salad products	4	3	9	9	4	1	3	33
Total	**10,177**	**9,253**	**10,078**	**8,961**	**8,477**	**8,858**	**7,669**	**63,473**

these data presented below, three measures are derived that, individually and as a collective, aim to provide a more complete picture of patterns and trends in non-conformity:

1. **Aggregate number of rejections:** Simple sum of the annual number of rejections over the period 2002 to 2008. Increases in the number of rejections can reflect increases both in the volume of exports and in the rate of non-compliance.
2. **Unit rejection rate:** Number of rejections per US$ 1 million of exports over the period 2002 to 2008. This measure takes account of changes in the volume of exports such that it provides a direct measure of the rate of non-compliance. This is best presented as a moving average to smooth out often appreciable year-on-year variations.
3. **Relative rejection rate:** Ratio of country share of total rejections to the share of total imports for the period 2002 to 2008. This provides a convenient measure of the performance of countries relative to one another over the medium term. Thus, a country whose share of rejections is less/more than its share of imports is defined as a relatively good/bad performer in terms of rates of non-conformity. These data provide a more reliable basis for comparison between the EU and the US.[11]

Across all of these measures, due account needs to be given to the characteristics of the rejection data and the factors that potentially influence the observed levels and rates of rejections (see Box 1).

While recognizing the distinct features of the RASFF and OASIS data (see Box 2), it is possible to discern distinct features of rates of EU and US rejections that are important to bear in mind when interpreting rejection patterns at the more disaggregated level. First, whilst the US unit rejection rate declined from 0.217 to 0.089 over the period 2002 to 2008, it remained substantially greater than the EU unit rejection rate (0.015) in 2008. Second, the unit rejection rate varied significantly across food commodity groups in both the EU and the US. In the EU, the highest unit rejection rate was for herbs and spices and nuts and seeds, with much lower rates for fruits and vegetables and fish and fishery products. For all commodities, with the one exception of nuts and seeds, the unit rejection rate was appreciably higher in the US. By far, herbs and spices had the highest unit rejection rate in the US, whilst nuts and edible seeds had the lowest rate.

Total rejections

To provide a broad picture of trade standards related compliance challenges with agri-food exports to the EU and the US, total rejections over the period 2002 to 2008 are first examined. As noted above, these data reflect both the volume of exports from particular countries to the EU/US and the rate of non-compliance. In turn, the rate of non-compliance can reflect such factors as the state of compliance capacity in the exporting country, the products exported (for example whether they are high or low risk with respect to food safety hazards) and the regulatory regime in place for these products in the importing country.

In both the EU and the US, a relatively small number of countries accounted for the majority of rejections from 2002 to 2008 (Tables 3 and 4). China and India had high levels of rejections in both the EU and the US. Other countries, for example Iran, Turkey and the Dominican Republic, had a large number of rejections in either the EU or US, but not both. It is notable that some industrialized countries also had large numbers of rejections. Thus, the US was in the top five countries by number of rejections in the EU, and the UK and Canada were among the six countries with the greatest number of rejections in the US.

Box 1. Caution in interpreting border rejection data

In using rejection data, the intention is to throw some light on the compliance performance of developing countries, individually and as income sub-groupings. It is necessary from the outset to reflect on how reliable rejection data are for this purpose and, perhaps more importantly, how patterns and trends in rejections should be interpreted.

First, it is important to recognize that rejection data are generated by specific instances where an exporter attempts to gain access to EU or US markets and where there is a failure due to non-conformity with official requirements that are enforced through border inspection. They tell us nothing about the state of capacity in countries that do not export. These countries may have very weak compliance capacity (and perhaps this is the reason they do not export), or alternatively very good compliance capacity while not exporting for other reasons (for example lack of productive capacity and/or high transport costs). Zero exports could also result from prohibitions on exports due to persistent non-compliance and/or non-approval of food safety control systems in the exporting country.

Second, border inspections cover a small fraction of total food imports.[12] Further, the RASFF and OASIS data do not record the number of consignments offered for inspection or the number of inspections undertaken. As a result, it is not possible to estimate the share of consignments from any one country or over time that is in non-compliance.

Third, the rate of rejection will reflect the exporting country's compliance capacity relative to the importing market's official requirements, which is of interest here. However, it will also be influenced by the efforts and attentions of border officials in the importing country, which may vary in a non-random manner across time, products, exporting firms and/or country of origin according to historical rejection rates, administrative priorities in the importing country, etc. As a result, enhancements in compliance performance could conceivably be accompanied by (but not related to) increases in levels of rejections.

In conclusion, rates of rejection at best provide a crude and partial picture of the compliance difficulties faced by developing countries with agri-food product exports. While patterns and trends in rates of rejection present a broad picture of where problems exist and how the scale of problems differs across countries and/or changes over time, in terms of compliance challenges they arguably represent the 'tip of the iceberg'.

Tables 5 and 6 present unit rejection rates for the largest exporters of agri-food products to the EU and the US, in declining order by value of exports over the period 2002 to 2008. The average

[11] The fact that rejection data are available for both the EU and the US should permit comparison of compliance performance at the country and products levels. However, strictly speaking, the RASFF and OASIS data are not directly comparable in that their coverage is somewhat different across products and the basis on which non-compliance is assessed. These inconsistencies must be borne in mind when making comparisons between rejections rates in the EU and the US.

[12] It is estimated that only about one per cent of US food imports were subject to FDA inspection in the 2000 financial year (GAO, 2001).

Box 2. Caution in comparing EU and US rejection data

The RASFF and OASIS data are only comparable with some caution in that their coverage is somewhat different across products and the basis on which non-compliance is assessed. Notably:

- *The RASFF database provides information on rejections of all food and feed products, while the OASIS database excludes meat and poultry and meat and poultry products. In practice, this is not a particularly significant issue since rejections of meat and poultry and meat and poultry products only account for five per cent of EU rejections. Further, exports of these products are insignificant for all but a very small number of developing countries.*
- *The RASFF database provides data on border rejections that are related almost entirely to non-compliance with food safety requirements. Conversely, the OASIS data includes rejections due to non-compliance with a broad set of compositional and labelling requirements, amongst others.*
- *In the vast majority of cases the RASFF data record a single reason for the rejection of a particular product consignment although a rejected product might have had several non-compliances, whereas multiple reasons are typically recorded in the OASIS data. Either the OASIS data provide a more complete record of the areas in which a particular consignment is in non-conformity, or the definitions of non-conformity are more specific than those of the RASFF.*
- *The ways in which commodities are categorized differ between the RASFF and OASIS databases. For some major product groups, however, it is possible to rearrange the data to define broadly comparable commodity groupings, and this has been undertaken for the four commodity groups analysed below.*
- *The RASFF data includes (albeit limited) instances of market notifications as well as border rejections. The OASIS data, however, are restricted to border rejections.*

While the distinct characteristics of the RASFF and OASIS data are not considered a serious impediment to comparative analysis, they do need to be borne in mind in interpreting the data and the results presented below.

across all countries is also presented.[13] Note that numerous very small exporters had single or small numbers of rejections. Because the exports of these countries were so low, the associated unit rejection rates were often extremely high, and as a result tend to distort the data.

In the case of the EU, major agri-food exporters with relatively high unit rejection rates included Iran, China, Nigeria, Egypt, India, Thailand, the Philippines, Vietnam, Turkey and Ghana. Most of these countries had high rejection rates throughout the period 2002 to 2008, suggesting longer-term problems with non-compliance. Notable exceptions, that recorded an appreciable decline in the unit rejection rate over time, included Iran, Vietnam and Thailand. Large exporters with low unit rejection rates, indicating that they had relatively few compliance problems, included Brazil, Argentina, South Africa and Chile.[14]

Of the largest agri-food exporters to the US, the Dominican Republic recorded the highest unit rejection rate by far throughout the period 2002 to 2008. Other countries with high unit rejection rates included South Korea, India, Taiwan, Japan, United Kingdom, Vietnam, Japan, Vietnam, Honduras and the Philippines. While China's unit rejection rate exceeded the all-country average, it performed better than a number of other large agri-food exporters. Developing countries with low unit rejection rates included Chile, Brazil, Colombia, Argentina, Peru and the Côte d'Ivoire. The fact that Chile, Brazil and Argentina had low unit rejection rates in both the EU and the US suggests that they faced few compliance challenges overall.

To provide a graphical depiction of the relative compliance performance of countries over the period 2002 to 2008, Figures 2 and 3 plot the log share of total rejections against the log share of total agri-food exports for the EU and the US.[15] The position of each country reflects their performance relative to one another. The 45° line represents the boundary between relatively 'good' and 'bad' performers in terms of the relative rejection rate. Countries above the line are relatively bad performers in that their share of rejections exceeds their share of exports. Conversely, good performers are below the line; their share of rejections is less than their share of exports. Given that the positioning of countries along the horizontal axis reflects their share of agri-food exports, a distinction can also be made between larger and smaller exporters.

Among large agri-food exporters, relatively poor performers included China, Turkey, India, Thailand, Vietnam and Iran in the case of the EU, and India, Vietnam, Dominican Republic and the Philippines in the case of the US. The share of US rejections of both China and Mexico was approximately in line with their share of exports. Large exporters with a relatively good compliance performance included Brazil, Argentina, Chile and Ecuador for both the EU and the US. Morocco and South Africa were among the better performing large exporters to the EU, while Guatemala and Colombia were good performing large exporters to the US. There were also a number of good performing smaller exporters, for example Tanzania, Paraguay, Mauritius, Malawi and Namibia.

The patterns in rejections across countries and over time reflect not only the compliance capacities of exporting countries but also the regulatory foci of the importing countries. Thus, there were appreciable differences in the reasons for EU and US rejections (Tables 7 and 8).[16] In the case of the EU, the most important reason by far for rejections of food and feed imports over the period 2002 to 2008 was mycotoxins, accounting for 40 per cent of all rejections. This is in stark contrast to the US, where mycotoxins were referenced in less than 0.5 per cent of rejections. Mycotoxins were a problem, however, for relatively few countries, notably Iran (accounting for 38 per cent of all mycotoxin-related EU rejections), Turkey, China and the United States. Veterinary drug residues also figure prominently in the

[13] In calculating the average throughout this chapter only countries with annual exports of US$1 million or more are included.

[14] A decrease in the rejection rate might have come about as the result of these countries' investments in compliance building at exporter level and in quality infrastructure and their performance according to international good practices.

[15] As above, countries with exports below US$1 million per year are excluded. Countries with zero rejections are also excluded because the plot is logarithmic.

[16] Note that multiple reasons can be cited for individual rejections, such that the total count of reasons in Tables 7 and 8 exceed the total number of rejections in Tables 1 and 2.

Table 3. Number of EU rejections of food and feed products from Third Countries, 2002-2008

Country	Year							Total	Annual Average
	2002	2003	2004	2005	2006	2007	2008		
Iran	63	492	491	470	243	130	172	2,061	294.4
China	149	133	158	253	262	354	498	1,807	258.1
Turkey	141	200	180	198	250	294	302	1,565	223.6
India	60	119	110	137	86	111	157	780	111.4
United States	25	53	52	74	231	184	144	763	109.0
Thailand	143	85	45	117	85	92	103	670	95.7
Brazil	102	116	109	124	91	58	61	661	94.4
Vietnam	67	35	56	124	68	44	55	449	64.1
Argentina	11	42	46	57	75	47	58	336	48.0
Indonesia	39	36	70	58	43	25	14	285	40.7
Ghana	1	8	78	59	44	31	23	244	34.9
Egypt	9	40	33	24	30	35	48	219	31.3
Nigeria	1	7	15	30	28	49	25	155	22.1
Hong Kong	2	4	6	31	29	45	25	142	20.3
Bangladesh	11	18	18	25	29	15	22	138	19.7
Ukraine	13	0	6	20	18	40	36	133	19.0
Pakistan	7	12	14	25	19	28	27	132	18.9
Morocco	17	29	9	15	23	22	11	126	18.0
Malaysia	14	34	23	8	13	22	8	122	17.4
Philippines	4	18	6	14	41	13	23	119	17.0
Chile	9	28	20	14	8	18	8	105	15.0
Russia	8	3	10	34	25	15	10	105	15.0
Singapore	5	54	19	1	7	10	5	101	14.4
Tunisia	5	3	11	17	7	16	33	92	13.1
Sri Lanka	6	4	14	5	9	22	23	83	11.9
Australia	2	4	6	25	17	14	12	80	11.4
Taiwan	5	36	13	1	5	5	15	80	11.4
Somalia	13	17	12	11	7	8	7	75	10.7
Lebanon	2	9	9	5	8	19	17	69	9.9
Ecuador	11	14	16	3	5	7	8	64	9.1
South Korea	3	4	16	19	11	3	7	63	9.0
Senegal	4	12	3	8	6	13	10	56	8.0
Israel	4	4	9	9	10	5	14	55	7.9
Other	93	126	202	262	237	258	222	1,400	200.0
Total	**1,049**	**1,799**	**1,885**	**2,277**	**2,070**	**2,052**	**2,203**	**13,335**	**1,905.0**

EU rejection data, accounting for 10 per cent of rejections. Conversely, veterinary drug residues were referenced in less than two per cent of US rejections.[17] While pesticide residues were referenced in over 11 per cent of US rejections, they accounted for just less than five per cent of EU rejections.

The most frequently referenced reason for US rejections of food imports was contravention of labelling requirements, this being associated with 58 per cent of all rejections. Almost 29 per cent of US rejections referenced unregistered process/manufacturer; the US requires that manufacturers of certain products (for example low-acid canned foods) register their process with the FDA. Broadly, the EU does not enforce labelling requirements through border inspection, and contraventions of such requirements are generally not recorded by the RASFF.

In both the EU and the US, microbiological contamination was a prominent reason for rejections of food products, accounting

[17] While this partly may reflect the absence of meat and poultry and meat and poultry products from the US rejection data, it should be noted that the majority of EU rejections for reasons of veterinary drug residues are fish and fishery products. Thus, this difference appears to be more a reflection of the distinct regulatory requirements of the EU and the US.

Table 4. Number of US rejections of food products, 2002-2008

Country	Year							Total	Annual Average
	2002	2003	2004	2005	2006	2007	2008		
Mexico	1,804	1,502	1,581	1,735	1,477	1,270	1,066	11,926	1490.7
India	746	725	871	1,026	1,132	1,113	707	7,223	902.9
China	541	667	616	672	664	740	479	5,005	625.6
United Kingdom	377	288	325	245	369	430	1,262	3,767	470.9
Dominican Republic	263	266	535	415	663	512	77	3,121	390.1
Canada	414	543	551	284	246	238	361	3,014	376.7
Vietnam	428	332	478	350	300	378	306	2,939	367.4
Japan	755	241	192	147	285	203	319	2,448	306
Indonesia	138	269	331	214	313	374	250	2,159	269.9
Thailand	280	258	351	307	216	233	212	2,122	265.3
France	461	365	345	223	159	155	113	2,081	260.1
South Korea	297	344	285	205	112	166	287	1,938	242.3
Philippines	203	456	248	214	135	244	168	1,906	238.3
Italy	197	226	252	245	175	287	223	1,834	229.3
Taiwan	244	180	183	210	165	173	272	1,631	203.9
Poland	259	129	121	117	58	59	40	895	111.9
Brazil	125	118	153	118	122	84	61	893	111.6
Pakistan	113	116	106	114	90	129	61	833	104.1
Guatemala	107	91	87	98	109	100	126	821	102.6
Spain	172	93	160	58	78	62	64	785	98.1
Turkey	180	101	84	82	70	83	28	718	89.7
Honduras	38	46	57	76	122	73	134	624	78
Bangladesh	30	22	188	98	50	67	42	568	71
Sri Lanka	84	71	28	32	89	109	29	505	63.1
Colombia	26	47	119	102	54	50	41	502	62.7
China	99	64	33	70	44	51	53	473	59.1
Peru	23	71	45	70	29	75	67	434	54.3
Ecuador	75	26	51	72	59	74	15	425	53.1
Israel	40	52	106	33	19	43	60	403	50.4
Ireland	230	19	68	29	1	4	1	402	50.3
Egypt	49	54	62	48	41	66	28	398	49.7
Syria	32	74	23	45	74	82	14	393	49.1
Lebanon	61	53	67	51	31	45	32	389	48.6
Malaysia	63	26	38	68	35	60	46	384	48
Nicaragua	25	37	77	32	15	65	45	338	42.3
Ghana	56	40	70	55	39	12	17	330	41.3
Netherlands	65	34	58	14	48	36	24	319	39.9
Chile	45	60	45	34	35	43	16	318	39.7
Jamaica	31	38	40	45	35	23	30	277	34.6
South Africa	29	39	55	27	37	11	43	275	34.4
El Salvador	44	56	14	47	25	31	22	273	34.1
Russia	22	44	83	13	31	18	28	273	34.1
Costa Rica	45	36	73	17	33	19	9	265	33.1
Ukraine	17	91	37	32	25	20	10	265	33.1
Other	844	843	786	772	568	748	381	5,648	706.0
Total	**10,177**	**9,253**	**10,078**	**8,961**	**8,477**	**8,858**	**7,669**	**72,541**	**9,067.6**

Table 5. Unit rejection rate for EU food and feed imports from Third Countries, 2002-2008

Country	Value of Exports 2002-08 (US$ million)	Moving Average				
		2002-04	2003-05	2004-06	2005-07	2006-08
Brazil	85,254	0.0122	0.0112	0.0096	0.0075	0.0049
United States	58,836	0.0058	0.0078	0.0150	0.0192	0.0202
Argentina	49,291	0.0062	0.0086	0.0095	0.0087	0.0070
China	28,370	0.0611	0.0580	0.0587	0.0616	0.0639
Norway	23,975	0.0023	0.0035	0.0038	0.0025	0.0014
Turkey	23,740	0.0722	0.0654	0.0588	0.0626	0.0672
Switzerland	17,093	0.0025	0.0031	0.0026	0.0028	0.0019
New Zealand	17,037	0.0018	0.0021	0.0027	0.0020	0.0015
South Africa	16,810	0.0000	0.0000	0.0000	0.0000	0.0000
Chile	16,711	0.0113	0.0111	0.0063	0.0049	0.0037
Indonesia	16,502	0.0282	0.0284	0.0273	0.0186	0.0106
Thailand	15,512	0.0608	0.0469	0.0425	0.0447	0.0325
Morocco	14,854	0.0117	0.0100	0.0075	0.0085	0.0073
Côte d'Ivoire	14,661	0.0034	0.0025	0.0040	0.0038	0.0041
Canada	14,557	0.0021	0.0031	0.0029	0.0038	0.0038
India	14,334	0.0654	0.0743	0.0598	0.0525	0.0431
Ecuador	12,858	0.0106	0.0078	0.0050	0.0024	0.0028
Colombia	12,432	0.0070	0.0072	0.0028	0.0023	0.0032
Australia	12,096	0.0025	0.0068	0.0088	0.0102	0.0075
Malaysia	11,142	0.0210	0.0173	0.0103	0.0080	0.0072
Vietnam	9,850	0.0883	0.0784	0.0733	0.0580	0.0263
Costa Rica	9,833	0.0003	0.0013	0.0018	0.0026	0.0021
Iceland	9,578	0.0005	0.0005	0.0005	0.0002	0.0004
Ukraine	9,278	0.0074	0.0102	0.0154	0.0213	0.0171
Israel	8,793	0.0056	0.0062	0.0073	0.0057	0.0066
Peru	8,507	0.0060	0.0061	0.0040	0.0060	0.0060
Russia	8,238	0.0073	0.0167	0.0225	0.0220	0.0122
Kenya	7,480	0.0012	0.0019	0.0024	0.0031	0.0036
Ghana	7,083	0.0310	0.0518	0.0627	0.0440	0.0274
Mexico	4,651	0.0095	0.0123	0.0088	0.0059	0.0034
Tunisia	4,566	0.0155	0.0172	0.0165	0.0181	0.0210
Philippines	4,167	0.0186	0.0239	0.0357	0.0382	0.0387
Cameroon	3,814	0.0023	0.0013	0.0007	0.0011	0.0011
Egypt	3,753	0.0808	0.0837	0.0549	0.0464	0.0512
Uruguay	3,678	0.0108	0.0091	0.0062	0.0075	0.0076
Mauritius	3,462	0.0024	0.0048	0.0046	0.0057	0.0025
Faroe Islands	3,381	0.0000	0.0000	0.0000	0.0000	0.0000
Nigeria	3,347	0.0170	0.0359	0.0543	0.0746	0.0686
Croatia	2,944	0.0083	0.0225	0.0264	0.0211	0.0169
Iran	2,809	0.8821	1.2313	0.9892	0.7234	0.4317
Papua New Guinea	2,770	0.0000	0.0009	0.0009	0.0009	0.0005
All Country Average	-	**0.0211**	**0.0240**	**0.0228**	**0.0210**	**0.0177**

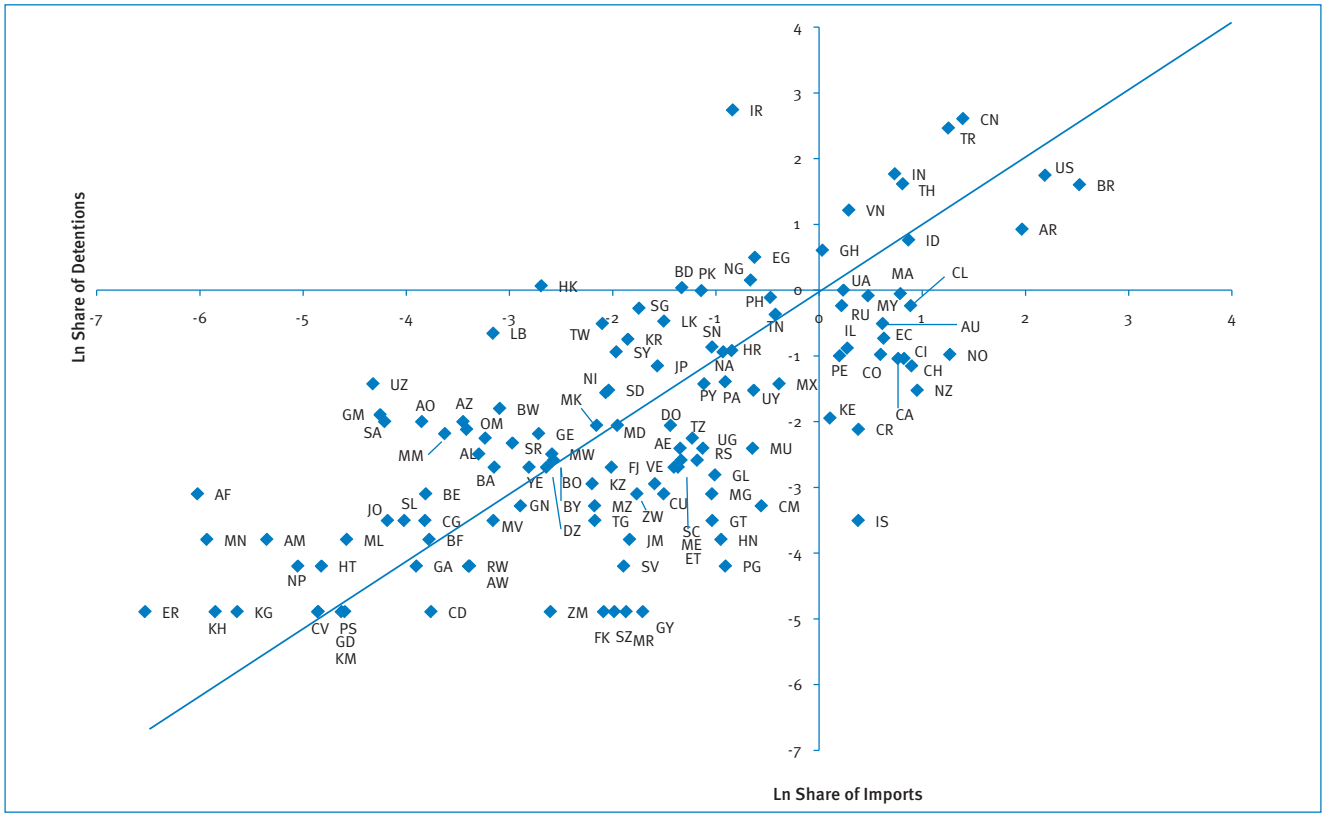
Note: Rejection rate in number of rejections per US$1 million converted at current exchange rate

Table 6. Unit rejection rate for US food imports, 2002-2008

Country	Value of Exports 2002-08 (US$ million)	Moving Average				
		2002-04	2003-05	2004-06	2005-07	2006-08
Canada	84,751	0.049	0.043	0.032	0.021	0.020
Mexico	60,929	0.246	0.212	0.187	0.156	0.120
China	24,846	0.263	0.234	0.194	0.172	0.133
France	20,773	0.162	0.117	0.086	0.056	0.041
Italy	18,569	0.106	0.101	0.086	0.080	0.072
Thailand	17,036	0.147	0.142	0.127	0.099	0.076
Chile	16,437	0.027	0.023	0.017	0.014	0.011
Brazil	14,825	0.096	0.078	0.064	0.044	0.031
Netherlands	14,170	0.028	0.018	0.020	0.015	0.016
United Kingdom	9,996	0.261	0.212	0.219	0.229	0.426
Indonesia	9,921	0.226	0.225	0.206	0.194	0.184
Colombia	9,581	0.057	0.071	0.068	0.046	0.030
India	8,360	0.726	0.767	0.849	0.902	0.767
Ecuador	7,873	0.052	0.047	0.055	0.058	0.040
Costa Rica	7,785	0.055	0.044	0.039	0.019	0.015
Australia	7,676	0.021	0.033	0.037	0.041	0.023
Vietnam	7,616	0.468	0.401	0.376	0.299	0.254
Spain	7,138	0.166	0.110	0.099	0.060	0.058
Germany	7,051	0.064	0.038	0.032	0.019	0.014
Guatemala	6,439	0.128	0.111	0.111	0.106	0.104
Philippines	5,728	0.458	0.432	0.257	0.229	0.187
Argentina	5,676	0.034	0.039	0.046	0.051	0.041
Malaysia	5,329	0.134	0.086	0.076	0.071	0.043
New Zealand	5,180	0.028	0.017	0.013	0.016	0.011
Peru	3,855	0.138	0.156	0.096	0.093	0.072
Japan	3,713	0.902	0.403	0.393	0.376	0.441
Côte d'Ivoire	3,320	0.008	0.005	0.002	0.004	0.004
Ireland	3,201	0.310	0.098	0.082	0.024	0.004
Sweden	3,054	0.029	0.022	0.013	0.008	0.012
Honduras	3,016	0.130	0.151	0.200	0.200	0.223
Austria	2,970	0.043	0.030	0.026	0.014	0.022
Russia	2,934	0.153	0.142	0.119	0.042	0.052
Taiwan	2,256	0.676	0.621	0.589	0.566	0.581
Belgium	2,098	0.092	0.063	0.040	0.025	0.017
Switzerland	2,042	0.076	0.067	0.056	0.086	0.051
South Korea	1,985	1.306	1.099	0.728	0.525	0.567
Dominican Republic	1,952	1.386	1.591	1.962	1.788	1.324
Denmark	1,906	0.049	0.062	0.055	0.153	0.133
Poland	1,762	0.774	0.499	0.397	0.306	0.193
Turkey	1,761	0.687	0.409	0.337	0.285	0.196
El Salvador	1,576	0.359	0.271	0.151	0.140	0.079
Nicaragua	1,512	0.286	0.284	0.222	0.155	0.146
South Africa	1,477	0.218	0.203	0.183	0.105	0.130
All Country Average	-	**0.175**	**0.142**	**0.119**	**0.115**	**0.089**

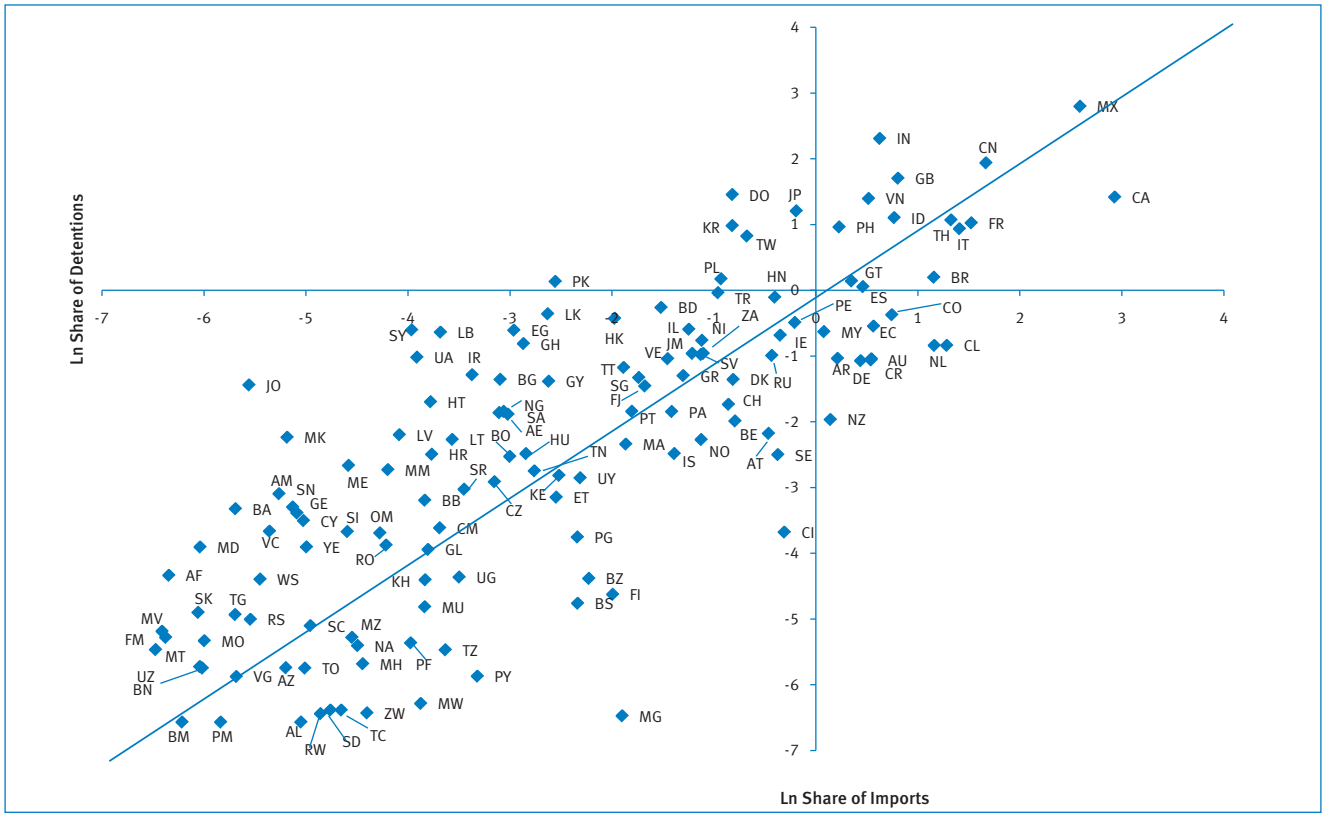
Note: Excludes meat and poultry

Figure 2. Share of EU rejections versus share of imports for food and feed products from third countries, 2002-2008 [18]



Note: Includes countries with annual exports of food and feed products of US$1 million or above and with non- zero rejections; €1 = US$1.46

Figure 3. Share of US rejections versus share of imports for food products, 2002-2008 [18]



Note: Includes countries with annual exports of food and feed products of US$1 million or above and with non- zero rejections. Excludes meat and poultry

[18] A list of abbrevations is provided in Annex 1.

Table 7. Reasons for EU rejections of food and feed products from Third Countries, 2002-08

Country	Mycotoxins	Microbiological contaminants	Veterinary drug residues	Heavy metals	Unauthorized food additives	Product composition	Pesticide residues	Migration	Industrial contaminants	GMO/novel food	Foreign bodies	Biotoxins/contaminants	Radiation	Organoleptic	Bad or insufficient controls	Parasitic infestation	Labelling	Packaging	Other chemical contamination	Allergens	Feed additives	Not determined/other	Total
Iran	2,041	1	0	3	9	0	15	0	1	0	4	0	0	0	0	0	2	0	0	0	0	3	2,079
China	503	89	286	300	139	77	25	229	86	41	45	8	31	26	14	12	20	14	12	3	0	109	2,069
Turkey	983	95	15	30	177	114	153	19	8	0	47	2	2	8	0	2	11	0	2	4	0	20	1,692
India	193	148	179	77	48	139	65	9	5	7	7	3	7	18	1	0	3	0	1	2	0	16	928
United States	340	32	8	18	48	36	5	0	15	206	13	0	43	7	8	4	13	1	7	3	3	26	836
Thailand	20	233	191	47	78	12	111	13	21	0	7	13	18	3	4	0	0	4	2	1	0	25	803
Brazil	178	234	78	29	70	4	12	2	1	1	5	3	3	11	16	6	4	19	3	1	13	22	715
Vietnam	20	147	186	46	26	28	8	1	30	1	3	13	5	5	7	2	0	1	0	1	0	16	546
Argentina	174	78	27	7	15	1	14	1	1	1	2	1	0	12	8	5	0	0	0	0	2	6	355
Indonesia	14	36	72	88	4	37	1	1	0	1	1	44	3	4	1	6	0	0	1	1	0	3	318
Ghana	91	13	0	5	11	101	0	0	8	0	5	0	0	6	6	0	4	4	0	0	0	8	262
Egypt	130	30	2	1	8	23	41	1	1	0	11	0	0	1	2	0	3	0	0	0	0	5	259
Hong Kong	4	6	0	57	19	5	0	57	10	4	1	0	4	3	0	0	1	0	2	0	0	6	179
Nigeria	90	13	0	10	16	18	0	0	1	0	7	0	1	2	2	1	1	0	0	0	0	2	164
Pakistan	56	10	4	3	19	55	1	0	0	0	3	0	0	6	0	0	1	0	0	1	0	1	160
Ukraine	8	22	27	7	6	6	9	0	17	0	23	3	4	5	13	0	2	2	0	1	0	4	159
Bangladesh	9	28	85	2	1	15	2	0	0	0	3	1	0	1	0	0	1	0	0	0	0	0	148
Morocco	5	44	0	15	17	1	30	1	4	0	1	14	0	4	5	1	2	2	1	0	0	0	147
Russia	8	7	9	2	9	65	0	1	5	0	0	0	4	2	7	1	0	6	1	0	0	10	137
Malaysia	6	70	11	2	6	5	1	1	7	0	0	13	0	0	1	0	3	0	0	0	0	3	129
Philippines	24	5	11	5	19	6	0	0	15	0	0	6	1	1	0	0	1	2	0	0	0	29	125
Singapore	11	1	1	89	3	1	0	0	2	1	2	0	3	0	0	0	0	0	0	3	0	0	117
Chile	3	38	16	17	9	3	18	1	1	0	2	1	0	0	2	1	0	1	1	0	0	2	116
Tunisia	1	31	0	8	24	0	1	0	2	0	16	1	0	4	6	2	4	1	0	0	0	6	107
Taiwan	0	0	33	13	4	0	9	24	2	0	0	0	1	0	0	2	0	0	0	0	0	14	102
Other	423	329	86	243	224	233	130	29	49	17	43	89	39	31	56	60	22	10	9	16	1	67	2,206
Total	**5,335**	**1,740**	**1,327**	**1,124**	**1,009**	**985**	**651**	**390**	**292**	**280**	**251**	**215**	**169**	**160**	**159**	**105**	**98**	**67**	**42**	**37**	**19**	**403**	**14,858**
% rejections	**40.0**	**13.0**	**10.0**	**8.4**	**7.6**	**7.4**	**4.9**	**2.9**	**2.2**	**2.1**	**1.9**	**1.6**	**1.3**	**1.2**	**1.2**	**0.8**	**0.7**	**0.5**	**0.3**	**0.3**	**0.1**	**3.0**	**-**

for 13 per cent of EU rejections and being referenced in over 12 per cent of US rejections. US rejections also made frequent reference to the broader concept of unsanitary or 'filthy', which was cited in 25 per cent of rejections.

Patterns and trends in rejections at the sub-commodity level

The focus thus far has been on patterns and trends in total rejections of food imports to the EU and the US. Not surprisingly, these results mask substantive differences across sub-commodities, and many of the more interesting results pertain to variations across these products. To date, the TSCR has undertaken analysis of rejections of four sub-commodities, namely fish and fishery products, fruits and vegetables, nuts and seeds, and herbs and spices. Collectively, these products capture the substantive food exports from most developing countries to the EU and/or US. Due to space constraints, only a summary of key findings is presented. However, more detailed results are available in a separate UNIDO publication.

Fish and fishery products

Over the period 2002 to 2008, the average number of rejections of fish and fishery products was 1,850 per annum in the US and

Table 8. Reasons for US rejections of food products, 2002-08

Country	Labelling	Unregistered process/ manufacturer	Filthy/unsanitary	Unauthorized food additives	Microbiological contaminants	Pesticide residues	Veterinary drug residues	Poisonous	Biotxins/contaminant	Product not approved/ no import permit	HACCP	Mycotoxins	Product composition	Foreign bodies	Other chemical contamination	Packaging	Allergens	Adulteration	Quality standards	Inadequate information	Radiation	Total
Mexico	3,328	475	3,476	1,475	1,328	2,109	16	135	5	27	114	91	14	17	10	14	7	1	8	0	0	**12,650**
India	3,829	1,246	1,722	1,346	1,532	454	16	48	2	28	0	37	15	38	10	4	4	1	1	0	0	**10,333**
United Kingdom	5,899	1,228	65	833	40	1	0	5	7	5	13	0	16	2	0	0	0	9	0	1	0	**8,124**
China	1,266	1,236	1,625	931	290	402	582	45	5	12	7	7	9	11	35	9	1	0	1	3	0	**6,477**
Canada	2,516	356	548	524	124	254	16	26	0	16	27	33	6	5	0	0	0	3	0	5	0	**4,459**
Japan	1,124	1,726	279	272	76	4	0	12	4	5	58	0	1	1	2	1	1	0	0	0	0	**3,566**
Vietnam	798	376	866	285	770	16	172	106	99	2	29	22	0	1	8	0	1	0	1	0	0	**3,552**
Dominican Republic	117	32	170	8	2	2456	0	4	5	15	0	0	1	0	0	2	0	0	0	0	0	**2,812**
Italy	1037	1268	215	68	63	10	0	11	0	4	6	1	5	1	0	0	0	0	1	0	0	**2,690**
South Korea	875	1068	181	299	129	13	0	8	0	7	49	0	2	1	1	0	2	0	0	0	0	**2,635**
Indonesia	335	347	949	82	600	0	120	56	95	6	2	3	13	0	0	1	0	0	0	0	0	**2,609**
France	725	561	186	83	541	22	0	16	0	371	0	1	0	0	0	1	0	0	0	0	0	**2,507**
Taiwan	707	693	398	436	153	14	11	10	42	5	1	2	4	13	5	4	1	1	0	0	0	**2,500**
Thailand	452	557	846	241	250	64	18	7	10	1	11	2	1	1	5	0	2	0	1	0	0	**2,469**
Philippines	455	662	624	353	210	10	0	26	43	4	0	3	7	1	3	6	0	0	0	0	0	**2,407**
Pakistan	589	298	98	150	154	15	0	13	0	7	0	3	5	1	0	3	0	0	0	0	0	**1,336**
Poland	608	513	19	81	1	55	0	0	0	0	13	0	4	0	0	0	0	1	0	0	1	**1,296**
Brazil	438	364	151	62	135	27	1	21	1	6	1	0	0	0	0	1	1	0	0	0	0	**1,209**
Turkey	513	358	67	70	66	17	0	7	0	4	0	11	0	0	0	5	0	2	0	0	0	**1,120**
Guatemala	521	134	37	52	11	306	0	0	0	4	1	4	8	0	0	0	0	2	0	0	0	**1080**
Spain	339	418	42	43	16	184	0	9	1	0	1	0	3	1	0	1	1	0	1	0	0	**1060**
Sri Lanka	464	240	89	80	42	2	0	10	5	1	2	0	0	0	1	1	0	0	0	0	0	**937**
Honduras	437	69	211	14	161	10	0	3	0	11	0	0	0	0	0	0	0	0	0	0	0	**916**
Other	9,462	4,015	3,034	1,318	1,200	598	95	232	92	69	72	39	118	15	7	20	18	12	16	1	0	**20,433**
Total	**36,834**	**18,240**	**15,898**	**9,106**	**7,894**	**7,043**	**1,047**	**810**	**416**	**610**	**407**	**259**	**232**	**109**	**87**	**73**	**39**	**32**	**30**	**10**	**1**	**99,177**
% rejections	**58.0**	**28.7**	**25.0**	**14.3**	**12.4**	**11.1**	**1.6**	**1.3**	**0.7**	**1.0**	**0.6**	**0.4**	**0.4**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**-**

383 per annum in the EU. In both the EU and the US, Vietnam, Indonesia, China, India and Thailand were among the countries with the greatest number of rejections, collectively accounting for over 45 per cent. In the US, the Philippines also recorded a large number of rejections, accounting for almost six per cent of the total.

Unit rejection rates, however, present a somewhat different picture. Over the period 2002 to 2008, high EU unit rejection rates for fish and fishery products were recorded by Vietnam, Indonesia, Sri Lanka and Malaysia. In all of these countries, however, the unit rejection rate declined over time more rapidly than the all-country average, suggesting appreciable improvements in compliance.[19] Morocco, Argentina, Ecuador, Chile, Namibia, Seychelles and Senegal all stand out as developing countries with large exports of fish and fishery products but that had low unit rejection rates. Countries with high US unit rejection rates included South Korea, Philippines, Taiwan, Guyana, Indonesia, Vietnam, Bangladesh, Japan, Spain and the United Kingdom. Among the developing countries with large exports of fish and

[19] While China, for example, had a relatively low unit rejection rate, this needs to be interpreted with some caution. Over much of the period 2002 to 2008, China faced additional controls on exports of certain fish and fishery products due to consistent non-compliance, for example with restrictions on veterinary drug residues.

fishery products, Chile, Thailand, Argentina, Mexico and Panama had unit rejection rates that were appreciably below the all-country average.

On the basis of relative rejection rates, Chile and Ecuador stand out as large exporters with good compliance performance in both the EU and the US. Conversely, Vietnam, Indonesia and Bangladesh exhibited relatively poor compliance performance. There were numerous minor exporters of fish and fishery products with particularly poor relative rejection rates, suggesting acute compliance problems, for example Ghana and Nigeria in the US and The Gambia, Benin, Fiji and Congo in the EU.

It is noteworthy that, while Thailand and China were large under-performing exporters in the case of the EU, they performed relatively well with exports to the US. Conversely, while Senegal recorded a relatively good compliance performance with (large) exports to the EU, it performed relatively poorly with its exports to the US, where it is a comparatively minor exporter. Arguably, such comparisons of relative rejection rates for particular commodities, in this case fish and fishery products, indicate destination-specific or exporter-specific compliance issues rather than more systemic weaknesses in compliance capacity.

Microbiological contamination was a major reason for EU and US rejections of fish and fishery products over the period 2002 to 2008, accounting for over 20 per cent of rejections in the EU and 29 per cent of US rejections. The related but more generic category of filthy/unsanitary was referenced in almost 50 per cent of rejections in the US; this category is not employed in the EU. In both the EU and the US, a relatively small proportion of rejections were related to concerns over the efficacy of process controls, whether generically or related specifically to hazard analysis and critical control point (HACCP).

Veterinary drug residues and heavy metals figured prominently in EU rejections of fish and fishery products, accounting for around 28 per cent and 20 per cent of rejections, respectively. Veterinary drug residues accounted for less than eight per cent of US rejections. At the same time, veterinary drug residues were a problem for a relatively small number of countries exporting to the EU, notably Vietnam, India, China, Thailand, Bangladesh and Indonesia; this reflects specific problems with residues of antibiotics in the products of aquaculture, notably shrimp.

Labelling and unregistered process/manufacturer were referenced in 20 per cent and 15 per cent of US rejections of fish and fishery products, respectively. Frequently these determinations were accompanied by other aspects of non-compliance, notably filthy/unsanitary and microbiological contamination.

Fruits and vegetables

Over the period 2002 to 2008, the number of EU rejections of fruits and vegetables was much lower than for fish and fishery products, although it increased appreciably over this period from 110 in 2002 to 353 in 2008. Conversely, fruits and vegetables accounted for the largest number of US rejections throughout the period, with an average of almost 2,800 rejections annually. From 2002 to 2008, however, the number of rejections of fruits and vegetables almost halved, from 3,182 in 2002 to 1,624 in 2008.

Turkey alone accounted for over 45 per cent of EU rejections of fruits and vegetables over the period 2002 to 2008. Other countries with significant numbers of rejections included China and Thailand. Most other countries had low levels of rejections. Mexico and the Dominican Republic accounted for a large share of US rejections of fruits and vegetables, representing almost 25 per cent and 13 per cent, respectively. A number of other countries had appreciable numbers of rejections, including China, India and Italy.

Aside from Turkey and China, most large exporters of fruits and vegetables to the EU had very low unit rejection rates. Among these countries were a number of developing nations, including Brazil, South Africa, Costa Rica, Morocco, Ecuador, Chile, Argentina and Colombia. While some middle-range exporters of fruits and vegetables, including Thailand, India, Tunisia, Ghana and Egypt, had relatively high unit rejection rates, most developing countries in this 'second tier' performed well. These countries included Kenya, Panama and Côte d'Ivoire.

Among significant exporters of fruits and vegetables to the US, the Dominican Republic, Italy and India had very high unit rejection rates, exceeding one rejection per US$1 million of exports. While China had a unit rejection rate that exceeded the all-country average, this was much lower than the aforementioned countries. It is worth noting that the all-country average was elevated appreciably by a small number of countries with extremely high unit rejection rates. Chile and Costa Rica stand out as developing countries that had very low unit rejection rates for fruits and vegetables.

Chile, Brazil, Argentina, Ecuador, Morocco, Mexico, Guatemala, Colombia and Peru (among others) had low relative rejection rates in both the EU and the US, suggesting that they have experienced limited compliance problems overall. Conversely, Turkey, India, Iran and Vietnam underperformed in the EU and the US, accounting for a greater proportion of rejections than their share of fruits and vegetable imports and suggesting systemic compliance issues. China's performance in both markets was marginal; its share of rejections just exceeded its share of imports over the period 2002 to 2008. Thailand had a high relative rejection rate for fruit and vegetable exports to the EU, but performed better with exports to the US.

Over the period 2002 to 2008, pesticide residues were a major cause of rejections of fruits and vegetables in both the EU and the US, accounting for 27 per cent of rejections in the EU and 33 per cent in the US. In the EU, mycotoxins and unauthorized food additives were also frequent causes of rejections, accounting for 24 per cent and 17 per cent, respectively, while the most frequently cited non-conformity in US rejections of fruits and vegetables was unregistered process/manufacturer, occurring in over 42 per cent of rejections, with labelling referenced in almost 30 per cent.

Nuts and seeds

Over the period 2002 to 2008, nuts and seeds (including nut and seed products) for human consumption were subject to the greatest number of EU rejections of all food and feed products, with an average of 669 annually. Of the 4,680 rejections over this period, Iran alone accounted for 43 per cent. Other countries with large numbers of rejections included Turkey, China and the US. These four countries collectively accounted for 75 per cent

of EU rejections. In stark contrast, there were relatively few US rejections, totalling only 1,043 from 2002 to 2008. India, Mexico and China accounted for 46 per cent of US rejections.

Of the largest exporters of nuts and seeds to the EU, Iran and China had the highest unit rejection rates. While Turkey had large numbers of rejections over this period, the magnitude of its exports meant that its unit rejection rate was quite low. Amongst smaller exporters, Brazil, Egypt, Nicaragua, Ghana and Thailand had high unit rejection rates. Of major exporters to the US, India and Mexico had the highest unit rejection rates. Vietnam and, especially, Brazil had relatively low unit rejection rates in the US.

In the EU, Iran, Brazil, Egypt, Ghana and Nigeria were clear under-performers on the basis of their relative rejections rates, accounting for a much higher share of rejections than their share of imports. In stark contrast, Brazil was one of the best performers amongst large exporters of nuts and seeds to the US. Countries with relatively good performance in nut and seed exports to the EU included the US, Turkey, Argentina, India, Vietnam and Chile. Iran and Nigeria had high relative rejection rates for nut and seed exports to the US, but were small exporters.

Of EU rejections of nuts and seeds over the period 2002 to 2008, 94 per cent were due to mycotoxins, totalling 4,502, Iran alone accounting for almost 45 per cent of nuts and seeds rejections. In contrast, mycotoxins were only referenced in 142 US rejections over the same period. The EU'S official controls on mycotoxins, and especially aflatoxins, and their impact on developing country exports of nuts and other food commodities have been widely discussed in the literature (see for example Diaz Rios and Jaffee, 2008; Otsuki *et al.*, 2001; Otsuki and Wilson, 2001).

The most frequent reasons for US rejections of nuts and seeds were labelling, referenced in 57 per cent of rejections, unregistered process/manufacturer and microbiological contaminants. The latter of these reasons was referenced in 168 rejections, accounting for 16 per cent of the total. Microbiological contaminants was the second most frequent reason for rejections of nuts and seeds in the EU over the period 2002 to 2008, accounting for 177 rejections.

Herbs and spices

India recorded the greatest number of rejections of herbs and spices in both the EU and the US over the period 2002 to 2008, accounting for 24 per cent and 39 per cent, respectively. Other countries with a large numbers of rejections included Thailand and Turkey in the EU, and Mexico, Pakistan, Indonesia, China and Vietnam in the US. Note that herbs and spices as a commodity group includes a great diversity of products. Thus, the patterns of rejections across countries very much reflected the types of herbs and spices exported and their associated compliance challenges.

Of the countries with appreciable exports of herbs and spices to the EU, Thailand stands out as having by far the highest unit rejection rate, approaching one rejection per US$1 million of exports. Other significant exporters with high rejection rates included India, Turkey, Morocco, Egypt and Sri Lanka. Countries with very low unit rejection rates included Madagascar, Israel, Brazil, Iran, Kenya, Chile and Guatemala; some of these countries did not record a single rejection over the period 2002 to 2008.

The US unit rejection rate for herbs and spices over the period 2002 to 2008 was much higher than any other of the commodities analysed here. Indeed, a number of countries, including India, Mexico, Sri Lanka, Canada Thailand and Guatemala, had unit rejection rates above one. Mexico, for example, had almost three rejections per US$1 million of exports over the period 2006 to 2008. Countries with low rejection rates included Madagascar, Brazil, Peru, Germany, Israel, Chile, France and Uganda.

In terms of relative rejection rates, China, Vietnam, Peru, Brazil and Chile were among the developing countries that had a good compliance performance for herbs and spices in both the EU and the US. Conversely, India, Pakistan and Thailand were relatively poor performers in both markets, accounting for a greater proportion of rejections of herbs and spices than their share of exports. In exports to the EU, other bad performers included Turkey, Thailand, Egypt and Ghana.

The main reason for EU rejections of herbs and spices was unauthorized food additives, accounting for almost 44 per cent of rejections.[20] In the US, unauthorized food additives were only referenced in five per cent of rejections. Microbiological contamination was a significant cause of rejections in both the US and the EU, being referenced in almost 58 per cent of US rejections and being the cause of 24 per cent of EU rejections. In the US, filthy/unsanitary was referenced in 16 per cent of rejections. Other frequent reasons for rejections included mycotoxins in the EU and labelling and unregistered process/manufacturer in the US.

Country-level analysis

While some caution needs to be taken not to over-interpret the EU and US rejection data, it is possible to build up a picture of the key compliance challenges faced by particular countries, and how these challenges compare to countries at a similar level of development. Here, Pakistan and Indonesia are presented as examples. The ultimate aim is for data to be made available through an Internet-based platform that would enable such analyses to be performed across a wide range of countries and commodities. Note that interpretation of the observed patterns and trends in rejections requires that further background research is undertaken; the rejection data for the two country examples simply reveal what has been repeated over the period 2002 to 2008, but not why the observed events have happened. The findings and conclusions are therefore to be taken as tentative only. This will be a focus of the on-going background research to the TSCR.

Both countries are interesting examples as they have taken bold policy decisions to upgrade export performance and quality infrastructure – supported by development partners – and compliance performance can be expected to improve significantly.

Pakistan

Figures 4 and 5 detail the number of rejections of Pakistani food product imports to the EU and the US from 2002 to 2008. Over this period, herbs and spices and cereals and cereal products (specifically rice) accounted for 33 per cent and 23 per cent, respectively,

[20] Mostly these were associated with specific problems with Sudan 1 and Sudan 4.

of EU rejections of Pakistani products. While herbs and spices were also the subject of significant numbers of US rejections, accounting for 27 per cent of the total, fruits and vegetables accounted for a greater proportion (29 per cent). From the outset, this suggests some degree of commonality, but also distinctions, in the compliance challenges faced by Pakistan in exporting to the EU and the US. Despite the fact that exports of herbs and spices to both the EU and the US were small, around US$3 million per year, these products were subject to numerous rejections in both markets. Conversely, while exports of fruits and vegetables to the EU were much greater than exports to the US over the period 2002 to 2008, the number of rejections was much lower: 11 in the EU compared to 218 in the US.

It is important also to examine the time profile of EU and US rejections of food imports from Pakistan. For example, while Pakistan experienced numerous rejections of herbs and spices over the period 2002 to 2008 as a whole, predominantly these were in the period to 2004, since when the number of rejections has declined appreciably. Most of these rejections were associated with unauthorized food colourings or aflatoxins. Similarly, there were almost no rejections of rice prior to 2006, while in 2008 these accounted for 60 per cent of the total. These rejections were almost all associated with aflatoxins.

By comparing the rejection history of Pakistan to that of lower middle-income countries as a whole, it is possible to make more general observations on its relative performance. Table 9 reports the unit rejection rate for all food and the four sub-commodities that have been analysed separately, for the EU and the US. Note that these measures are not truly comparable between the EU

Figure 4. Number of EU rejections of food and feed exports from Pakistan, 2002-2008

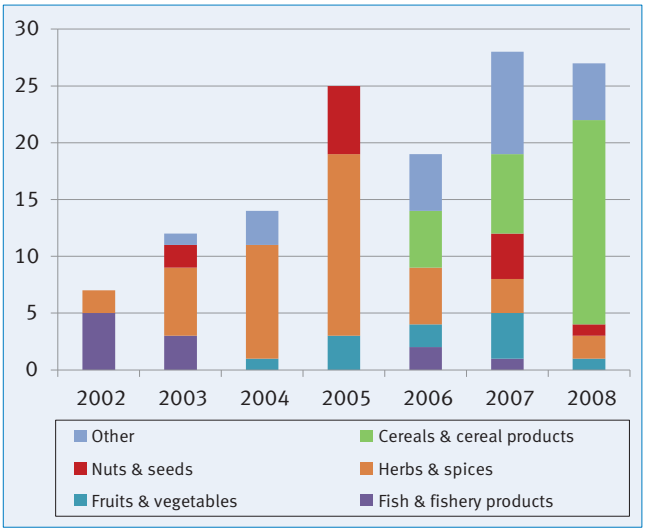


Figure 5. Number of US rejections of food and feed exports from Pakistan, 2002-2008

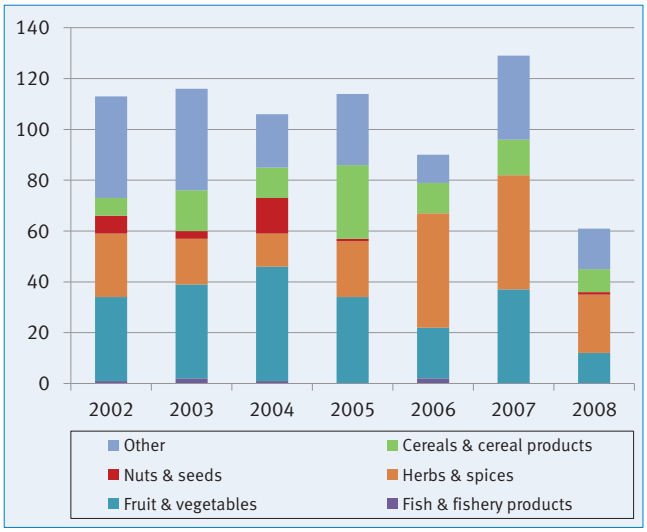


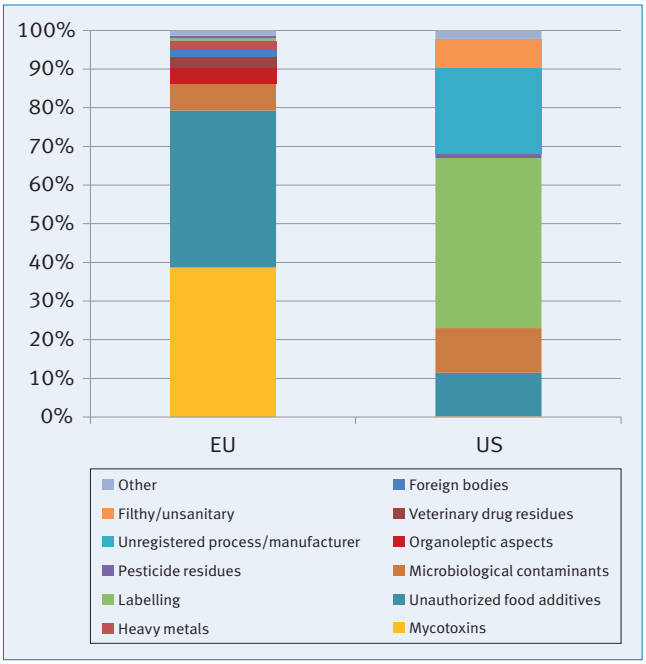
Table 9. Average unit rejection rate for EU and US imports of food products from Pakistan, 2002-2008

Commodity	EU		US	
	Pakistan	Lower Middle-Income Countries	Pakistan	Lower Middle-Income Countries
Total	0.06397	0.04340	2.30268	0.23776
Fish & fishery products	0.05728	0.04430	0.25474	0.15249
Fruits & vegetables	0.04016	0.01320	8.02788	0.31426
Herbs & spices	2.25346	0.19766	7.88467	0.90038
Nuts & seeds	0.27613	0.46420	37.55098	0.16948

Table 10. Relative rejection rate for EU and US imports of food products from Pakistan, 2002-2008

Commodity	EU		US	
	Pakistan	Lower Middle-Income Countries	Pakistan	Lower Middle-Income Countries
Total	3.48	2.13	15.33	1.64
Fish & fishery products	3.58	1.81	1.51	0.98
Fruits & vegetables	3.12	1.08	35.98	1.42
Herbs & spices	15.95	1.42	11.93	1.40
Nuts & seeds	1.63	2.43	237.94	1.22

Figure 6. EU and US rejections of food and feed imports from Pakistan by reason, 2002-2008



and the US, and the primary focus should be on the unit rejection rate across products within either the EU or the US and/or the rate recorded by Pakistan compared to lower middle-income countries in general.

At the level of food products as a whole, Pakistan had a higher unit rejection rate than all lower middle-income countries, especially in the US, suggesting greater compliance challenges than was typical for countries at a similar level of development. This relatively high rejection rate was observed across all of the sub-commodities, with the one exception of nut and spice imports to the EU, where Pakistan's unit rejection rate was appreciably lower than for lower middle-income countries in general. Note that the unit rejection rate for fruits and vegetables, herbs and spices and nuts and seeds imports to the US were all extremely high, reflecting the fact that, while the value of trade was limited, there were appreciable numbers of rejections. For example, over the period 2002 to 2008 there were a total of 191 rejections of herbs and spices, representing almost eight rejections for every US$1 million of imports.

The relative rejection rate (Table 10) broadly presents the same pattern of relative rejection performance, but does permit more reliable comparisons between exports to the EU and the US. As with all lower middle-income countries, Pakistan accounted for a greater proportion of rejections than of food imports in both the EU and the US. In the case of the EU, Pakistan's relative rejection rate was appreciably higher even than for all lower middle-income countries, most notably for herbs and spices where the share of rejections was almost 16 times greater than the share of imports. Again the one exception was nuts and seeds, for which Pakistan's relative rejection rate was lower than that for lower middle-income countries in general. Much higher relative rejection rates were observed for fruits and vegetables and, especially, nuts and seeds in the US than in the EU. While Pakistan recorded its best rejection performance overall in the case of fish and fishery product exports to the US, the rate of rejection was still appreciably higher than for lower middle-income countries more generally.

Figure 6 details the reasons for rejections of Pakistani imports of food products to the EU and the US over the period 2002 to 2008. Compliance issues clearly differed markedly between the EU and the US. In the EU, mycotoxins accounted for around 35 per cent of rejections, but were a virtual non-issue in the US. Unauthorized food additives, specifically colouring, accounted for a further 34 per cent of EU rejections, but only 11 per cent of US rejections. In the US, 44 per cent of rejections were due to contravention of labelling requirements, and a further 22 per cent were associated with unregistered processes/manufacturers.

Taken as a whole, these results suggest that Pakistan faced considerable compliance challenges in both the EU and the US. Across all commodities, Pakistan's share of rejections exceeded its share of imports. With the one exception of nut and seed imports to the EU, lower middle-income countries in general performed better. While the nature of the compliance challenges differed across commodities, the chief problems were associated with mycotoxins and product composition in the EU, and labelling and unregistered processes/manufacturers in the US. Finally, the results suggest that the severity of the compliance challenges faced by Pakistani food exports varied significantly between the EU and the US. Thus, Pakistan's compliance performance, as indicated by the relative rejection rate, was better in the EU than the US for all food and for fruits and vegetables and nuts and seeds. Conversely, its compliance performance for fish and fishery products and herbs and spices was greater in the US than in the EU. Pakistan has since engaged in an ambitious effort to improve compliance performance and develop quality infrastructure services to assess product conformity, and this will bear fruit in the years to come.

Indonesia

As another lower middle-income country, Indonesia provides a useful comparator to the rejection performance of Pakistan, but also a somewhat different profile of rejections across commodities. Thus, fish and fishery products accounted for 86 per cent and 78 per cent of Indonesia's EU and US import rejections, respectively, over the period 2002 to 2008 (Figures 7 and 8). The one other commodity that recorded significant numbers of rejections over this period was herbs and spices, accounting for five per cent of EU rejections and three per cent of US rejections.

For all food products, Indonesia's unit and relative rejection rates were lower than those for lower middle-income countries as a whole (Tables 11 and 12) and also than those for Pakistan. Its compliance performance was greatest for fruits and vegetables and herbs and spices, with relative rejection rates of appreciably less than one. Conversely, the unit and relative rejection rates for Indonesian exports of fish and fishery products to both the EU and the US were much higher than those for all lower middle-income countries, and also than those for Pakistan. This suggests that, while Indonesia apparently faced lesser compliance challenges than were typical for countries at a similar level of development, it incurred considerable problems in the specific instance of fish and fishery products.

Comparison of the time profile of EU and US rejections brings out some important contrasts. While rejections of fish and fishery products declined appreciably in the case of the EU, reaching low levels by 2008, US rejections remained at high levels, although with appreciable year-on-year variations throughout

Figure 7. *Number of EU rejections of food and feed exports from Indonesia, 2002-2008*

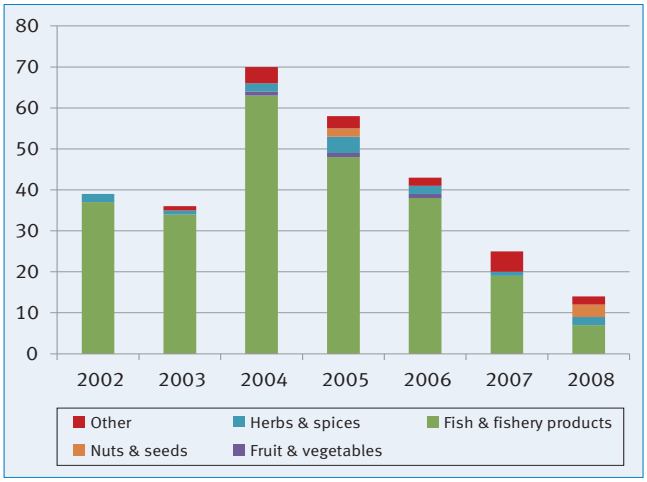
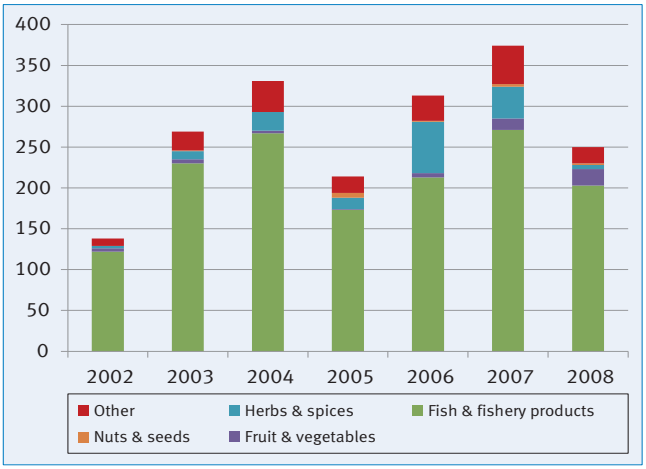


Figure 8. *Number of US rejections of food and feed exports from Indonesia, 2002-2008*



the period 2002 to 2008. Reflecting this, total EU rejections of food and feed products from Indonesia declined dramatically from 2004 to 2008, while in the US there was no discernable downwards trend. In the EU, the primary factors driving fish and fishery products rejections were heavy metals and antibiotic residues, problems that Indonesia has evidently largely addressed. This contrasts with on-going rejections in the US due to poor sanitation/hygiene and resultant microbiological contamination.

Figure 9. *EU and US rejections of food and feed imports from Indonesia by reason, 2002-2008*

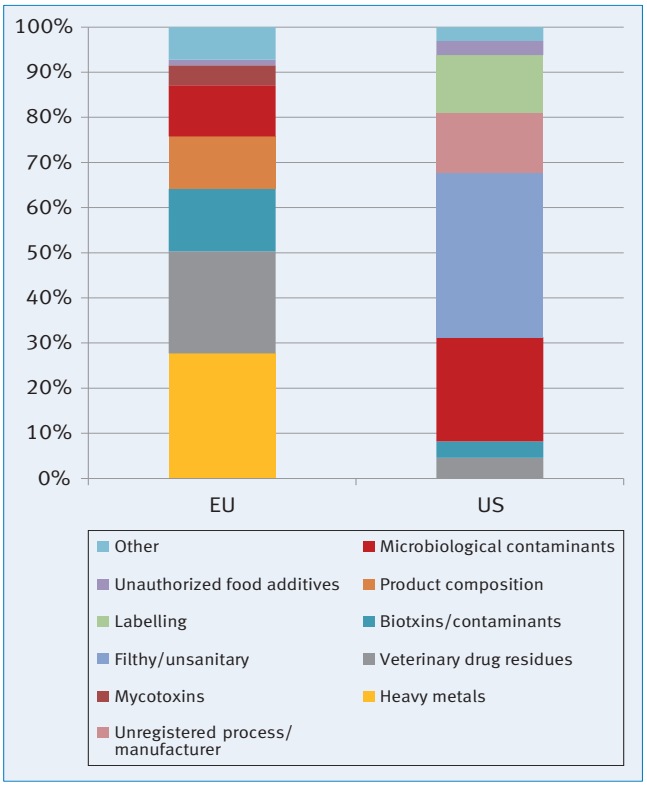


Table 11. *Average unit rejection rate for EU and US imports of food products from Indonesia, 2002-2008*

Commodity	EU		US	
	Indonesia	Lower Middle-Income Countries	Indonesia	Lower Middle-Income Countries
Total	0.02048	0.04340	0.19690	0.23776
Fish & fishery products	0.13295	0.04430	0.32148	0.15249
Fruits & vegetables	0.00509	0.01320	0.10815	0.31426
Herbs & spices	0.03305	0.19766	0.31891	0.90038
Nuts & seeds	0.02079	0.46420	0.25332	0.16948

Table 12. *Relative rejection rate for EU and US imports of food products from Indonesia, 2002-2008*

Commodity	EU		US	
	Indonesia	Lower Middle-Income Countries	Indonesia	Lower Middle-Income Countries
Total	0.98	2.13	1.40	1.64
Fish & fishery products	5.53	1.81	2.06	0.98
Fruits & vegetables	0.39	1.08	0.73	1.42
Herbs & spices	0.24	1.42	0.47	1.40
Nuts & seeds	0.12	2.43	2.15	1.22

As with Pakistan, there were major differences in the compliance challenges faced by Indonesian food exports to the EU and the US, which, as shown above, are largely associated with fish and fishery products. Collectively, heavy metals, veterinary drug residues and biotoxins/contaminants accounted for around 64 per cent of rejections (Figure 9). In the US, there were no rejections due to heavy metals over the period 2002 to 2008, while veterinary drug residues and biotoxins/contaminants accounted for less than 10 per cent. The main reasons for US rejections were filthy/unsanitary and microbiological contaminants, which collectively accounted for 59 per cent.

In summary, while Indonesia represents a better performing lower middle-income country in terms of rates of border rejections in both the EU and the US, the one commodity where it has experienced significant problems is fish and fishery products. In the EU, these problems have largely been addressed, such that rejections of all food products are now at low levels. US rejections of fish and fishery products, however, remain at levels that are more typical for lower middle-income countries as a whole. Here the main issue is evidently standards of hygiene/sanitation.

For several years, Indonesia has made, and is continuing to make significant investments in the development of compliance capacities and in quality infrastructure, with support from development partners.

Synthesis and comparative analysis

The analysis presented above demonstrates how border rejection data can provide broad indications of the compliance performance of substantive exporters of agri-food products to the EU and/or the US, both in aggregate and for particular agri-food sub-commodities. Looking across the results, a number of themes emerge:

- There are significant differences in the patterns of rejections between the EU and the US, reflecting patterns of trade and distinct food safety requirements and associated systems of enforcement. For example, EU rejections have been dominated by products that contravene restrictions on levels of mycotoxins, while in the US non-compliance with labelling and company/process registration requirements has been a frequent cause of rejections.
- A large proportion of rejections, both in total and across the four commodities, are attributable to a relatively small number of countries. In the EU, the developing countries recording the highest numbers of rejections are Iran, China, Turkey, India and Thailand. Countries with large numbers of US rejections include Mexico, India, China, Dominican Republic, Vietnam, Indonesia and Thailand.
- In order to examine the compliance performance of developing countries, attention must focus on the unit and relative rejection rates. For example, Mexico has had a large number of US rejections, predominantly because of the volume of its agri-food exports, but its unit rejection rate, while above the all-country average, has been much lower than for a number of other large developing country exporters, such as India, Vietnam and the Philippines, for example, which have had high rejection rates in both the EU and the US. Other countries have performed relatively well in one market, but less well in the other. For example, China has had the highest unit rejection rate of major agri-food exporters to the EU, but a much lower rate of rejection in exports to the US.
- For some countries, high levels of rejections are observed across a number of food commodities. For example, India has had a high relative rejection rate in both the EU and the US for all foods, fish and fishery products, fruits and vegetables and herbs and spices. For these countries, presumably compliance with export market food safety and related requirements has been a general problem. The poor compliance performance of other countries has been restricted to particular commodities, suggesting localized capacity constraints. For example, Iran had the largest number of EU rejections of any country over the period 2002 to 2008, but this was almost entirely down to large numbers of rejections of nuts and seeds.
- A number of countries, many of which are major exporters of agri-food products, have had a good compliance performance in both the EU and the US and across most (if not all) of the agri-food commodities they export. Examples include Chile, Argentina, Ecuador and South Africa. Presumably, these countries have relatively well-developed compliance capacity in general.
- Numerous (indeed the majority) of countries have sporadic rejections. Care needs to be taken in interpreting these data. Thus, very large rejections in any one year provide an indication of acute compliance problems. Examining these rejections in the context of trade flows in subsequent years shows the degree to which the country has been able to 'recover'. Conversely, the scattering of large numbers of low levels of rejections should largely be regarded as 'noise' and not a reliable indicator of prevailing compliance capacity.

While these broad trends are a very considerable source of insight, in examining the performance of any one country it is very easy to get lost in the various metrics that are presented above. To get over this problem, a summary measure of compliance performance across products and export markets – the Relative Rejection Rate Indicator (RRRI) – is presented. This is very much 'work in progress', and the results should be interpreted with some caution. In future issues of the TSCR, this measure will be refined and its validity tested.

The RRRI provides a summary of the performance of each country relative to the average rejection rate for particular products in each market.[21] In this way, the RRRI aims to maximize the

[21] The RRRI for each country-product-export-market combination and for total food exports by country and export market is derived as follows:
1. The ratio of the proportion of rejections to the appropriation of imports is calculated in the same manner as the relative rejection rate described above.
2. For countries with positive rejections, the ratio derived in 1 above is converted into natural logarithms in order to generate a normal distribution. Countries with zero rejections are labelled 'none'.
3. The natural logarithms are divided into three equal groups to create a tercile distribution. Countries in the highest tercile are labelled 'high', middle tercile are labelled 'medium', and bottom tercile are labelled' low'.

comparability of the rejection data between the EU and the US and across products. Thus, the RRRI indicates whether a country performs relatively well/badly overall and identifies areas of particularly good/poor performance. In this way it is possible to identify where general compliance capacity is weak or where compliance is an issue for particular products or export markets. This is important information for the allocation and design of technical assistance aimed at trade capacity-building. The RRRI is being first applied to the period 2002 to 2008 in order to identify longer-term compliance issues and to minimize the 'noise' created by the large scatter of small numbers of rejections across exporters.

Annex 2 reports the RRRI for each country with substantive exports of total food and/or any of the four commodities on which the analysis has focused. Where cells are empty there were zero or trivial exports over the period 2002 to 2008. Increasing performance is indicated by the progression from none through low and medium to high. Taking some countries as an illustration:

- **Brazil** had a low relative rejection rate for all food exports to the EU and the US. However, it had a high and medium rejection rate for fishery product exports to the EU and the US, respectively. Its rejection rate for nuts and seeds was classed as medium. In both the EU and the US, Brazil had a low rejection rate for fruits and vegetables and herbs and spices.
- **Chile** had a relative rejection rate classed as low or none for all food commodity exports to the EU and the US, with the one exception of fish and fishery products, which was classed as medium.
- The relative rejection rate for all food exports from **China** was classified as high for the EU and medium for the US. Of the four food commodities included in the analysis, China's relative rejection rate was low in the US and medium in the EU.
- **Iran** had a high relative rejection rate for fruit and vegetable and nut and seed exports to the EU, but a low rejection rate for herb and spice exports. Its relative rejection rate for fruit and vegetable and nut and seed exports to the US, conversely, was medium.

Turning to the two case study countries as further examples, the RRRI suggests that Pakistan had a high rejection rate for all food exports to both the EU and the US. In the US, it had a high rejection rate for all four of the sub-commodities with the exception of fish and fishery products, which are classified as medium. Rejections of its fish and fishery products in the EU were also categorized as medium, while EU rejections of nuts and seeds were relatively lower than US rejections. Indonesia performed better than Pakistan in both the EU and the US for all food imports and for all of the four sub-commodities. The one exception was fish and fishery product exports to the EU, which were categorized as high for Indonesia and medium for Pakistan. Rejections were categorized as low for fruits and vegetables, nuts and seeds, and herbs and spices in the case of the EU, and fruits and vegetables and herbs and spices in the case of the US.

While reiterating that caution needs to be applied when interpreting the values of the RRRI, remembering that these values reflect the nature and quality of the underlying data, they do provide a convenient summary of patterns of compliance performance of countries across export products and markets. In so doing, the RRRI provides a very broad initial indicator of both the degree to which countries struggle with compliance and the specific areas where problems are most acute.

The RRRI thus provides a valuable tool to support policy decisions and decision makers in capacity-building and technical assistance efforts.

Way forward

The analysis presented above represents the most in-depth analysis of border rejection data, with a specific focus on developing countries, for the EU and the US to date. Further analysis of these data, specifically focused on the value of losses associated with border rejections, is presented later in this report. As a whole, this analysis is, however, intended to be just the starting point in what aims to be on-going reporting of compliance performance as indicated by rejection data in coming issues of the TSCR. In the future, more disaggregated analysis for a number of agri-food commodities will be presented, while ways are examined in which patterns and trends in rates of rejections can be used to examine the need for and impacts of capacity-building efforts and the benchmarking of public goods aspects of compliance capacity. In moving forward, it is anticipated that there will be two threads to the on-going analysis.

The first will be further work on border rejection data, in particular extending the analysis to include other industrialized countries, notably Japan, Canada and Australia. This will enable a more complete picture of the compliance performance of developing countries to be identified and variation across markets to be understood better. There will also be a focus on particular agri-food commodities that are of significance to substantive sub-sets of developing countries.

The second thread of this further work aims both to validate the patterns and trends revealed by the rejection data and to begin explaining these patterns and trends. There will be a particular focus on relating rejections to the status of compliance capacity of exporting countries. It is envisaged that a series of in-depth case studies will be undertaken with countries according to the portfolio of values of the RRRI. Thus, the cases might include countries with very product-specific, sector-specific or exporter-specific compliance problems and with more systematic weaknesses in compliance, which would reflect on their quality infrastructure capabilities. It is envisaged that this further analysis, with in-depth case studies, will be reported over future issues of the TSCR. This will enable the identification of patterns and trends in rejection rates to be related to changes in levels of compliance capacities and for compliance performance to be benchmarked across developing countries, thus providing a detailed quantified analysis for capacity-building investment at both supply-side and quality infrastructure levels.

2. Big or Small Money – How significant are Border Rejections for Developing Countries?

Introduction

The analysis of border rejections suggests that a number of developing countries face challenges complying with food safety and other requirements in exporting to the EU and the US. While counts of the number of rejections have utility in indicating where challenges are most acute (for example, across export markets and products) and how these challenges change over time, they do not demonstrate the scale of the problem faced by developing countries, both individually and in aggregate. Thus, do these rejections represent a small or a large proportion of the value of their agri-food exports? Is the dollar value of these rejections in the tens or hundreds of millions, so that improvements in compliance performance would yield appreciable benefits in terms of allayed export losses?

In principle, data from the EU's RASFF and the US's OASIS databases permit estimation of the value of food products rejected due to non-conformity with the food safety and other requirements that are enforced through border inspection. Thus, both databases report the volume of rejected consignments, the value of which can be imputed through the use of unit values derived from trade data. Indeed, estimates of the value of border EU and/or border US rejections derived in this way are reported in the literature for particular commodities, namely fish and fishery products (Ababouch *et al.*, 2005) and groundnuts (Diaz Rios and Jaffee, 2008). These estimates suggest the value of rejections is relatively small. More general estimates (Jaffee and Henson, 2004) have also been made on the basis of expert opinion of the proportion of a range of agri-food exports that are subject to border refusal. These estimates, however, put the value of losses in the billions of dollars.

In this chapter new and more comprehensive estimates of the value of losses due to border rejections are presented for both the EU and the US. This first comprehensive analysis has been made possible by the access to the raw RASFF and OASIS data given to UNIDO by DG Sanco and the US FDA. Specifically, two value measures are estimated by applying the unit value[22] of imports into the EU or the US to the volume of rejections as recorded in these databases:

1. Absolute value of rejected consignments in US$ million.
2. Relative value of rejected consignments as a proportion of the value of imports.[23]

These estimates are derived for fish and fishery products, fruits and vegetables and products, nuts and seeds and nut and seed products, and herbs and spices. (Henceforth, 'fruits and vegetables' will be understood to include fruit and vegetable products, and likewise with 'nuts and seeds'.) The estimates thus permit the scale of the losses to developing countries to be assessed, and also comparisons to be made of the value of losses across commodities and between imports into the EU and the US.

Beyond providing an indication of the degree to which developing countries should be concerned about the scale of the losses they entail due to border rejections per se, these estimates could have considerable utility in estimating the likely benefits from improvements in compliance capacity, and in guiding the allocation of technical assistance resources across export commodities. At the same time, it is important to recognize the limitations of rejection data as an indicator of compliance performance, as has already been discussed earlier in this report. Thus, rejections represent the 'tip of the iceberg' of the problems faced by developing countries in complying with food safety and other requirements in export markets. For example, these data provide no indication of the scale of potential exports curtailed due to real or perceived weaknesses in compliance capacity. That is, they relate to trade that actually occurs rather than potential trade opportunities that are not exploited. The results presented below need to be interpreted with these provisions in mind.

Methods

Before outlining the procedure by which estimates of the value of rejections were derived, it is necessary to assess the quality of the volume data provided by the RASFF and OASIS databases. There are two potential problems here: first, instances of volume being recorded in spurious units that were incompatible with unit values derived from trade data that are in US$ per Kg (for example litres, number of items, etc.); and, second, the degree to which data on the volume of rejected consignments were missing. Whilst the RASFF systematically records the volume of rejected consignments[24], this information is only subject to voluntary disclosure in the case of the US FDA. Indeed, Buzby *et al.* (2008) question the validity of using the OASIS data for estimating the value of rejections, due to a potentially large amount of missing data.

[22] Derived by dividing the value of imports (in US$) by the volume (in Kg).

[23] Note that, throughout, rejections are expressed as a proportion of the value of imports, in aggregate and by particular countries, into the EU or the US. This reflects the fact that import data for the EU and the US are employed in this analysis.

[24] Note that the RASFF data used in this analysis relates only to border rejections and excludes withdrawals of products from the market that were included in the analysis of rejections reported earlier in this report. In this regard, the RASFF and OASIS data employed here are more directly comparable.

Table 1. Spurious units and missing data for volume of rejected consignments in RASFF and OASIS databases

Commodity	Missing Data (%)	Spurious Units (%)	Total (%)
RASFF			
Fish and Fishery Products	3.93	0.98	4.91
Fruits and Vegetables	2.20	0.63	2.83
Nuts and Seeds	1.21	0.12	1.33
Herbs and Spices	4.41	0.00	4.41
OASIS			
Fish and Fishery Products	0.04	12.79	12.82
Fruits and Vegetables	0.03	4.89	4.92
Nuts and Seeds	0.19	10.46	10.65
Herbs and Spices	0.03	8.41	8.44

The degree of both spurious units and missing data is evidently not a significant problem with either the RASFF or OASIS data. Thus, the amount of missing and/or spurious data was less than five per cent with the RASFF data (Table 1) and between five and 13 per cent with the OASIS data. Contrary to prior expectations, the major problem with the OASIS data was spurious rather than missing data. Although, in principle, much of this data could have been converted into kilograms, the time needed to undertake this task was prohibitive. Hence, spurious data in both the RASFF and OASIS databases was treated as missing.

The absolute and relative values of losses due to EU and US border rejections were estimated at the country level as follows:

1. The total volume of rejections for each of the four commodity groups was estimated in metric tonnes (MT) on the basis of the recorded values. With the OASIS data, the recorded values were clearly incorrect in a number of instances, being orders of magnitude greater than any other rejections of the respective products, and were adjusted accordingly.
2. The unit value of imports for each of the four commodity groups was estimated from US and EU import data.[25] These values were computed by dividing the value of imports (in US$) by the volume of imports (in metric tonnes).
3. The absolute value of detained consignments (in US$ million) was estimated by multiplying the volume (from Stage 1) by the unit value (from Stage 2).
4. The relative value of detained consignments (in per cent) was estimated by dividing the absolute value (from Stage 3) by the total value of imports.

Data on the volume of product rejections were available for the periods 2002 to 2008 for the US but only 2004 to 2008 for the EU. To permit comparison between the EU and the US, therefore, the analysis below was restricted to the period 2004 to 2008.

[25] Trade data were derived from the US Foreign Agricultural Service (FAS) Global Agricultural Trade System (GATS) (http://www.fas.usda.gov/gats/default.aspx) and Eurostat's Community External Trade Statistics (COMEXT) (http://epp.eurostat.ec.europa.eu/newxtweb/).

Broad patterns and trends

Figures 1 to 4 report the absolute and relative values of EU and US detentions of the four commodities in the analysis over the period 2004 to 2008. Over this period, the mean value of detentions was US$72.1 million per annum in the EU and US$71.0 million per annum in the US. The similarity of these values suggests that, despite the appreciable differences in rates of deten-

Figure 1. Trend in value of EU rejections of food products, 2004-2008

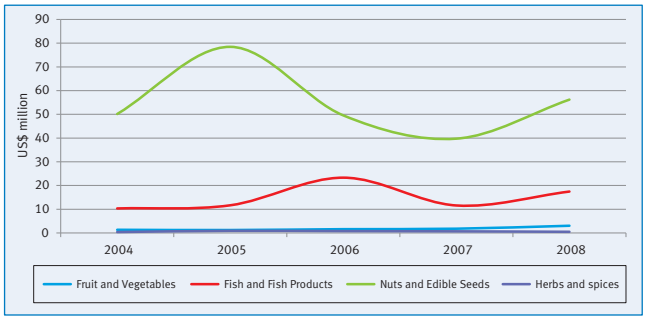


Figure 2. Trend in value of US rejections of food products, 2004-2008

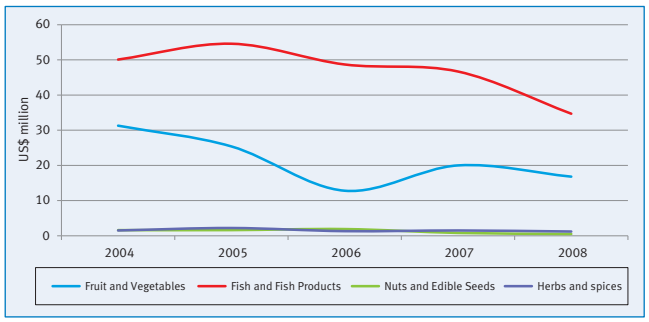


Figure 3. Trend in value of EU rejections of food products as a proportion of the value of imports, 2004-2008

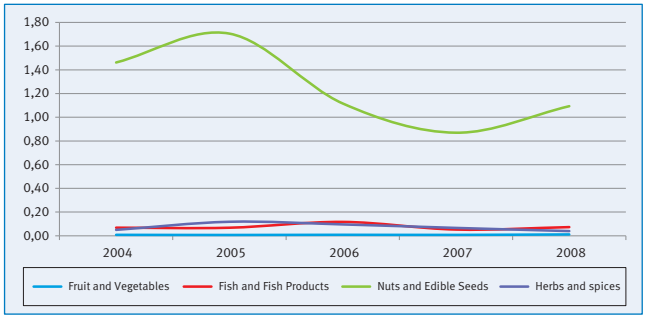
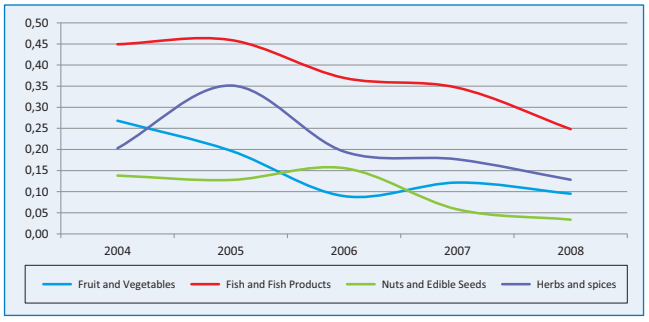


Figure 4. Trend in value of US rejections of food products as a proportion of the value of imports, 2004-2008



tion between the EU and the US described earlier in this report, the burden imposed on developing countries as a whole was remarkably similar.

Across the four commodities, EU detentions were dominated by nuts and seeds, the annual value of which varied between US$39.7 million and US$78.5 million, with a mean of US$54.8 million. As a proportion of the total value of nut and seed imports, however, detentions were relatively small, varying from 0.87 per cent to 1.71 per cent, with a mean of 1.25 per cent ('per cent of the value of imports' should always be understood in this text to refer to the total imports of the relevant commodity). Detentions of the other commodities were negligible, accounting for less than 0.1 per cent of the value of imports of these commodities over the 2004 to 2008 period.

Fish and fishery products and fruits and vegetables accounted for a large proportion of the total value of US rejections. The value of fish and fishery product rejections averaged US$47.0 million per annum over the period 2004 to 2008, accounting for between 0.25 per cent and 0.46 per cent of the value of imports. The value of fruit and vegetable rejections varied widely over this period, from US$12.8 million in 2006 to US$31.3 million in 2004, accounting for between 0.09 per cent and 0.27 per cent of the value of imports. The absolute value of nut and seed and herb and spice rejections were negligible over the period 2004 to 2008, although herb and spice rejections did account for up to 0.35 per cent of the value of imports.

So how credible are these estimates of the value of rejections? On the one hand, the fact that the aggregate value of losses for the EU and the US are so close gives some credence to the analysis in terms of the estimates' broad order of magnitude; if there had been very large differences in the aggregate value of detentions between the EU and the US, questions could legitimately have been raised over their validity. On the other hand, these values seem rather low, especially in comparison with some prior estimates. Notably, Jaffee and Henson (2004) estimate the value of rejections of agri-food products in world trade over the period 2001 to 2002 at US$3.8 billion, of which developing countries accounted for US$1.8 billion.[26] This suggests that US rejections, for example, were valued at US$456 million.[27] This estimate compares with US$84.5 million in 2004 according to the current analysis.[28] It should be noted, however, that there are reasons to expect that the Jaffee and Henson (2004) estimate is significantly higher[29], suggesting that the current more in-depth analysis and estimates should be given greater credence.

Fish and fishery products

The absolute values of EU and US rejections of fish and fishery products over the period 2002 to 2008 are reported in Tables 2 and 3. Tables 4 and 5 report rejections as a proportion of the value of imports, with countries having a relative value of border rejections of one per cent or above itemized separately.

Table 2. Value of EU rejections of fish and fishery products, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
Indonesia	0.9	0.4	1.9	0.8	8.1	**12.0**
Australia	0.0	0.7	10.7	0.3	0.0	**11.7**
Vietnam	1.0	3.3	1.8	0.6	0.6	**7.3**
China	0.4	0.9	0.9	1.9	1.3	**5.3**
India	0.6	1.1	1.1	0.8	1.4	**5.1**
Bangladesh	0.4	0.3	1.4	0.5	0.8	**3.4**
Russia	2.0	0.8	0.1	0.1	0.0	**2.9**
Greenland	0.0	0.0	0.1	0.0	2.0	**2.1**
Other	4.9	4.1	4.9	6.2	2.3	**22.5**
Total	**10.3**	**11.6**	**23.3**	**11.6**	**17.4**	**74.3**

Table 3. Value of US rejections of fish and fishery products, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
China	3.5	6.9	21.5	13.2	7.9	**53.0**
Vietnam	12.0	9.7	6.7	8.3	6.1	**42.8**
Indonesia	7.2	6.3	5.8	6.3	5.6	**31.2**
Bangladesh	6.3	3.8	1.0	0.8	1.9	**13.8**
India	3.5	3.8	2.0	1.8	0.5	**11.6**
Thailand	2.3	2.6	1.7	2.5	1.6	**10.7**
Honduras	0.0	7.9	0.2	0.0	0.1	**8.2**
Taiwan	1.9	1.3	0.9	1.6	2.0	**7.7**
Philippines	2.2	1.3	0.6	1.7	1.2	**7.0**
Mexico	1.7	1.2	1.0	0.6	0.7	**5.2**
Brazil	1.2	0.5	0.5	0.5	2.2	**4.9**
Japan	1.6	0.0	1.2	1.2	0.0	**4.0**
Chile	0.7	0.6	0.6	1.8	0.1	**3.8**
Malaysia	0.5	1.1	0.4	0.8	1.0	**3.8**
Ecuador	0.1	0.8	0.7	0.9	0.4	**2.9**
Canada	0.5	0.4	0.8	0.1	0.2	**2.0**
Other	4.9	6.5	3.2	4.5	3.1	**22.2**
Total	**50.1**	**54.7**	**48.7**	**46.7**	**34.7**	**234.8**

[26] These estimates are based on trade estimates of the proportion of food products in world trade that are detained and RASFF and OASIS data.

[27] In 2001-2002, the US accounted for approximately 12 per cent of world food imports.

[28] While this analysis only covers four commodities, these accounted for 72 per cent of EU rejections and 56 per cent of US rejections over the period 2002 to 2008.

[29] For example, more detailed analysis of EU rejections of groundnuts due to mycotoxins over the period 2004 to 2005 suggests that only 0.5 per cent of imports were intercepted, valued at US$2.7 million in 2004 and US$ 3.2 million in 2005 (Diaz Rios and Jaffee, 2008). Mycotoxins in nuts (of which groundnuts were a major part) accounted for 38 per cent and 34 per cent of total EU rejections of food and feed in 2004 and 2005, respectively. This implies that EU rejections over this period were of a much lower magnitude than implied by Jaffee and Henson (2004). Further evidence that the value of border rejections of food products is relatively low is provided by Ababouch *et al.* (2005). Estimates are provided of the value of Japanese rejections of fish and fishery products in 2001 and 2002 as US$1.1 million and US$ 2.2 million, respectively. The detained consignments represent a very small proportion of total imports, accounting for 0.0083 per cent in 2001 and 0.016 per cent in 2002.

Table 4. Value of EU rejections of fish and fishery products as a proportion of the value of imports, 2004-2008 (%)

Country	Value of Imports into EU 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Australia	183.2	0.08	1.41	26.49	1.29	0.00	**6.40**
Benin	3.1		6.08	3.71	0.00	0.00	**3.26**
Angola	85.1	0.00	3.41	1.85	2.75	0.00	**1.97**
Total	-	**0.07**	**0.12**	**0.05**	**0.07**	**0.08**	**0.07**

Note: Blank cells reflect zero imports.

Table 5. Value of US rejections of fish and fishery products as a proportion of the value of imports, 2004-2008 (%)

Country	Value of Imports into US 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Ghana	15.3	113.52	14.87	1.20	0.81	7.92	**27.66**
Cape Verde	0.2	64.6		0.00		0.00	**21.53**
Haiti	2.0	7.52	6.65	0.00	82.21	0.00	**19.28**
The Gambia	0.1		0.00	62.87	0.00	0.00	**15.72**
Palau	1.2		0.00	0.12	16.84		**5.65**
Guinea	0.8	3.23	20.15	0.12	0.53	0.37	**4.88**
Sierra Leone	0.6	21.77	0.00	0.00	0.00	1.67	**4.69**
Nigeria	3.6	2.2	6.63	3.40	5.47	0.10	**3.56**
Croatia	5.8	15.82	0.00	0.00	0.00	0.43	**3.25**
Liberia	0.4				6.13	0.00	**3.07**
Lithuania	4.8	9.85	2.02	2.75	0.00	0.00	**3.66**
Brunei Darussalam	11.8	0.00	14.58	0.00	0.00	0.00	**2.92**
Hong Kong	62.3	4.68	0.95	3.72	3.23	0.26	**2.57**
Mozambique	4.6	0.00	0.00	10.10	0.00		**2.53**
Iran	16.3	0.46	1.02	0.92	9.21	0.00	**2.32**
Côte d'Ivoire	0.6	0.60	6.82	0.000	1.50	1.23	**2.03**
Bangladesh	800.3	3.57	2.7	0.54	0.52	1.42	**1.75**
Germany	28.0	0.00	8.52	0.00	0.00	0.00	**1.70**
El Salvador	55.5	0.09	1.17	0.16	5.37	0.66	**1.49**
Vietnam	3,296.0	2.12	1.54	1.02	1.2	0.8	**1.34**
Uganda	20.1	5.86	0.00	0.00	0.00	0.00	**1.17**
United Arab Emirates	111.8	0.90	0.53	0.61	3.31	0.00	**1.07**
Taiwan	666.6	1.38	1.00	0.77	1.24	1.29	**1.14**
Honduras	733.5	0.00	5.12	0.14	0.00	0.06	**1.06**
Total	-	**0.45**	**0.46**	**0.37**	**0.35**	**0.25**	**0.38**

Note: Blank cells reflect zero imports.

Table 6. Value of EU rejections of fish and fishery product imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	1.9	4.6	4.3	2.5	1.7	**15.0**
Lower middle-income	2.5	3.5	5.7	5.5	13.0	**30.2**
Upper middle-income	5.1	2.6	2.1	2.8	0.3	**13.0**
High-income OECD	0.3	0.8	11.1	0.4	0.3	**12.9**
High-income non-OECD	0.5	0.2	0.1	0.4	2.0	**3.2**
Total	**10.3**	**11.7**	**23.3**	**11.6**	**17.5**	**74.3**
Per cent of Value of Imports into EU (%)						
Low-income	0.12	0.26	0.20	0.10	0.07	**0.14**
Lower middle-income	0.07	0.07	0.10	0.08	0.17	**0.11**
Upper middle-income	0.14	0.07	0.05	0.06	0.01	**0.06**
High-income OECD	0.01	0.01	0.17	0.01	0.00	**0.04**
High-income non-OECD	0.05	0.02	0.01	0.03	0.16	**0.06**
Total	**0.07**	**0.07**	**0.12**	**0.05**	**0.07**	**0.08**

Table 7. Value of US rejections of fish and fishery product imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	19.4	13.9	8.2	9.6	9.2	**60.3**
Lower middle-income	19.5	30.6	32.9	27.6	17.7	**128.3**
Upper middle-income	5.6	5.3	3.3	5.0	4.9	**24.1**
High-income OECD	2.7	2.9	2.3	1.6	0.4	**9.9**
High-income non-OECD	2.9	2.0	2.0	3.1	2.4	**12.4**
Total	**50.1**	**54.7**	**48.7**	**46.7**	**34.7**	234.9
Per cent of Value of Imports into US (%)						
Low-income	2.23	1.58	0.83	0.99	0.90	**1.31**
Lower middle-income	0.42	0.59	0.54	0.45	0.26	**0.45**
Upper middle-income	0.24	0.22	0.12	0.17	0.18	**0.19**
High-income OECD	0.09	0.10	0.07	0.05	0.01	**0.06**
High-income non-OECD	0.79	0.57	0.56	0.93	0.69	**0.71**
Total	**0.45**	**0.46**	**0.37**	**0.35**	**0.25**	0.38

EU rejections of fish and fishery products over the period 2004 to 2008 were valued at US$74.3 million, with an annual average of US$14.9 million. Overall, rejections of fish and fishery products accounted for a negligible proportion of the value of imports at 0.07 per cent. Countries with substantial rejections over this period included Indonesia and Australia, each valued at around US$12 million. In the case of Australia, rejections accounted for 6.4 per cent of the value of its exports into the EU. Other countries with a high relative value of rejections included Benin and Angola. All of these countries were minor exporters of fish and fishery products into the EU.

Over the period 2004 to 2008, total US rejections of fish and fishery products were valued at US$234.9 million, with an annual average of US$47.0 million or 0.40 per cent of the value of fish and fishery product imports into the US. Countries with substantial rejections by value included China, Vietnam and Indonesia, although, as a proportion of the value of the imports of their products into the US, these were negligible. A number of small exporters to the US had extremely high relative values of rejections, including Ghana, Cape Verde, Haiti and The Gambia.

Tables 6 and 7 report the values of fish and fishery product rejections by country income group[30] in absolute terms and as a proportion of the value of imports of their goods into the EU and the US. In both the EU and the US, lower middle-income countries accounted for the largest proportion of rejections by value. However, it was low-income countries, most of which were relatively minor exporters of fish and fishery products into the EU and/or the US, which had the highest relative value of rejections, most notably in the US where rejections accounted for 1.24 per cent of the value of imports.

[30] Country income groupings based on World Bank List of Economies (July 2009). Available at: http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS.

Fruits and vegetables

Tables 8 to 11 report the absolute and relative values of EU and US fresh fruit and vegetable rejections over the period 2004 to 2008. Whilst EU detentions were very low over this period, valued at US$9.0 million and accounting for only 0.01 per cent of the value of imports, US rejections were much greater, valued at US$106.4 million and accounting for 0.16 per cent of the value of imports. Over this period, however, the value of US fruit and vegetable rejections declined appreciably, from US$25.5 million to US$16.8 million, and from 0.27 per cent to 0.10 per cent of the value of imports.

Table 8. Value of EU rejections of fruits and vegetables, 2004-2008

Country	2004	2005	2006	2007	2008	Total
Turkey	0.7	0.8	1.1	1.1	1.8	**5.6**
China	0.2	0.1	0.1	0.1	0.5	**0.9**
Argentina	0.0	0.0	0.0	0.1	0.1	**0.3**
Iran	0.0	0.1	0.1	0.0	0.1	**0.3**
Other	0.3	0.3	0.3	0.6	0.5	**2.0**
Total	**1.3**	**1.2**	**1.6**	**1.8**	**3.0**	9.0

Table 9. Value of US rejections of fruits and vegetables, 2004-2008

Country	2004	2005	2006	2007	2008	Total
China	7.3	11.2	1.9	1.1	5.2	**26.7**
Mexico	11	4.4	4.5	2.9	1.8	**24.6**
Thailand	0.3	5.9	0.8	0.3	0.2	**7.5**
Brazil	5.2	0.1	1.1	0.9	0	**7.3**
Argentina	1.6	0.2	0.3	4.4	0.3	**6.8**
Iran	0.1	0.1	1.1	2.9	0.7	**4.9**
Dominican Republic	0.2	0.1	0.3	0.4	3.3	**4.3**
Chile	0.1	0.1	0.2	0.8	1.3	**2.5**
Turkey	1.4	0.2	0.3	0.3	0.2	**2.4**
Peru	0.0	0.4	0.2	1.3	0.2	**2.1**
Other	4.1	2.8	2.1	4.7	3.6	**17.3**
Total	**31.3**	**25.5**	**12.8**	**20.0**	**16.8**	106.4

Table 10. Value of EU rejections of fruits and vegetables as a proportion of the value of imports, 2004-2008

Country	Value of Imports into EU 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Afghanistan	6.2	11.01	0.00	0.00	0.00	0.00	**1.71**
Kazakhstan	1.4	0.00	0.00	0.00	4.60	0.00	**1.21**
Nigeria	8.9	2.77	0.04	0.01	1.00	0.00	**0.72**
Uzbekistan	35.5	1.06	2.00	2.35	0.00	0.00	**0.66**
Total	-	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**

Note: Blank cells reflect zero imports.

Table 11. Value of US rejections of fruits and vegetables as a proportion of the value of imports, 2004-2008

Country	Value of Imports into US 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Saudi Arabia	2.2	27.2	0.71	14.01	13.49	6.17	**12.32**
Slovenia	0.5	0.00	0.00	48.11	0.00	0.00	**9.62**
Cyprus	1.0	48.09	0.00	0.00	0.00	0.00	**9.62**
Lithuania	1.1	34.84	1.07	0.00	0.00	0.00	**7.18**
Mozambique	0.2	0.00			0.00	20.05	**6.68**
Afghanistan	0.3			0.00	16.47	1.32	**5.93**
Austria	10.80	0.00	0.00	18.65	0.00	0.01	**3.73**
Iran	118.5	3.88	0.63	4.97	5.33	3.10	**3.58**
Jordan	5.1	4.96	8.04	1.69	2.65	0.37	**3.54**
Pakistan	21.0	2.74	0.21	0.34	13.71	0.07	**3.41**
Algeria	3.4	1.61	0.00	0.00	9.15	3.61	**2.87**
Cameroon	0.4	0.00	0.00	10.55	3.35	0.00	**2.78**
Serbia and Montenegro	15.3	3.57	0.44	1.15			**1.72**
Syria	7.0	0.85	2.21	2.45	2.31	0.61	**1.69**
Ukraine	13.8	1.55	1.06	4.44	0.38	0.87	**1.66**
Croatia	15.8	2.87	0.00	0.00	3.86	0.31	**1.41**
Dominican Republic	295.2	0.44	0.21	0.52	0.63	5.18	**1.40**
Samoa	8.9	6.96	0.00	0.00	0.00	0.00	**1.39**
Armenia	6.5	0.16	2.26	1.97	2.38	0.00	**1.35**
Tunisia	6.5	3.60	0.67	0.27	1.05	0.35	**1.19**
Jamaica	119.6	1.04	0.63	0.74	2.86	0.57	**1.17**
Russia	8.8	0.69	0.03	1.41	2.50	0.75	**1.08**
Total	-	**0.27**	**0.20**	**0.09**	**0.12**	**0.10**	**0.16**

Note: Blank cells reflect zero imports.

The only country with appreciable EU rejections of fruits and vegetables was Turkey. In the case of the US, China and Mexico accounted for 48.2 per cent of fruit and vegetable rejections. Largely, countries for which rejections accounted for a significant proportion of the value of imports of their goods were minor exporters into the EU and/or US. The main exceptions were Iran and the Dominican Republic, for which rejections accounted for 3.58 per cent and 1.40 per cent of the value of imports into the US, respectively.

Across all country income groupings, rejections of fruits and vegetables accounted for an insignificant proportion of the value of imports into the EU over the period 2004 to 2008 (Table 12). In the case of imports into the US, lower middle-income countries had the highest relative value of fruit and vegetable rejections, accounting for 0.33 per cent of the value of imports (Table 13). Rejections of fruit and vegetable imports from low-income and high-income non-OECD countries accounted for 0.19 per cent of the value of imports into the US, appreciably greater than those for high-income countries, for which rejections accounted for only 0.04 per cent of the value of imports.

Table 12. Value of EU rejections of fruit and vegetable imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.2	0.1	0.2	0.0	0.1	**0.6**
Lower middle-income	0.3	0.2	0.2	0.4	0.7	**1.8**
Upper middle-income	0.8	0.9	1.1	1.4	2.2	**6.5**
High-income OECD	0.0	0.0	0.0	0.0	0.0	**0.0**
High-income non-OECD	0.0	0.0	0.0	0.0	0.0	**0.1**
Total	**1.3**	**1.2**	**1.6**	**1.8**	**3.0**	**9.0**
Per cent of Value of Imports into EU (%)						
Low-income	0.00	0.00	0.00	0.00	0.00	**0.00**
Lower middle-income	0.00	0.00	0.00	0.00	0.01	**0.00**
Upper middle-income	0.03	0.02	0.03	0.00	0.01	**0.01**
High-income OECD	0.01	0.00	0.00	0.00	0.01	**0.01**
High-income non-OECD	0.01	0.01	0.01	0.01	0.02	**0.01**
Total	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**

Table 13. Value of US rejections of fruit and vegetable imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.4	0.3	0.1	0.3	0.1	**1.2**
Lower middle-income	8.6	17.8	4.3	5.9	7.9	**44.5**
Upper middle-income	20.5	6.2	7.6	12.0	7.8	**54.1**
High-income OECD	1.3	1.1	0.8	1.5	0.8	**5.5**
High-income non-OECD	0.4	0.1	0.1	0.3	0.2	**1.1**
Total	**31.3**	**25.5**	**12.8**	**20.0**	**16.8**	**106.4**
Per cent of Value of Imports into US (%)						
Low-income	0.36	0.24	0.05	0.21	0.08	**0.19**
Lower middle-income	0.38	0.72	0.16	0.17	0.20	**0.33**
Upper middle-income	0.30	0.08	0.09	0.12	0.08	**0.13**
High-income OECD	0.06	0.04	0.03	0.05	0.03	**0.04**
High-income non-OECD	0.30	0.07	0.07	0.33	0.20	**0.19**
Total	**0.27**	**0.20**	**0.09**	**0.12**	**0.10**	**0.16**

Nuts and seeds

Over the period 2004 to 2008, EU rejections of nuts and seeds were valued at US$274.1 million, averaging US$54.8 million annually (Table 14). In contrast, US rejections over this period were only valued at US$6.4 million (Table 15). EU nut and seed rejections were dominated by Iran, which accounted for almost 62 per cent of the total. Other countries with appreciable rejections included Turkey, US and China. Note that the dominant cause of the high value of EU rejections was the implementation of harmonized limits on aflatoxins in nuts, which in the case of Iran were the cause of high levels of rejections of pistachios.

Overall, EU border rejections of nuts and seeds over the period 2004 to 2008 accounted for 1.24 per cent of the value of imports (Table 16). Rejections of Iranian nuts and seeds accounted for almost 17 per cent of the value of imports into the EU, although with some evidence of a decline over this period. A number of countries also had EU rejections with a high relative value, including Ethiopia, Zambia, Russia, Sudan, Uganda and Malawi, although all of these countries were minor exporters into the EU. The only other significant exporters of nuts and seeds to the EU for which rejections accounted for more than one per cent of the value of imports were Brazil and Azerbaijan. Most countries for which US border rejections accounted for a significant proportion of the value of imports, for example El Salvador, Bangladesh and Senegal (Table 17), were insignificant exporters into the US that incurred one-off problems with non-compliance or where compliance problems led to imports being curtailed.

By far, the country income group with the highest absolute and relative values of nut and seed rejections in the EU was lower middle-income countries (Table 18), almost entirely due to

Table 14. Value of EU rejections of nuts and seeds, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
Iran	41.2	60.4	27.4	16.5	23.9	**169.4**
Turkey	2.9	7.0	8.7	10.9	7.7	**37.2**
United States	2.0	3.5	6.9	6.5	10.2	**29.0**
China	1.2	1.6	1.8	2.4	7.0	**13.9**
Argentina	0.5	0.4	0.9	0.5	1.0	**3.4**
Brazil	0.3	1.0	1.0	0.3	0.8	**3.3**
India	0.7	0.7	0.1	0.5	0.6	**2.6**
Egypt	0.2	0.3	0.3	0.2	0.8	**1.9**
Azerbaijan	0.0	1.1	0.7	0.0	0.0	**1.8**
Russia	0.0	0.0	0.0	0.1	1.6	**1.7**
Australia	0.0	0.0	0.0	0.6	0.9	**1.5**
South Africa	0.0	0.4	0.4	0.2	0.4	**1.3**
Other	1.1	2.2	1.4	1.1	1.3	**7.1**
Total	**50.1**	**78.5**	**49.5**	**39.7**	**56.2**	**274.1**

the high value of rejections experienced by Iran. If Iran is excluded, however, the value of EU rejections of nuts and seeds from lower middle-income countries declines to US$24.6 million, accounting for 0.56 per cent of the value of imports. In contrast to the other commodities for which estimates are derived here, low-income countries had the lowest relative value of rejections. Lower middle-income countries also had the highest relative value of US rejections for nuts and seeds (Table 19), although rejections only accounted for 0.16 per cent of the value of imports into the US, compared with 3.59 per cent in the case of imports into the EU.

Table 15. Value of US rejections of nuts and seeds, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
India	0.4	0.6	0.7	0.1	0.1	**1.9**
China	0.4	0.3	0.4	0.0	0.1	**1.2**
Mexico	0.1	0.3	0.4	0.2	0.3	**1.3**
Other	0.7	0.4	0.4	0.5	0.0	**2.0**
Total	**1.6**	**1.6**	**1.9**	**0.8**	**0.5**	**6.4**

Table 16. Value of EU rejections of nuts and seeds as a proportion of the value of imports, 2004-2008

Country	Value of Imports into EU 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Ethiopia	0.20		0.00	0.00	284.01	0.00	**127.55**
Zambia	0.00	0.00	0.00	86.09			**27.93**
Russia	9.1	0.00	0.00	0.00	9.38	75.08	**18.78**
Iran	1,004.2	18.72	30.20	14.28	8.08	12.69	**16.86**
Sudan	7.10	13.98	5.63	15.94	4.61	0.00	**8.57**
Uganda	0.30	0.00	85.65	0.00	0.00	0.00	**6.09**
Malawi	15.7	0.00	10.35	9.15	4.51	1.74	**5.40**
Hong Kong	1.20	0.00	0.00	0.17	15.90	0.00	**3.21**
Bangladesh	0.20	0.00	0.00	0.98	5.77	9.89	**3.19**
Syria	25.0	39.26	1.11	2.25	1.03	2.55	**2.37**
United Arab Emirates	2.10	26.67	0.00	0.00	0.00	0.00	**2.37**
Saudi Arabia	0.40	38.31	0.00	0.00	0.00	0.00	**2.37**
Egypt	81.1	1.73	1.79	2.22	1.41	3.85	**2.29**
Kyrgyzstan	3.80	0.00	0.00	0.00	0.00	3.61	**2.26**
Paraguay	18.2	0.00	2.75	1.94	1.00	3.14	**2.24**
Nigeria	4.10	0.44	7.40	1.41	3.10	1.27	**2.13**
Mali	1.00	17.75	0.00	0.00	0.00	0.00	**2.10**
Pakistan	41.5	0.00	13.40	0.00	0.37	0.05	**2.01**
Serbia	0.20		0.00	0.00	0.00	2.75	**1.96**
Kuwait	0.30			4.71	0.00	0.00	**1.81**
Uzbekistan	5.30	5.13	0.00	12.99	0.00	0.00	**1.53**
Japan	5.40	0.00	0.00	0.00	0.00	6.42	**1.48**
Afghanistan	8.10	0.00	6.14	0.00	0.00	0.00	**1.35**
Azerbaijan	151.6	0.00	1.60	2.16	0.00	0.00	**1.18**
Brazil	302.3	0.62	1.38	1.78	0.50	1.05	**1.09**
Total	**-**	**1.46**	**1.71**	**1.12**	**0.87**	**1.09**	**1.24**

Note: Blank cells reflect zero imports.

Table 17. Value of US rejections of nuts and seeds as a proportion of the value of imports, 2004-2008

Country	Value of Imports into US 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
El Salvador	0.0		329.89	0.00	0.00		**109.96**
Bangladesh	0.1		188.75	0.00	0.00	0.00	**47.19**
Senegal	0.0			36.00		0.00	**18.00**
Saudi Arabia	0.1			1.30	45.61	0.00	**15.64**
Jordan	0.3	15.21	0.00	31.72	30.91	0.00	**15.57**
Iran	7.0	20.37	0.00	7.48	2.95	0.00	**6.16**
Ghana	0.5		0.00		12.75	0.00	**4.25**
Armenia	0.4	0.00	0.00	15.04	0.00	0.00	**3.01**
Monaco	0.0		3.00				**3.00**
Honduras	0.3	0.00	0.00	10.89	0.00	0.00	**2.18**
Colombia	1.5	0.00	0.00	0.72	7.31	0.00	**1.61**
Taiwan	5.5	0.03	0.09	0.84	4.71	0.04	**1.14**
Switzerland	2.9	5.42	0.00	0.00	0.00	0.00	**1.08**
Total	-	**0.14**	**0.13**	**0.16**	**0.06**	**0.04**	**0.11**

Note: Blank cells reflect zero imports.

Table 18. Value of rejections of EU nut and seed imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.0	0.6	0.4	0.5	0.2	**1.7**
Lower middle-income	44.1	65.5	31.1	20.1	33.2	**194.0**
Upper middle-income	3.8	8.8	11.0	12.0	11.5	**47.2**
High-income OECD	2.0	3.5	6.9	7.1	11.3	**30.7**
High-income non-OECD	0.1	0.1	0.3	0.0	0.0	**0.5**
Total	**50.1**	**78.5**	**49.5**	**39.7**	**56.2**	**274.1**
Per cent of Value of Imports into EU (%)						
Low-income	0.04	0.42	0.26	0.24	0.06	**0.19**
Lower middle-income	4.96	5.90	3.05	1.78	2.63	**3.59**
Upper middle-income	0.33	0.50	0.66	0.73	0.58	**0.57**
High-income OECD	0.16	0.22	0.43	0.46	0.71	**0.41**
High-income non-OECD	0.72	0.43	1.44	0.18	0.06	**0.49**
Total	**1.46**	**1.71**	**1.12**	**0.87**	**1.09**	**1.24**

Table 19. Value of rejections of US nut and seed imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.1	0.0	0.0	0.1	0.0	**0.2**
Lower middle-income	1.0	1.0	1.3	0.2	0.2	**3.7**
Upper middle-income	0.5	0.5	0.5	0.4	0.3	**2.2**
High-income OECD	0.1	0.0	0.0	0.1	0	**0.2**
High-income non-OECD	0.0	0.0	0.0	0.1	0.1	**0.2**
Total	**1.6**	**1.6**	**1.9**	**0.8**	**0.6**	**6.5**
Per cent of Value of Imports into US (%)						
Low-income	0.03	0.01	0.01	0.02	0.01	**0.02**
Lower middle-income	0.22	0.21	0.30	0.04	0.03	**0.16**
Upper middle-income	0.12	0.12	0.12	0.09	0.06	**0.10**
High-income OECD	0.00	0.12	0.09	0.34	0.02	**0.11**
High-income non-OECD	0.09	0.01	0.01	0.07	0.02	**0.04**
Total	**0.14**	**0.13**	**0.16**	**0.06**	**0.04**	**0.11**

Table 20. Value of EU rejections of herbs and spices, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
India	0.1	0.3	0.1	0.4	0.2	**1.0**
Brazil	0.0	0.2	0.2	0.0	0.1	**0.5**
Vietnam	0.0	0.0	0.2	0.1	0.0	**0.3**
Other	0.3	0.4	0.3	0.2	0.2	**1.4**
Total	**0.4**	**0.9**	**0.8**	**0.7**	**0.5**	**3.2**

Table 21. Value of US rejections of herbs and spices, 2004-2008 (US$ million)

Country	2004	2005	2006	2007	2008	Total
India	0.6	0.7	0.3	0.8	0.4	**3.6**
Mexico	0.1	0.1	0.2	0.1	0.1	**1.0**
Peru	0.1	0.4	0.1	0.0	0.2	**0.9**
Sri Lanka	0.0	0.2	0.4	0.1	0.0	**0.7**
Brazil	0.2	0.1	0.0	0.1	0.0	**0.7**
Turkey	0.1	0.0	0.1	0.1	0.1	**0.6**
China	0.1	0.0	0.1	0.1	0.1	**0.5**
Jamaica	0.0	0.4	0.0	0.0	0.0	**0.5**
Other	0.3	0.3	0.1	0.2	0.3	**1.2**
Total	**1.5**	**2.2**	**1.3**	**1.5**	**1.2**	**7.7**

Herbs and spices

Over the period 2004 to 2008, the value of both EU and US rejections of herbs and spices was low (Tables 20 and 21) and accounted for less than 0.2 per cent of the value of imports (Tables 22 and 23). India accounted for a significant proportion of the value of herb and spice rejections in both the EU and the US. All countries for which border rejections accounted for an appreciable proportion of the value of imports into the EU or US were minor exporters of herbs and spices into the EU or the US, with the exception of Jamaican and Sri Lankan exports into the US.

Tables 24 and 25 report the absolute and relative values of EU and US herb and spice rejections over the period 2004 to 2008, grouped by country income. Rejections accounted for less than 0.1 per cent of imports into the EU across all country income groups, with lower and upper middle-income countries having the highest relative value of detentions at 0.9 per cent and 0.8 per cent, respectively. Rejections from middle-income countries accounted for 0.32 per cent of the value of herb and spice imports into the US. Indeed, upper middle-income countries accounted for 56 per cent of total US rejections of herbs and spices by value over the period 2004 to 2008.

Table 22. Value of EU rejections of herbs and spices as a proportion of the value of imports, 2004-2008

Country	Value of Imports into EU 2004-2009 (US$ million)	2004	2005	2006	2007	2008	Total
Uzbekistan	3.6	0.00	28.60	0.00	0.00	0.00	**2.28**
Ukraine	12.0	0.00	6.80	3.13	0.00	1.29	**1.80**
Total	**-**	**0.05**	**0.12**	**0.10**	**0.07**	**0.04**	**0.07**

Note: Blank cells reflect zero imports.

Table 23. Value of US rejections of herbs and spices as a proportion of the value of imports, 2004-2008

Country	Value of Imports into 2004-2008 (US$ million)	2004	2005	2006	2007	2008	Total
Cameroon	0.4	0.00	0.00	0.00	0.00	45.71	**9.14**
Bangladesh	0.1		15.36	6.33	10.63	0.00	**8.08**
Jordan	1.3	0.70	0.00	1.30	17.28	1.25	**4.11**
Jamaica	8.8	0.21	19.11	0.40	0.54	0.00	**4.05**
Panama	0.9	0.00	8.64	0.00	0.00	0.00	**1.73**
Lebanon	1.4	0.00	7.06	0.74	0.01	0.00	**1.56**
Sri Lanka	46.4	0.00	2.71	4.05	0.81	0.03	**1.52**
Guyana	0.4	0.00	0.00	0.00	2.39	5.00	**1.48**
Ethiopia	1.0	1.32	3.70	0.22	1.82	0.00	**1.41**
Total	**-**	**0.20**	**0.35**	**0.20**	**0.18**	**0.13**	**0.19**

Note: Blank cells reflect zero imports.

Table 24. Value of rejections of EU herb and spice imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.0	0.1	0.2	0.1	0.0	**0.4**
Lower middle-income	0.2	0.6	0.3	0.4	0.3	**1.9**
Upper middle-income	0.1	0.2	0.2	0.2	0.1	**0.8**
High-income OECD	0.0	0.0	0.0	0.0	0.1	**0.1**
High-income non-OECD	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.4**	**0.9**	**0.8**	**0.7**	**0.5**	**3.2**
Per cent of Value of Imports into EU (%)						
Low-income	0.00	0.08	0.15	0.09	0.00	**0.06**
Lower middle-income	0.07	0.18	0.09	0.08	0.05	**0.09**
Upper middle-income	0.07	0.10	0.13	0.07	0.04	**0.08**
High-income OECD	0.00	0.00	0.00	0.00	0.08	**0.02**
High-income non-OECD	0.02	0.00	0.00	0.00	0.00	**0.00**
Total	**0.05**	**0.12**	**0.10**	**0.07**	**0.04**	**0.07**

Table 25. Value of rejections of US herb and spice imports by country income, 2004-2008

Income Group	2004	2005	2006	2007	2008	Total
Absolute Value (US$ million)						
Low-income	0.0	0.0	0.0	0.1	0.0	0.2
Lower middle-income	0.8	1.0	0.8	1.1	0.7	5.6
Upper middle-income	0.6	1.1	0.4	0.3	0.5	3.8
High-income OECD	0.0	0.1	0.0	0.0	0.1	0.3
High-income non-OECD	0.0	0.0	0.0	0.0	0.0	0.1
Total	**1.5**	**2.2**	**1.3**	**1.5**	**1.2**	**10.0**
Per cent of Value of Imports into US (%)						
Low-income	0.01	0.02	0.05	0.07	0.01	0.02
Lower middle-income	0.28	0.35	0.28	0.26	0.13	0.23
Upper middle-income	0.41	0.63	0.20	0.13	0.20	0.32
High-income OECD	0.02	0.10	0.02	0.02	0.14	0.07
High-income non-OECD	0.20	0.35	0.20	0.18	0.13	0.19
Total	**0.20**	**0.35**	**0.20**	**0.18**	**0.13**	**0.19**

Conclusions

This chapter has presented the most comprehensive analysis to date of the value of border rejections of agri-food products in the EU and the US. Specifically, it uses unit values derived from trade data to impute values to the volumes recorded in the RASFF and OASIS databases, and explores the degree to which the absolute and relative values of rejections vary across commodities, countries and export markets. In principle, data of this kind could be used to identify where compliance challenges are having the greatest economic impact on agri-food exports from developing countries, and to assess the impacts of investments in compliance capacity, which presumably would be reflected in a decline in the value of border rejections over time. It is important to recognize, however, that the value of losses for most countries is lower than suggested by earlier analyses. This in itself is an important new finding. Thus, the major focus of such an analysis of this kind should be on countries and commodities where significant losses are incurred, whether in absolute terms (predominantly for large exporters) or relative (predominantly for small exporters) terms.

While there were appreciable differences across commodities and export markets, the aggregate value of border rejections over the period 2004 to 2008 were not significant. Thus, with the one exception of nut and seeds imports into the EU, border rejections in both the EU and the US accounted for less than 0.5 per cent of the value of imports. These estimates are more in line with those for fish and fishery products and groundnuts by Ababouch *et al.* (2005) and Diaz Rios and Jaffee (2008) than Jaffee and Henson (2004). Whilst, the value of EU rejections of nuts and seeds was much greater, accounting for almost 1.25 per cent of the value of imports over the period 2004 to 2008, this high figure was largely due to the poor compliance performance of one country, namely Iran. At the same time, the value of rejections for some countries was more considerable, and certainly

in the case of relatively minor importers into the EU and/or US this could have imposed a significant burden. This is observed, in particular, with nut and seed imports into the EU and fish and fishery product imports into the US.

In interpreting these results it is important to recognize that detention data only relate to compliance problems incurred when trade occurs. Thus, these values relate to losses when consignments are refused entry at the border. In some cases, these consignments may be diverted to other markets, such that at least some of their value is recovered. However, the greater cost almost certainly relates to the degree to which future trade is curtailed because detentions occur; these detentions act as a signal that compliance challenges exist and may deter future consignments from being sent.

While perhaps less spectacular in absolute terms, these export losses represent serious challenges for individual exporting countries, often resulting in consequences for the individual enterprises as well as for local employment. More importantly, such identification of losses and their root causes will serve as an early warning indicator and will orient policy choices and development efforts before more considerable losses occur that could lead to further economic and employment degradations which will ultimately endanger the poverty-alleviation efforts made by countries and development partners.

Updates of these border rejection value estimates will be provided periodically in future issues of the TSCR. At the same time, efforts will be made to increase the scope of these estimates to cover other commodities and industrialized country markets, as the analysis of border rejections more generally is extended, as described earlier in this report. Feedback on these estimates that might feed into refinements of the method employed and the updating of these estimates is welcomed.

3. How to measure Developing Countries' Standard Compliance Capacity?

The analysis of EU-RASFF and US-FDA rejection data in Chapter 1 has shown that exporting companies in some countries struggle more in establishing compliance with international standards and market requirements than do others, and has highlighted further points for consideration.

As the rejection data only reveals rejections that have already occurred, it is equally important to analyze why non-compliance had not been detected during the production process or prior to shipment. Non-compliance can have its origins at producer and exporter level in their lack of knowledge about such requirements as product characteristics, packaging or labelling. It can also be the result of the non-availability of or difficulty of access to reliable conformity assessment or certification services.

This chapter presents two different approaches to how developing countries can detect non-compliance with international standards and market requirements prior to shipment and how they can address this non-compliance:

The first approach, using the Standards Compliance Capacity Index (SCCI), is based on a quality infrastructure survey that UNIDO conducted in 28 developing countries: the adequacy of their quality infrastructures and related services for potential export products and market requirements were analyzed. The index thus serves as a benchmarking tool, allowing developing countries to compare their performance, in areas related to quality infrastructure, to countries at a similar or higher stage of development.

The second approach, an analysis of the EU Food and Veterinary Office's (FVO) inspection reports, offers an absolute benchmark of developing country performance in seafood exports. Developing countries can utilize the findings of this analysis to address the most common causes of compliance failure.

3.1 Assessing the Status of Trade Standards related Compliance Capacity: Deriving a Standards Compliance Capacity Index

Introduction

The increasing prevalence of agri-food standards in international trade – whether technical regulations promoted by governments or 'voluntary' private standards (Henson and Humphrey, 2009) – has focused attention on the importance of enhancing trade-related compliance capacity in developing countries as part of the wider 'Aid for Trade' agenda (see UNIDO, 2007a, for example).

Given the limited availability of finance in developing countries and the often precarious nature of their competitiveness in international markets, a key concern is the high cost of compliance with public and private standards. Compliance costs, particularly non-recurring costs, may be substantially higher than in industrialized countries, in part because capacity tends to be weaker. Such costs are borne by the public and/or private sectors and relate to the design and implementation of administrative systems, certification, auditing and product testing capacity (Ganslandt and Markusen, 2004; Otsuki *et al*, 2001; Maskus and Wilson, 2004), product redesign, and increased short-run production costs due to additional labour and capital. There is a need for public and private decision-makers to establish the most efficient ways in which to enhance developing country capacity and to prioritize the use of scarce resources; this requires an appreciation of the level and composition of compliance costs.

Public and private standards are becoming more common and more stringent, and this can overwhelm the public and private sectors in developing countries which have limited technical capacities. Not only must they be able to monitor changes in the standards landscape and to formulate appropriate plans for compliance, but they must also be able to employ the financial, technical and human resources needed to implement and operate the necessary capacities. Even the more 'traditional' elements of capacity are often lacking, such as laboratories, metrology (measuring) services and improved production and manufacturing processes. At the same time, with the increasing role of management system standards, such as ISO 9001, ISO 14001 and ISO 22000, which define managerial processes rather than lay down end-product specifications, change may be also required in the structure and/or modus operandi of value chains. Further, new forms of conformity assessment are required which focus on third-party certification (Busch *et al*, 2005) and thus on systems of certification and accreditation.

Developing countries, and the public and private sectors therein, differ widely in their capacity to comply with public and private standards in international trade. Even in the poorest and/or smallest countries, where overall capacity is weak, it is often possible to observe 'islands' of more enhanced capability (World Bank, 2005), often where substantive exports have been established through the efforts of leading domestic firms and/or multinationals. The degree of 'spill-over' from these islands to other sectors and/or elements of capacity, however, is often limited. At the same time, lead export sectors can induce the development of compliance services that have a wider use: laboratory testing capacity and metrology services for science and technology and medical services are obvious examples.

Generally, however, a country needs to do more than achieve compliance with international trade standards, whether public or private; it also needs to show that its national compliance capacity, including its systems of conformity assessment, is recognized globally. It may do this through the International Laboratory Accreditation Cooperation Mutual Recognition Agreement (ILAC-MRA), International Accreditation Forum Mutual Recognition Arrangements (IAF-MLA), or the International Committee for Weights and Measures Mutual Recognition Agreement (CIPM-MRA). If it fails to do this, and its systems of conformity assessment remain weak, its access to international markets may be blocked altogether or it may experience high levels of rejection– whether official or by buyers – which will reduce its competitiveness and may lead buyers to discount the prices of its goods to offset the additional risks they face. Systems of conformity assessment can be in the public sector, as with official certification (for example, plant and animal health), or in the private sector, with its many systems of third-party certification. Such systems must, typically, meet international standards or those of the importing country. Indeed, they may require the prior approval of the importing country. There is also a need, in both the public and private sectors in developing countries, for related capacities in standards development and dissemination, metrology, product testing, laboratory accreditation, calibration, certification and auditing, and so on. These are often weak and, in the poorest or smallest countries, maybe virtually absent (UNIDO, 2007b).

While developing countries might develop compliance and conformity assessment capacities that enable them to gain access to particular international markets on a case-by-case basis, this is unlikely to produce a sustained process of export growth. Developing countries need to become integrated with the multilateral trading system, including the Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary Measures (SPS) Agreements of the World Trade Organization (WTO), that set the guidelines for the use of standards in trade, international standards-setting organizations such as the International Organization for Standardization (ISO) and the Codex Alimentarius Commission, and private-sector organizations and standard-setters (such as GlobalGap, the Global Partnership for Good Agricultural Practice). Only by participating in such public and/or private forums will developing countries be heard and be able to begin shifting from being passive 'standards takers' towards being 'standard setters' and proactive in standards development and compliance.

Various efforts are underway to develop indicators of the trade performance and/or capacity of developing countries that will identify weaknesses that might need addressing – by providing technical assistance and guidance to policymakers in developing countries. Examples include the World Trade Indi-

cators (WTI)[31], the Logistics Performance Index[32] and the Doing Business project.[33] None of these instruments, however, focus specifically on trade-related compliance capacity. At best, they allude to the implications of weaknesses in capacity, for example longer border clearance procedures. They do not present indices of relative capacity across countries at the same stage of development or of competitors in export markets, which is the focus in this chapter.

This chapter builds on and complements UNIDO's efforts[34] to define an instrument for assessing and monitoring the state of trade-related compliance capacity in developing countries. Using data on specific elements of compliance capacity – standards infrastructure, metrology, laboratory testing, inspection, certification and accreditation – the chapter defines a series of relative indices that overall constitute a Standards Compliance Capacity Index (SCCI). The aim of the SCCI is to facilitate:

- Comparison of trade-related compliance capacity across developing countries to identify those with the most acute capacity weaknesses or where specific aspects of capacity are missing or weak;
- Tracking changes in the relative levels of trade-related compliance capacity in specific countries over time, enabling assessment of the potential impact of capacity-building investments by governments, private sector and/or donors.

The SCCI is proposed as a tool to assist in identifying capacity-building needs, assessing the effectiveness of capacity-building efforts and estimating the impacts of capacity enhancements – on trade performance, for example. It is important to recognize, however, that the index and its application to a select range of developing countries is an initial analysis. In future issues of the TSCR, the index will be further developed and applied to a wider range of developing countries. It is also envisaged that the SCCI might be made available though an online platform that would enable countries to compare their capacity with that of competitors. The intention is also to extend the SCCI into other facets of trade capacity and to develop a more comprehensive Trade Performance Index (TPI). Comments are welcome on the usefulness of the index and the specific approach employed to develop it, in order to inform the future development of the SCCI.

In Section 2, we outline the nature of compliance services and their associated infrastructure. Section 3 describes the conceptual basis of the SCCI. Section 4 describes the data collection methods and in Section 5 we apply the SCCI to assess the current capacity in 28 developing countries in standards-setting, metrology, testing, certification and accreditation.

Conformity infrastructure

A range of services is associated with compliance, including standards-setting, testing, metrology, system certification, inspection, traceability, packaging and labelling. Table 1 shows the related requirements for exporters and the institutional mechanisms or infrastructure needed to support such compliance. In many cases, these services can be provided by, and the related infrastructure situated in, the public or the private sector. They can also be delivered at the firm or farm, sector or macro levels, with corresponding levels of adaptation and customization.

Underlying the provision of compliance services is the necessary standards, metrology, testing and quality (SMTQ) infrastructure. Figure 1 provides a schematic representation of this quality infrastructure and the link between the various elements. Whereas this infrastructure is taken for granted in industrialized countries, critical elements may be missing or weak in many developing countries and in Least Developed Countries in particular.

The key building blocks of quality infrastructure[35] are as follows:

- A **National Standards Body** (NSB), responsible for approval and dissemination of standards. The NSB should be a member of the core international standard-setting organizations, notably ISO, the International Electro-Technical Commission (IEC) and the Codex Alimentarius Commission, and function as the enquiry point for the TBT agreement. Exporters may be required to have system certification for ISO 9001, ISO 14001, ISO 22000, Hazard Analysis Critical Control Point (HACCP) and the like. The NSB is generally responsible for creating awareness at enterprise level of these systems.
- A **National Metrology Institute**[36] (NMI) is the institution designated by national decision (e.g. by legislation) to develop and maintain national standards for one or several quantities (for mass, volume, length, electrical parameters, and so on). Although not required by definition, most developing countries will operate a centralized metrology organization. The mandate of the NMI should be to:
  - Establish and maintain national measurement standards demonstrably traceable to international metrology definitions/standards for the relevant metrology quantities needed by the country;
  - Ensure that a national calibration system is established and maintained to diffuse metrology standards into industry, authorities and society;
  - Represent the country at the international level, e.g. BIPM;
  - Represent the country in regional metrology structures such as AFRIMET (Africa), APMP (Asia Pacific), COOMET (Euro-Asia), EUROMET (Europe), SIM (Americas), etc.; and
  - Represent the country in relation to national metrology institutes of other countries.

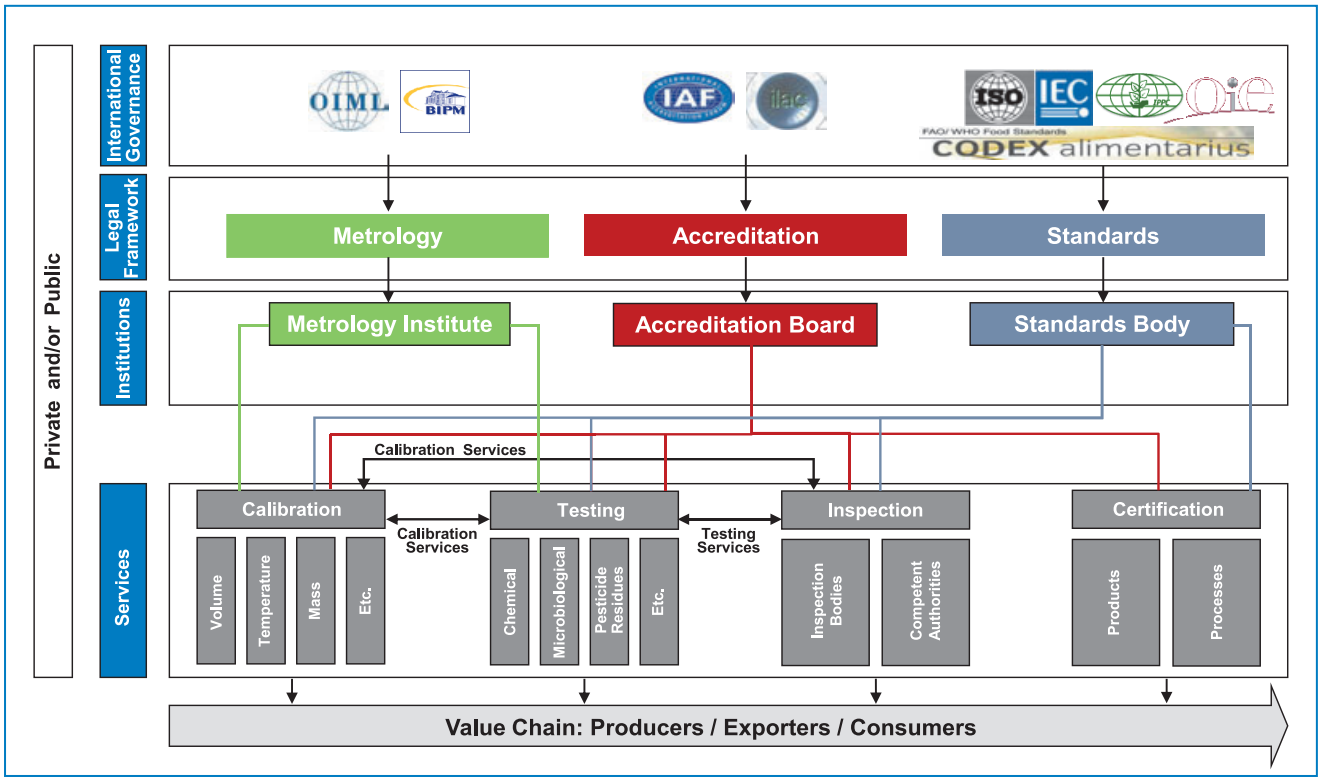
  In many countries, the NMI also conducts the type approval testing of measuring equipment falling within the

[31] World Trade Indicators 2009/10 http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE/0,,contentMDK:22421950~pagePK:148956~piPK:216618~theSitePK:239071,00.html
[32] Logistics Performance Index http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTTLF/0,,contentMDK:21514122~menuPK:3875957~pagePK:210058~piPK:210062~theSitePK:515434,00.html
[33] http://www.doingbusiness.org/
[34] UNIDO Working Paper:
Trade Capacity-Building Metrics: Facilitating Market Entry through Proof of Conformity Services (please also see in bibliography)
[35] More ample information available in the UNIDO-ISO Guides "Fast Forward" and "Building Trust"
[36] More ample information on compliance with ISO/IEC 17025 available in the UNIDO publication "Complying with ISO 17025. A practical guidebook for meeting the requirements of laboratory accreditation schemes based on ISO 17025:2005 or equivalent national standards"

Table 1. Elements of trade standards compliance [37]

Compliance Area	Need of the Exporter	Necessary Service
Product standards/technical regulations, including packaging and labelling	Access to standards/ technical regulations	Reference centre in standards body or other
Product testing	Conformity assessment recognized by the (international) client	Laboratory testing services internationally recognized through accreditation
Accuracy of measurement	Internationally recognized, calibrated testing and measurement equipment, measurement traceability to SI (measurement) standard	Metrology laboratory services internationally recognized through accreditation, inter- calibration schemes
Product characteristics and quality	Consistency and reliability of enterprise quality management	Consultancy services and internationally recognized system certification capacity (ISO 9001, etc.)
Management of environmental impact	Consistency and reliability of enterprise environmental management	Consultancy services and internationally recognized system certification capacity (ISO 14001, etc.)
Food safety	Consistency and reliability of food contamination control and food safety management	Consultancy services and internationally recognized system certification capacity (HACCP, ISO 22000, etc.)
Social accountability	Assurance of consumer concerns relating to child labour, worker exploitation etc.	Consultancy services and internationally recognized certification capacity (SA 8000, etc.)
Examinations of shipment content to order	Internationally recognized product inspection services	Internationally accredited cross border inspection services
Traceability of products and inputs from farm to fork	Traceability system	Consultancy capacity and internationally recognized certification capacity for traceability systems

Figure 1. Quality infrastructure scheme



Source: UNIDO

[37] (Goonatilake and Kaeser, 2008)

scope of legal metrology regulations. The final approval of such measuring equipment for use in the market place, however, should remain with the Legal Metrology Department. Certification to ISO 9001 and ISO 14001 and laboratory accreditation to ISO/IEC 17025 require an established NMI with traceable calibration.

- **Laboratories for product testing** for local consumer safety and for export product testing services are needed. Chemical, microbiological and physical testing are, for example, provided by laboratories external to the exporting enterprise. They must obtain international recognition or accreditation to ensure international acceptance of the certificates issued and to avoid re-testing, possibly costly, in the importing country.
- **Certification services** are generally divided into product certification and system certification services. Certification bodies will typically use specialist auditors to undertake their assessment of products or management systems of their clients. The requirements for product certification are specified in ISO/IEC Guide 65 (that will soon be superseded by ISO/IEC 17065) and requirements of ISO/IEC 17021 provide the base standard for international consistency with regard to system certification.
- **Inspection** is a form of conformity assessment which has a long history. Some inspection activities are aligned with testing activities; others may be closely associated with certification activities (particularly product certification); while other inspection is a stand-alone activity without any relation to testing or certification. Looking at inspection as a conformity assessment technique it can include:
  - Visual examination of physical items
  - Measurement or testing of physical items
  - Examination of specification documents such as design drawings
  - Comparison of the findings with the requirements of specification documents or with generally accepted good practice in the field
  - Drawing up a report on the results of the inspection.
- A **National Accreditation Board** (NAB) is a vital part of the conformity assessment infrastructure. At the domestic level, a NAB is responsible for accrediting laboratories, system certifiers and inspection bodies. Through an international peer evaluation process, a NAB can establish a Mutual Recognition Agreement (MRA) with the International Laboratory Accreditation Cooperation (ILAC) for laboratory certification and with the International Accreditation Forum (IAF) for system certification, so that the local conformity assessment structure obtains international recognition.

The individual elements of the quality infrastructure operate as a whole, but are each necessary to ensure that reliable and credible compliance services are provided. For example, the NSB establishes standards, while laboratories and certification bodies accredited by the NAB assess conformity. If any critical elements of the quality infrastructure are missing or are weak, compliance services may not be recognized internationally – by export market buyers, for example – or the country may struggle to establish MRAs with key trading partners (An and Maskus, 2009). It may then be necessary for exporters to seek compliance services, perhaps at higher costs, from elsewhere. Indeed, many firms in sub-Saharan Africa, for example, obtain ISO 9001 or ISO 14001 certification from South Africa or Europe.

The SCCI presented below, aims to provide a coherent way in which to assess capacity in each of the key areas of quality infrastructure. It enables comparison between countries, and changes in capacity levels over time can also be assessed. As a diagnostic tool, it enables identification of weaknesses in capacity and monitoring of the impact that investments in particular aspects of the quality infrastructure have on capacity.

Conceptual framework

Comparing the capacities of the various elements of the quality infrastructure is complicated by the fact that each component may consist of multiple elements that are measured discretely (whether or not an NSB is present, for example) or continuously (the number of internationally-accredited laboratories, for example). The positioning or focus of this capacity may also be important, for example whether laboratory testing is in the public or private sectors and whether certification services are available for strategically important export sectors. Given that each element of the quality infrastructure is multi-dimensional, each dimension may change over time. Thus, for any particular element, a sometimes daunting array of information can be presented that is difficult to distil into a summary measure that can be used to compare the status of capacity across elements of the quality infrastructure or over time. The SCCI aims to provide such a summary measure.[38]

The SCCI is essentially like an asset index, now widely used in development economics (see for example Sahn and Stifel, 2003; McKenzie, 2005). Asset indices can take various forms: (i) the simple sum of assets owned; (ii) the weighted sum of assets; and (iii) index-derived using principal components analysis (PCA). We discuss each of these in turn below.

The trade-related compliance capacity of a country consists of a number (i) of separable compliance capacities (C^i), where $i \in [1,2,...,8]$, for example standards-setting, metrology, testing and certification. Within each of these compliance capacities there are p assets or specific competencies denoted by $a^{i.1}....a^{i.p}$. For example, within standards-setting capacity (see below) these include the existence of a national standards body, membership of international standards-setting organizations, and the existence of technical committees in priority sectors. The associated *'a'*s are either measured through a discrete, ordinal or continuous variable. The idea of the index is to assign a weight (w) to each specific competence a and then to aggregate the weighted variables to obtain a measure of C^i:

$$C^i = \sum_{p=1}^{p} w^{i.p} a^{i.p}$$

There are three ways in which the *'w'* can be derived, as outlined below.

[38] The ideal measure of trade-related compliance capacity would use the market valuation of the associated investments and make comparisons across countries. While such comparisons are complicated by differences in export structures and trade priorities (amongst other factors) that influence the demand for compliance services, these can be allowed for econometrically. However, in many cases such market valuations are not available or the associated data are subject to measurement and recall problems. For example, many compliance services are provided as public goods, meaning that market prices are not explicit.

*i. **Sum of assets***

With this approach the simple sum of the number of assets owned is derived. Until recently this was the method most commonly used to construct an index of durable goods and flows of services (Klassen, 2000). The benefit of this approach is its simplicity. However, although it can be widely applied to areas of trade-related compliance capacity where monetary values are missing (see below), crucially the contribution of each asset or competence is given the same weight, such that $w=1$ for each w. Conversely, it may be that particular assets are of greater or lesser importance to compliance capacity, begging the question: how should the associated non-common weights be defined?

*ii. **Monetary values***

The second approach is to weight the assets using monetary values so that the value of each asset is given by $w^{i.p}=v^{i.p}$, where $v^{i.p}$ is some monetary value of the investment or flow of services. The monetary value of the investments is then added together to give the total value of compliance capacity in the country, as in the equation above. In practice, however, this approach is problematic. Estimating the net present value (NPV) of assets can be difficult due to the paucity of data, especially where values have to be assigned to intangibles, such as human capital, or where compliance services are public goods.

*iii. **Principal components analysis***

The use of PCA is a relatively new method of deriving a single metric of the ownership of assets (Filmer and Pritchett, 2001; Sahn and Stifel, 2003; McKenzie, 2005). It is grounded in the asset-based approach to poverty measurement, although it is more generally applicable to the measurement of the status of assets. It relies on combining a series of binary asset ownership variables into a single index. The assumption is that a series of observable discrete variables can be used as indicators of an underlying (but unobservable) continuous variable, in this case compliance capacity. More explicitly, it is assumed that there is an unobserved compliance capacity variable (C^i) for each type of standards capacity C^i observable through the existence of assets $a^{i.1}....a^{i.p}$.

The rotation of the dimensional axes in PCA minimizes the variance from observations in the data. This is similar to minimizing residuals in a regression, although crucially in PCA the variance is measured against all co-variates and not just the dependent variable. The literature recommends that the asset index is interpreted using only the first principal component, given that this provides the most information about the variables (Filmer and Pritchett, 2001; McKenzie, 2005). The assets which vary most across observations will be given a larger weight. If all countries have invested in a particular compliance asset, that variable will be given a zero weight in the first principal component, given that it does not explain any variation across countries. The same applies to cases where no country has invested in a particular asset.

In practice, PCA is straightforward and provides more accurate weights than a simple aggregation. The estimated coefficients are generally intuitive, aiding interpretation of the results. The estimated coefficient for any one asset variable is determined by how much information that variable provides about the other asset variables associated with the same compliance capacity. If one asset is correlated with other assets associated with the same compliance capacity, the coefficient is positive. Conversely, if a particular asset is not correlated with the other assets associated with the same compliance capacity, the coefficient is zero. Finally, the coefficient on a particular asset is negative if the existence of that asset suggests that few (if any) other assets associated with the same compliance capacity are likely to be present The absolute value of the coefficient indicates that the associated asset conveys more or less information about other assets associated with the respective compliance capacity.

If PCA reveals that an asset is highly correlated with other assets associated with a particular compliance capacity, it is likely that this asset is also correlated with assets associated with the same compliance capacity but for which no data are available. In this way, the derived asset index can be used as a more general measure of the status of that compliance capacity. A potential drawback of PCA, however, is that it cannot satisfactorily measure the status of a particular compliance capacity unless the measured variables are positively correlated with the associated latent variable and with each other (McKenzie, 2005). This means that the associated assets must be clearly defined and that there has to be a broad array of assets to be able to distinguish between capacity levels across countries. Indeed, McKenzie (2005) argues that, if there are not enough, clumping and truncation may occur.[39]

In the PCA approach to asset indices, assets are represented as categorical variables indicating whether an asset exists or not. Here, a multidimensional approach to PCA is used (Sahn and Stifel, 2003; Moser and Felton, 2007), whereby the principal components for particular elements of compliance capacity are estimated separately based on the existence or not of a series of associated and observable assets:

- standards-setting
- metrology
- testing
- inspection
- certification
- accreditation.

For each element of compliance, the index shows the position of countries relative to other countries in the analysis. In this way, each index, in effect, benchmarks the state of capacity in any country against the level of capacity across countries as a whole. The associated assets and the derived index for each are described below.

In using categorical variables there can be some loss of information for variables that have ordinal values, such as the number of

[39] This means that observations will be clumped together, in small groups and in extreme cases, under one asset indicator between countries that own the asset and those that do not. In addition, the distribution of the asset index may be truncated, making it difficult to distinguish between countries that have a good endowment of the asset and those that do not. Plotting histograms and probability density functions of the asset index can help to identify if truncation or clumping are a concern. In turn, this can be solved by adding more indicators into the PCA (McKenzie, 2005).

technical committees establishing standards for a priority sector.[40] Further, information on the quality of a particular asset is not incorporated. The indices presented below should be seen, however, as a starting point in the development of the SCCI. In future issues of the TSCR, additional assets are likely to be added to some or all of the compliance capacity indices, whilst the use of non-categorical indicators will also be explored.

Data collection

In order to collect data for the indicators corresponding to the assets or competencies in the SCCI, a compliance performance survey was designed. Most survey questions required discrete (yes or no) responses: whether a national standards body was in place, whether numerical indications existed, how many technical committees were in operation, for example. Some questions addressed the status of capacity in general, while others referred to the main import and export sectors or priority export or import sectors. For each country, the three main agri-food, textile or footwear import and export sectors were defined *a priori* using UN COMRADE data at the HS2 digit level, and three priority export and import sectors were defined by respondents on the basis of strategic trade priorities and/or product safety and quality concerns.

The questionnaire was sent to UNIDO regional or country offices and to local laboratories or institutions that had previously cooperated with UNIDO. The contacted persons served as focal points and were responsible for collecting the required data from local institutions.

For the application of the SCCI, data was collected from countries in the Economic Community of West African States and the Association of Southeast Asian Nations regions plus other developing countries with relatively well-developed trade compliance infrastructure and which could serve as reference points for comparative analysis.[41] In total data from 28 countries was collected. However, the questionnaire was not fully completed by every country and some of the data was of dubious quality. Lack of time and resources meant that the data could not be validated or the gaps filled, but this was not seen as a major problem, given the illustrative purpose of the exercise. To prevent misuse of the results, the country names have been removed from the reporting of results.

Compliance capacity indices

Standards-setting capacity

The standards-setting capacity index includes seven assets or competencies:

- existence of a national standards body;
- existence of a standards documentation centre;
- membership of international standards-setting organizations[42];
- country membership of the WTO;
- existence of an enquiry point for TBT and/or SPS measures, as required under TBT and SPS agreements;
- existence of technical committees for standards-setting in major export and major import sectors, and for priority products[43];
- degree to which industry participates in technical committees for standards-setting in major export and import sectors, and for priority products.

For most of these elements the corresponding categorical variables in the index relate to whether a country has the respective institution in place or is a member of the respective organization. When the data on the number of technical committees in major export and major import sectors and for priority products had been collected, data was converted into categorical variables as follows:

- existence of technical committees in at least one of the three major export sectors, in at least one of the three major import sectors, and for at least one of the three priority products;
- existence of technical committees in at least two of the three major export sectors, in at least two of the three major import sectors, and for at least two of the three priority products;
- existence of technical committees in all three major export sectors, in all three major import sectors, and for all three priority products.

The categorical variables provide a measure of increasing coverage of capacity across the major export and import sectors and across the priority products. Categorical variables are defined for industry participation in technical committees in a similar manner. Note that only the first of these three sets of variables – for the existence of technical committees and industry participation in technical committees – was included in the standards-setting capacity index.[44]

[40] While Filmer and Pritchett (2001) suggest creating a series of dummy variables instead, this can create large distortions in the correlation matrix because the variables are negatively correlated with each other (Moser and Felton, 2007). Polychoric principal components analysis can be used to overcome this problem.

[41] Benin, Burkina Faso, Cambodia, Cape Verde, Côte d'Ivoire, Egypt, The Gambia, Guinea, Guinnea Bissau, Indonesia, Kenya, Laos, Liberia, Malaysia, Mali, Mauritania, Nepal, Niger, Nigeria, Pakistan, Philippines, Senegal, Sierra Leone, Sri Lanka, Thailand, Togo, Tunisia, Vietnam.

[42] Namely: International Organization for Standardization; International Electrotechnical Commission; International Telecommunications Union; International Organization of Legal Metrology; Codex Alimentarius Commission; International Plant Protection Convention; and International Organisation for Animal Health (not applicable for all NSBs).

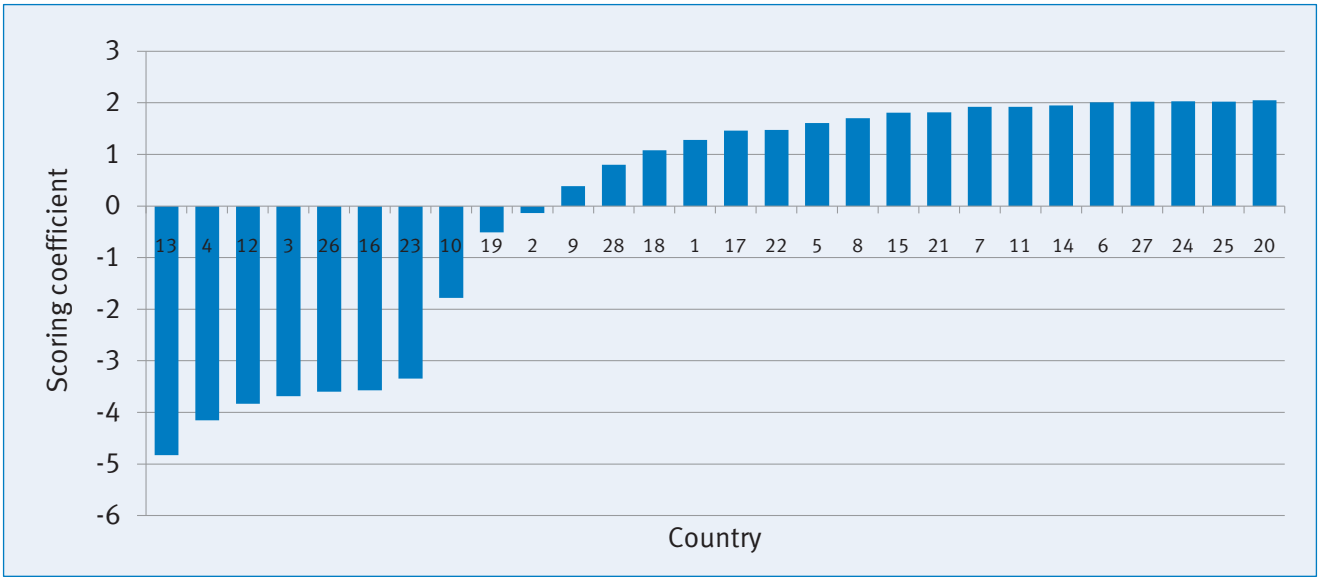
[43] For each country, three major export sectors, three major import sectors and three priority products are defined. As described above, major export and import sectors are defined as the largest agri-food, textile or footwear sectors in terms of value of exports and imports, respectively. Priority sectors are defined as those of strategic trade performance or with significant product safety and/or quality issues.

[44] There would be problems including all three variables for each of the major export markets, major import markets and priority products because these variables are not mutually exclusive. To explore whether this had a significant impact on the degree to which the index captures information on the state of standards-setting capacity, the PCA was run with each of the three variables for the existence of technical committees and for industry participation in the technical committees, and for major export sectors, major import sectors and priority products. The choice of which of the three variables to use in each case was not found to have an appreciable impact on the PCA solution.

Table 2. Summary statistics and first principal component scores for standard-setting capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
National standards body (NSB)			
Local NSB	0.857	0.356	0.108
Membership of international standard-setting organizations			
ISO	0.821	0.390	0.008
IEC[44]	0.428	0.503	0.056
ITU	0.964	0.188	0.089
IPPC	0.928	0.262	-0.170
OIE	0.964	0.188	0.147
OIML[45]	0.464	0.507	0.054
CODEX	1	0	-
WTO membership and standards obligations			
WTO	0.321	0.475	0.198
TBT enquiry point	0.785	0.417	0.104
SPS enquiry point	0.714	0.460	0.304
National technical committees			
Major export sectors	0.750	0.440	0.303
Major import sectors	0.714	0.460	0.405
Priority products	0.714	0.460	0.298
Industry participation in national technical committees			
Major export sectors	0.678	0.475	0.389
Major import sectors	0.642	0.487	0.370
Priority products	0.678	0.475	0.377
Eigenvalue of first component		**6.5**	
Percentage variance of first component		**0.38**	

Figure 2. Standard-setting capacity index



[44] International Electrotechnical Commission
[45] International Organization of Legal Metrology

Figure 3. Metrology capacity index

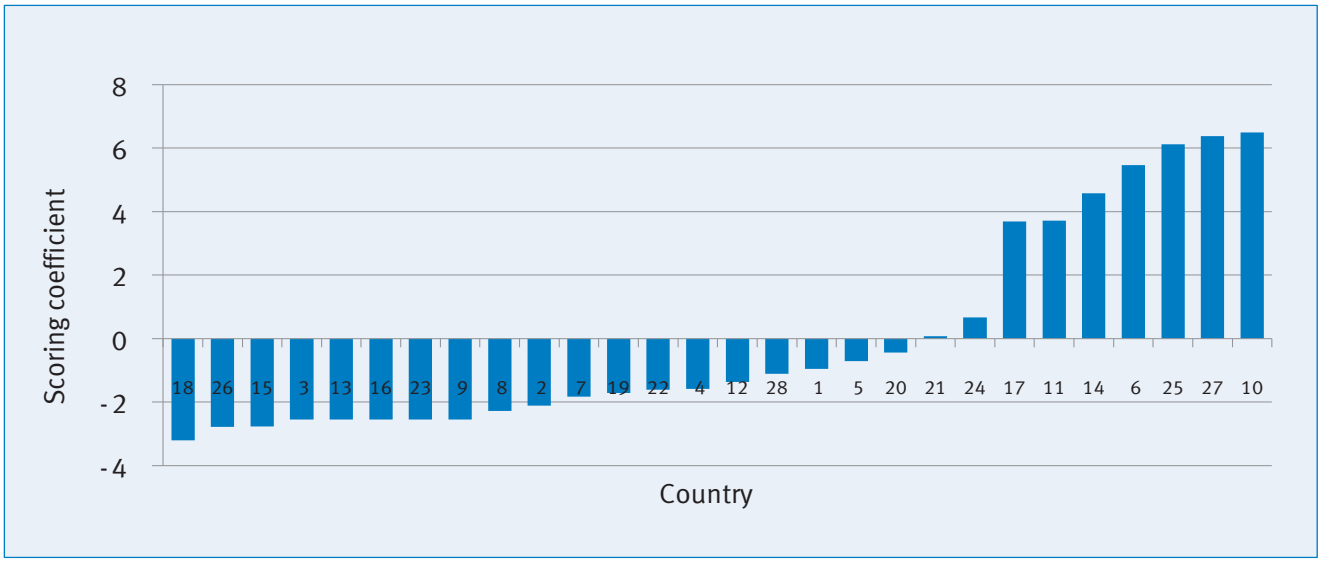


Table 2 reports the results of the PCA on the 17 variables in the standards-setting capacity index.[47] The first principal component accounts for 38 per cent of the total variation across the 18 assets, with an eigenvalue of 6.5.[48] While the first principal component may not seem to account for a large proportion of the variation, low values are not atypical (see, for example, MacKenzie, 2005; Filmer and Pritchett, 2001); these may, for example, reflect the number of variables included in the analysis and/or the complexity of correlations between the variables (Filmer and Pritchett, 2001). It is also important to recognize that this analysis is exploratory, covering only 28 countries: the position of each country *is relative to the set of countries in the analysis*. Nevertheless, the fact that the scoring factors on 15 of the 18 variables are positive in the first principal component suggests that this provides a good measure of standard-setting capacity. Note that only being a signatory to the International Plant Protection Convention (IPPC) has a negative weight, reflecting the fact that all but two countries in the analysis are signatories to the IPP, providing little variation within the sample.

Of the variables included in the analysis, having national technical committees in at least one of the major export or import sectors and/or for at least one priority product has the largest influence on the value of the standards-setting capacity index. Industry participation in the technical committees of at least one major export or import sector and/or for at least one priority product also has a considerable influence on the value of the index. Note that, with the exception of the World Organization for Animal Health (OIE), membership of international standards-setting organizations has little influence on the standards-setting capacity index, reflecting the fact that the rate of non-membership among the sample countries is low.

Figure 2 compares the scoring coefficients for the first principal component of the 28 countries. The scoring coefficient is a measure of relative standard-setting capacity: the higher the coefficient the higher the level of capacity relative to all other countries. Thus, countries 20, 25, 24 and 27 have the highest standard-setting capacity, while countries 13 and 4 have the lowest capacity.

Metrology capacity

The metrology capacity index consists of seven categories of variable:

- existence of a national metrology institute;
- membership of the BIPM;
- availability of calibration parameters for mass, length, temperature, volume, pressure and electrical measurements;
- availability of internationally-recognized calibration parameters for mass, length, temperature, volume, pressure and electrical measurements;
- availability of calibration laboratories that participate in intercomparison schemes for mass, length, temperature, volume, pressure and electrical measurements;
- availability of legal metrology services for balances, high capacity weighing machines, fuel dispensers, pre-packed commodities, electric meters, water meters, calibration of tankers and tanks.
- availability of traceable legal metrology standards for balances, high capacity weighing machines, fuel dispensers, pre-packed commodities, electric meters, water meters, calibration of tankers and tanks.

The first principal component from the PCA of the 36 variables in the metrology capacity index accounts for 41 per cent of the variation across the indicators and has an eigenvalue of 17.1 (Table 3).[49] Thirty of the indicator variables have positive signs, suggesting that the index provides a good measurement of metrology capacity. The most important driver of metrology capacity

[47] Note that Codex Alimentarius was dropped from the estimation because it has a variance of zero.

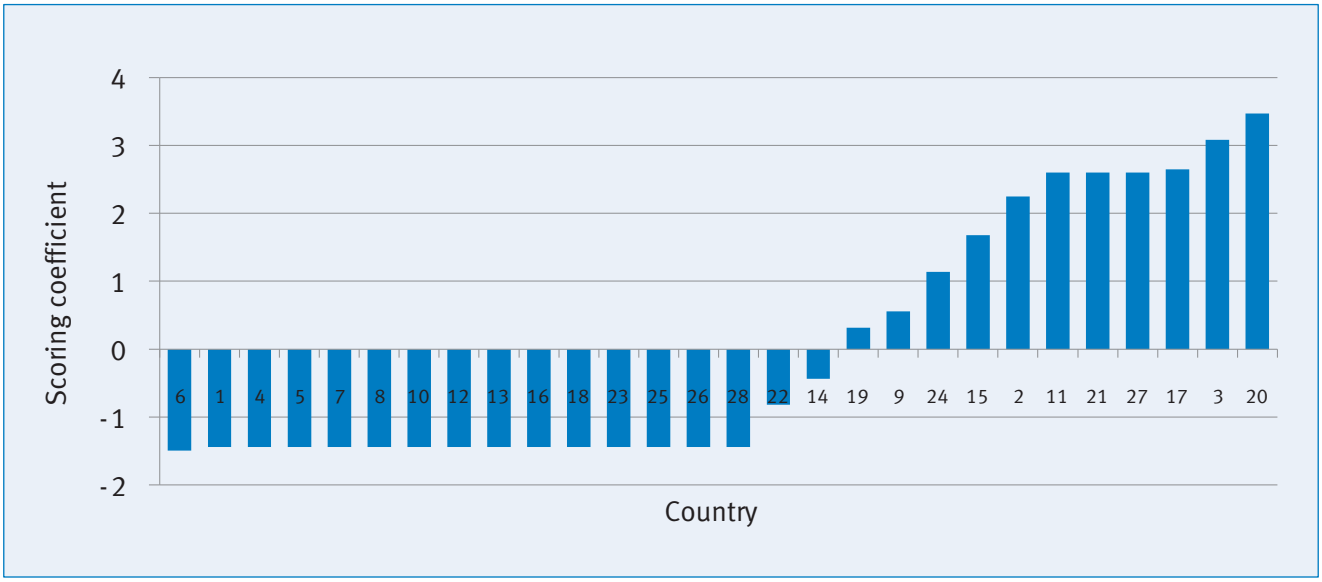
[48] The second principal component has an eigenvalue of 2.1 and accounts for 12 per cent of the variation. Two other principal components have eigenvalues exceeding one, but each accounts for less than one per cent of the variation.

[49] The second and third principal components have eigenvalues of 5.3 and 4.6 and account for 12 and 11 per cent of the variation, respectively. The fourth principal component has an eigenvalue exceeding one, but accounts for less than one per cent of the variation.

Table 3. Summary statistics and first principal component scores for metrology capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
National metrology institute			
National body	0.821	0.390	0.001
BIPM member	0.321	0.475	0.109
Calibration services			
Mass	0.750	0.440	0.032
Length	0.535	0.507	0.150
Temperature	0.607	0.497	0.109
Volume	0.642	0.487	0.090
Pressure	0.500	0.509	0.160
Electrical	0.464	0.507	0.173
Internationally-recognized calibration services			
Mass	0.535	0.507	0.080
Length	0.285	0.460	0.289
Temperature	0.392	0.497	0.219
Volume	0.285	0.460	0.246
Pressure	0.285	0.460	0.289
Electrical	0.250	0.440	0.307
Calibration laboratories participating in intercomparison schemes			
Mass	0.571	0.503	0.133
Length	0.214	0.417	0.223
Temperature	0.285	0.460	0.278
Volume	0.214	0.417	0.272
Pressure	0.285	0.460	0.278
Electrical	0.285	0.460	0.201
Legal metrology			
Balances	0.750	0.440	0.008
High capacity weighing machines	0.678	0.475	0.039
Fuel dispensers	0.607	0.497	0.07
Pre-packed commodities	0.214	0.417	0.017
Electricity meters	0.321	0.475	0.145
Water meters	0.142	0.356	0.216
Calibration of tankers	0.464	0.507	0.071
Calibration of tanks	0.428	0.503	0.061
Legal metrology traceable standards			
Balances	0.535	0.507	-0.149
High capacity weighing machines	0.500	0.509	-0.120
Fuel dispensers	0.392	0.497	-0.085
Pre-packaged goods	0.214	0.417	0.003
Electricity machines	0.142	0.356	0.033
Water meters	0.107	0.314	0.079
Calibration of tankers	0.357	0.487	-0.130
Calibration of tanks	0.214	0.417	-0.065
Eigenvalue of first component		**17.08**	
Percentage variance of first component		**0.42**	

Figure 4. Testing capacity index



is having internationally-recognized calibration parameters, followed by having laboratories that participate in intercomparison schemes.

Figure 3 reports the scoring coefficients of all 28 countries from the first principal component, providing a measure of relative metrology capacity. The distribution is skewed, suggesting that a small number of countries have relatively good metrology capacity, namely 10, 27, 25, 6, 14, 11 and 17. All other countries have relatively weak metrology capacity, with the lowest being observed in countries 18, 26 and 15.

Testing capacity

The testing capacity index takes account of capacity in both the public and private sectors. The questionnaire collected data on the numbers of laboratories available to undertake tests for the main export and main import sectors and for priority products. Based on these data, categorical variables are generated, taking a value of one if laboratories are available for at least one major export sector, one major import sector and one priority product.[50]

These variables are derived for the following four categories of laboratory:

- public laboratories;
- private laboratories that provide general testing services to the public;
- private laboratories that do not provide general testing services to the public;
- Internationally-accredited laboratories (MRA holding body).

Note that there appear to be some errors in the data for testing capacity (for example countries 6, 25 and 28). For these countries, zeros are recorded for the availability of public and private laboratories in major export and import sectors and for priority products throughout, while the total number of laboratories in these countries is among the highest of all countries for which data is available.

The first principal component following the PCA of the 12 variables making up the testing capacity index accounts for 52 per cent of variation across the indicators.[51] It has an eigenvalue of 6.3 (Table 4). The scoring factors for nine of the twelve indicators are positive, suggesting that the index provides a good indication of the level of testing capacity and includes the main determinants. The availability of private laboratories for at least one of the major import sectors, at least one of the major export sectors and at least one priority product are the key drivers of the value of the testing capacity index. Private laboratories providing general testing services to the public are relatively unimportant, reflecting the fact that these are absent in many of the countries used in this analysis. Conversely, the availability of private laboratories for major import sectors that do not provide general testing services to the public are a relatively large determinant of testing capacity.

Figure 4 compares the scoring coefficients for testing capacity in all 28 countries, on the basis of the first principal component. Countries with relatively strong testing capacity include 20, 3, 17, 27, 21 and 11. Conversely, countries 6, 1, 4 and 5 have the weakest testing capacity relative to others in the study. Note that the position of country 6 reflects weaknesses in the data.

Inspection capacity

The inspection capacity index consists of nine categorical variables as follows:

- availability of public bodies to undertake inspections in at least one of the major export sectors, in at least one

[50] Major export and import sectors and priority products are as defined previously.

[51] The second and third principal components have eigenvalues of 1.7 and 1.6 and account for 14 per cent and 13 per cent of the variation, respectively.

Table 4. Summary statistics and first principal component scores for testing capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
Public laboratories			
Major export sectors	0.428	0.503	0.478
Major import sectors	0.357	0.487	0.513
Priority products	0.035	0.188	0.367
Private laboratories providing general testing services			
Major export sectors	0.25	0.440	-0.047
Major import sectors	0.214	0.417	0.220
Priority products	0.214	0.417	-0.009
Private laboratories not providing general testing services			
Major export sectors	0.357	0.487	0.113
Major import sectors	0.25	0.440	0.390
Priority products	0.285	0.460	0.264
Internationally-accredited laboratories			
Major export sectors	0.285	0.460	-0.030
Major import sectors	0.035	0.188	0.293
Priority products	0.25	0.440	0.006
Eigenvalue of first component		**6.3**	
Percentage variance of first component		**0.52**	

Table 5. Summary statistics and first principal component scores for inspection capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
Public inspection bodies			
Major export sectors	0.250	0.440	-0.054
Major import sectors	0.250	0.440	0.067
Priority products	0.285	0.460	0.005
Private inspection bodies			
Major export sectors	0.250	0.440	0.544
Major import sectors	0.214	0.417	0.618
Priority products	0.250	0.440	0.544
Internationally-accredited inspection services			
Major export sectors	0.250	0.440	-0.050
Major import sectors	0.178	0.390	0.109
Priority products	0.250	0.440	-0.050
Eigenvalue of first component		**5.6**	
Percentage variance of first component		**0.63**	

of the major import sectors, and for at least one of the priority products;

- availability of private bodies to undertake inspection services in at least one of the major export sectors, in at least one of the major import sectors, and for at least one of the priority products:
- availability of internationally-accredited inspection services in at least one major export sector and one major import sector and for at least one priority product.

Table 5 reports the scoring factors for the first principal component, which accounts for 63 per cent of the total variation across the nine variables in the inspection capacity index.[52] Of all the indices, the inspection capacity index performs the best (alongside the accreditation capacity index) in terms of the proportion of variation explained by the first principal component. Six of the nine indicators have positive scoring factors. The negative scoring factors for three, notably for the availability of internationally-accredited inspection services for at least one major export and at least one major import sector, largely reflects the

[52] The second principal component has an eigenvalue of 1.8 and accounts for 20 per cent of the variation.

Figure 5. Inspection capacity index

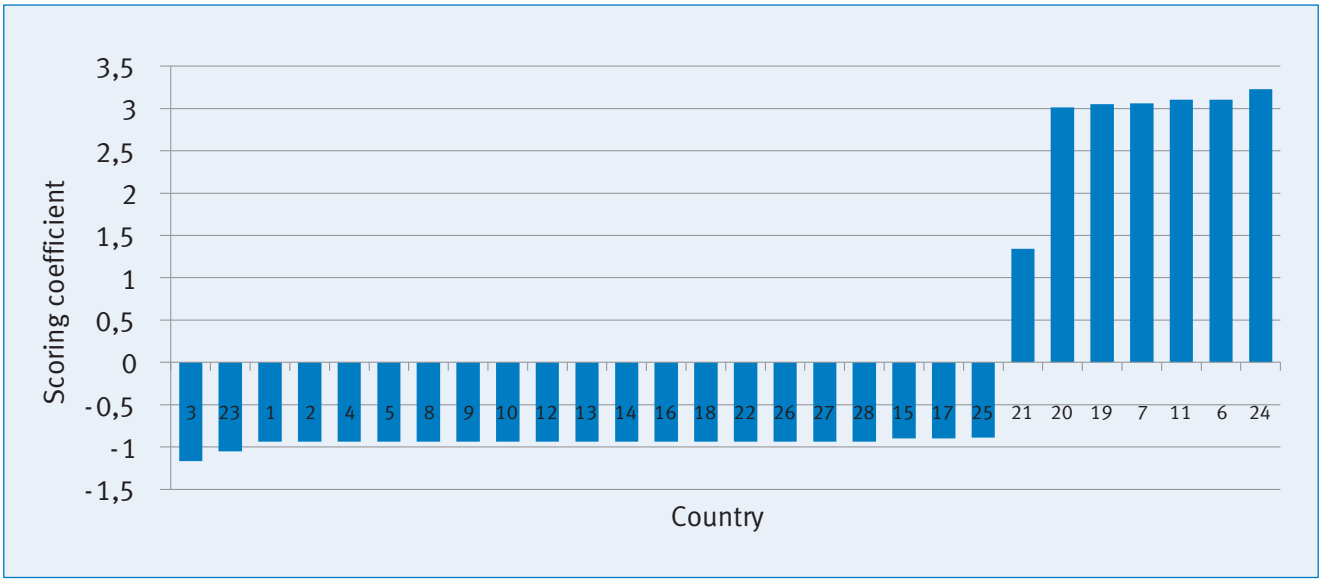


Table 6. Summary statistics and first principal component scores for certification capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
Certification bodies			
National certification body	0.642	0.487	0.091
ISO/IEC 17021 accredited	0.250	0.440	0.366
ISO 9011 accredited	0.107	0.314	0.125
Internationally-accredited private certification bodies	0.464	0.507	0.048
Certification services			
ISO 9001 auditors	0.464	0.507	-0.156
ISO 14001 auditors	0.321	0.475	-0.035
ISO 22000 auditors	0.285	0.460	-0.098
Firms certified to ISO 9001			
Major export sectors	0.285	0.460	0.113
Major import sectors	0.285	0.460	0.113
Priority products	0.25	0.440	0.069
Firms certified to ISO 14001			
Major export sectors	0.178	0.390	0.325
Major import sectors	0.178	0.390	0.325
Priority products	0.107	0.314	0.430
Firms certified to ISO 22000			
Major export sectors	0.107	0.314	0.408
Major import sectors	0.071	0.262	0.334
Priority products	0.035	0.188	0.313
Eigenvalue of first component		**7.6**	
Percentage variance of first component		**0.47**	

Figure 6. Certification capacity index

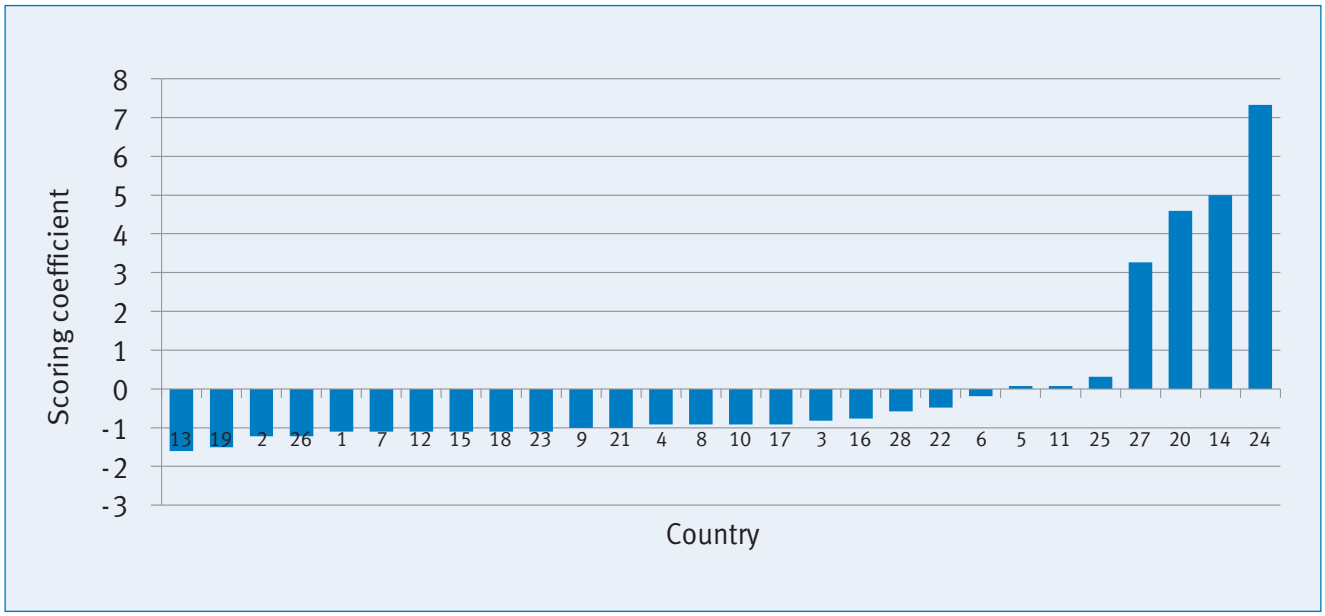
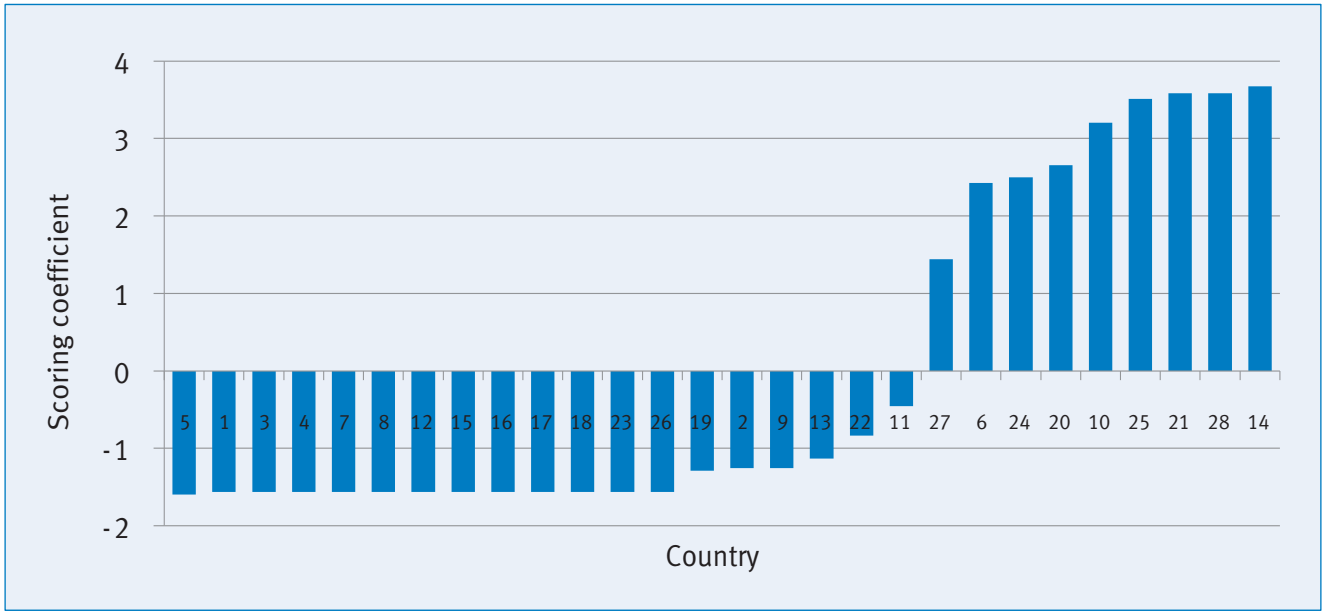


Figure 7. Accreditation capacity index



fact that the incidence of inspection services is heavily skewed towards a small number of countries, with many others having little or no inspection capacity.

Countries with relatively high levels of inspection capacity on the basis of the scoring factors from the first principal component include countries 24, 6, 11, 7, 19 and 20 (Figure 5). Relative to these countries, all others have much lower levels of capacity. Note that there are some questions over the data, especially for countries 25 and 28.

Certification capacity

The certification capacity index has 16 indicator variables:

- existence of a public certification body;
- whether the national certification body is accredited to ISO/IEC 17021;
- availability of internationally-registered private certification bodies;
- availability of internationally-accredited auditors for ISO 9001, ISO 14001 and ISO 22000;
- existence of firms certified to ISO 9001 in at least one of the major export sectors, in at least one of the major import sectors, and for at least one of the priority products;
- existence of firms certified to ISO 14001 in at least one of the major export sectors, in at least one of the major import sectors, and for at least one of the priority products;
- existence of firms certified to ISO 22000 in at least one of

Table 7. Summary statistics and first principal component scores for accreditation capacity index

Asset	Mean	Standard deviation	Scoring factor for first principal component
National accreditation body			
National Accreditation Body	0.392	0.497	0.360
ILAC signatory	0.321	0.475	0.451
IAF signatory	0.214	0.417	0.410
ISO/IEC 17011 certified	0.321	0.475	0.451
Accreditation services			
ISO/IEC 17025 auditors	0.357	0.487	-0.017
Laboratories audited	0.464	0.507	0.156
Certification bodies audited	0.285	0.460	0.072
Inspection bodies audited	0.178	0.390	-0.019
Eigenvalue of first component		**5.7**	
Percentage variance of first component		**0.63**	

the major export sectors, in at least one of the major import sectors and for at least one of the priority products.

The first principal component accounts for 47 per cent of the variation across the indicators, with an eigenvalue of 7.6.[53] Of the remaining 15 scoring factors, 13 are positive, suggesting that the first principal component provides a good measure of certification capacity. Variables with heavy scoring factors include having firms certified to ISO 14001 and ISO 22000, and having a national certification body that is accredited to ISO/IEC 17021.

Countries with the highest scoring factors on the first principal component, indicating that they have relatively high levels of certification capacity, include countries 24, 14, 20 and 27 (Figure 6). Almost all other countries have a negative scoring factor, suggesting relatively weak certification capacity. Of these, the weakest capacity is found in countries 13 and 19.

Accreditation capacity

The accreditation index consists of the following variables:

- existence of an NAB;
- whether the NAB is a signatory to a mutual recognition agreement with the International Laboratory Accreditation Cooperation and/or the International Accreditation Forum;
- whether the national accreditation board is peer reviewed by IAF or ILAC;
- existence of qualified auditors;
- whether laboratories, certification bodies and/or inspection bodies were accredited between 2006 and 2008.

Table 7 reports the scoring factors for the first principal component following PCA on the nine indicators. The first component accounts for 63 per cent of the total variation and, with only two of the indicators having negative scoring factors, the index appears to be a good measure of accreditation capacity. The eigenvalue of the first principal component is 5.7.[54] Indicator variables with the greatest influence on the value of the accreditation index are having an NAB that is a signatory to an MRA with ILAC and to an MLA with IAF, and that is certified to ISO/IEC 17011.

Countries with a relatively high level of accreditation capacity, on the basis of the accreditation capacity index, include countries 14, 28, 21, 25 and 10 (Figure 7). Reflecting the rather skewed distribution of the index values, there is a long tail of countries with relatively weak accreditation capacity, including countries 5, 1, 3, 4, 7 and 8.

Defining a national compliance capacity index

Because each of the indices presents the position of each country relative to the others, the raw scoring factors cannot be meaningfully compared across the indices, and thus measures for specific compliance capacities cannot be derived. To allow such comparison, the scoring factors can be categorized into quintiles and the mean score calculated for each area of capacity. In studies using asset indices, the data from these categories represents levels of wealth/assets and is used as a dependent variable in regression analysis to explain variations in wealth across households (see for example Filmer and Pritchett, 2001). The latter – focusing on variations in compliance capacity across countries – will be the focus of future issues of the TSCR. Here, we simply aim to make comparisons across the six elements of compliance capacity and to present the scoring factors for each of the indices in a manner that is perhaps easier to interpret. Thus, the scoring factors for each of the six indices are categorized into quintiles, with the first quintile corresponding to the 'weakest capacity' and the fifth quintile to the 'strongest capacity'.

The quintiles can also be interpreted as indicators of 'inequality' in compliance capacity. If capacity is uniformly distributed across countries, the difference in the mean capacity scores

[53] The second and third principal components have eigenvalues of 2.3 and 1.7 and account for 14 per cent and 11 per cent of the variation, respectively. The fourth principal component has an eigenvalue of 1.3 but accounts for less than one per cent of the variation.

[54] The second eigenvalue has a value of 1.5 and accounts for 17 per cent of the variation.

Figure 8. *Array of standards-setting capacity across countries studied*

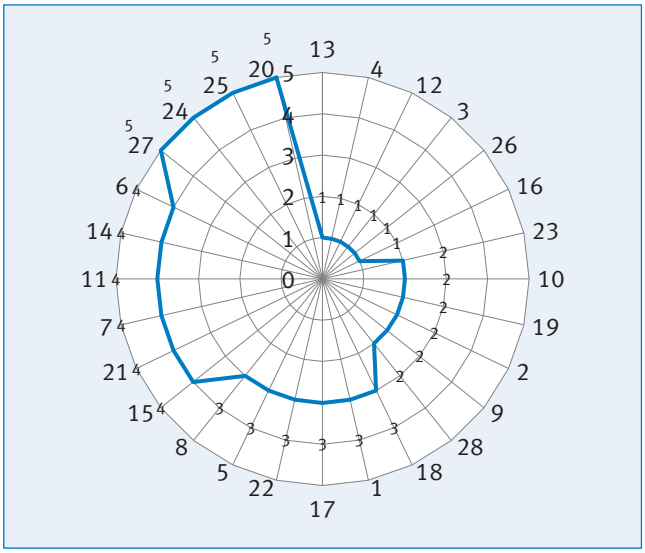


Figure 9. *Array of metrology capacity across countries studied*

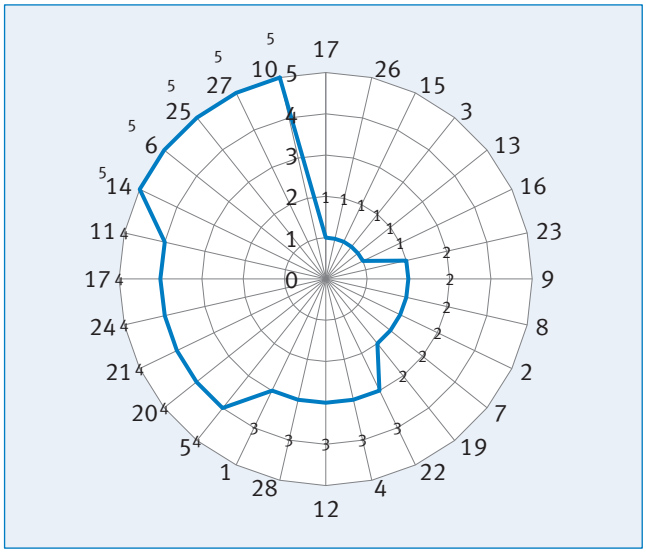


Figure 10. *Array of testing capacity across countries studied*

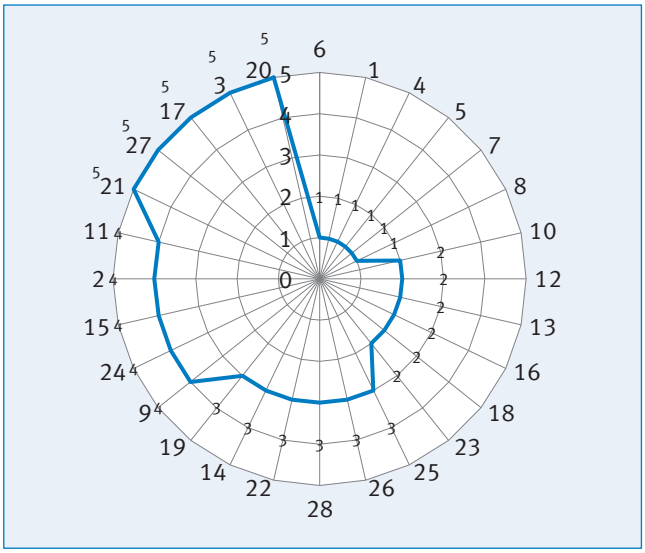


Figure 11. *Array of inspection capacity across countries studied*

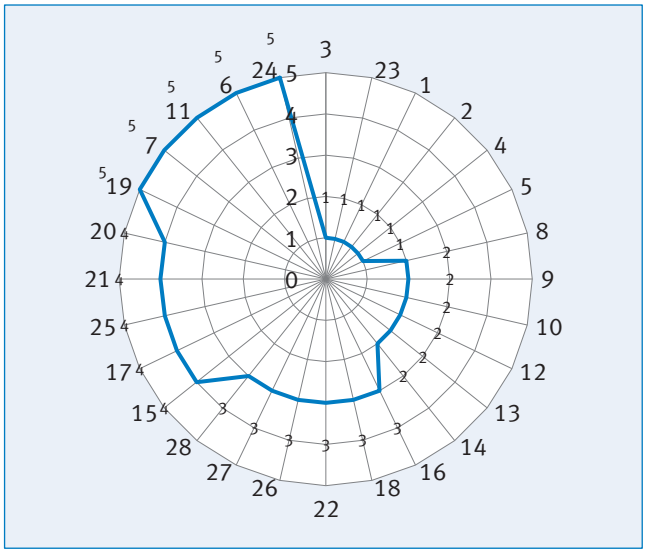


Figure 12. *Array of certification capacity across countries studied*

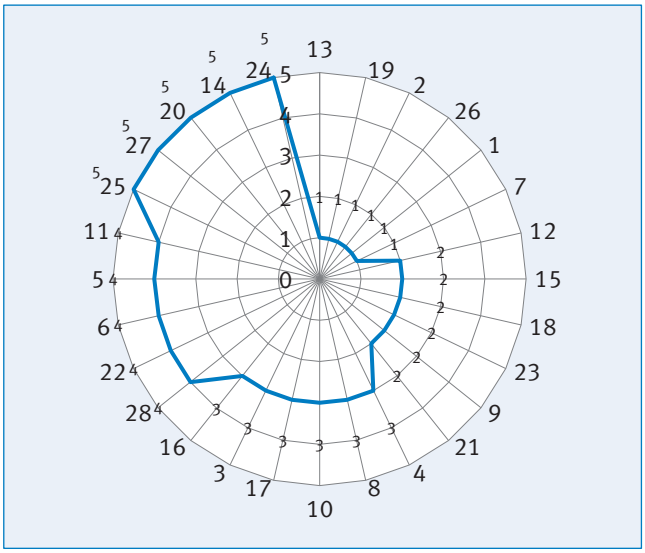


Figure 13. *Array of accreditation capacity across countries studied*

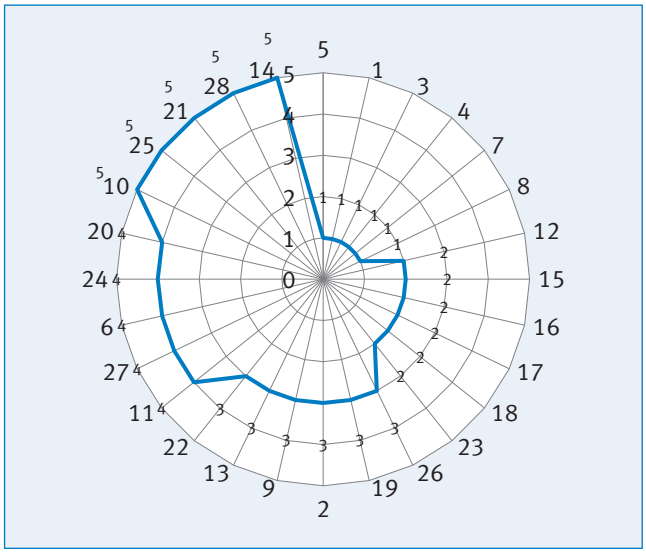


Table 8. Mean compliance capacity scores by quintile

Capacity	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Standards	-3.98	-1.47	1.47	1.90	2.03
Metrology	-2.73	-2.17	-1.32	1.16	5.81
Accreditation	-1.57	-1.56	-1.22	1.71	3.51
Testing	-1.45	-1.44	-1.11	1.42	2.88
Inspection	-0.99	-0.94	-0.94	0.33	3.11
Certification	-1.29	-1.07	-0.87	-0.22	4.09

between adjoining quintiles will be even (Filmer and Pritchett, 2001). Table 8 shows the mean capacity for each of the six areas by quintiles. There is a greater difference in the levels of capacity between countries in the first and second quintiles than in the third, fourth and fifth quintiles. This suggests that countries with the lowest levels of capacity are particularly weak. Conversely, there is little difference between countries at higher levels of capacity. With the accreditation, testing and inspection indices there is clumping of the first and second quintiles; there is no appreciable difference between the mean scores[55]. This may suggest that additional variables are needed to distinguish between countries at the lowest level of capacity. Alternatively, there may be a degree of homogeneity of accreditation, testing and/or inspection capacity across some countries, which could be solved through the inclusion of more variables in the PCA (McKenzie, 2005).

Figures 8 to 13 present arrays of compliance capacity across each of the six specific areas, with countries categorized according to the quintiles defined above. It is important to remember that relative capacity increases as a country moves from Quintile 1 to Quintile 5. It is easy to identify those countries with high, medium and low levels of capacity in each of the six areas relative to other countries in the analysis. Moreover, *the arrays say nothing about the capacity of these countries relative to countries excluded from the analysis*. In the case of standards capacity, for example, countries 13, 4, 12, 3, 26 and 16 all fall into the first quintile, suggesting they have the weakest capacity. Table 8 indicates that Quintile 1 has a much lower mean score than Quintile 2, suggesting that countries in this quintile have particularly weak capacities. Conversely, countries 20, 25, 24 and 27 are all in the fifth quintile, indicating that they have the highest level of standards capacity. There is a small drop in capacity to Quintile 4 (see Table 8), which includes countries 6, 14, 11, 7, 21 and 15.

Figures 14 to 16 present the array of compliance capacity across the six areas for three countries: 5, 11 and 14. Again, they present the level of capacity in these countries in the six areas *relative to other countries in the analysis*. In country 5, there is considerable disparity across the six areas. Thus, inspection, accreditation and testing capacity are weak, falling into Quintile 1. Conversely, certification and metrology capacity are relatively good, falling into the fourth quintile. Country 5 has no area of compliance capacity in the fifth quintile. Country 11 has good compliance capacity overall, being classified in either the fourth or fifth quintile across all six areas. Whilst metrology, certification and accreditation capacity in country 14 is in the fifth quintile, indicating that it is one of the highest compared to others in the study, inspection capacity is weak, falling into Quintile 2. Indeed, inspection capacity stands out as the one area of considerable weakness in country 14's compliance capacity.

Conclusions and further analysis

The SCCI, or perhaps more accurately SCCIs, is the first attempt to develop summary measures of the status of trade-related compliance capacity in developing countries. The indices aim to provide a comparatively easy and transparent way in which to identify areas of relative weakness in capacity, both within and across countries, and to monitor changes in the level of capacity over time, for example in the context of providing trade-related technical assistance. Thus, they indicate the status of compliance capacity across six specific areas relative to other countries, including those at similar levels of development or competitors in target export markets. The aim is for the SCCI to complement other efforts to develop indicators of trade capacity, for example the World Bank Institute's WTI and the Doing Business indicators of the International Finance Corporation.

The main concern has been to develop a coherent methodology rather than focus on the values assigned to particular countries for specific areas of capacity. Indeed, the values presented here should be regarded as illustrative. There is a need to enhance the quality of the data and to examine the statistical performance of the index, in particular the existence of clumping and truncation (see above). It will also be necessary to revisit the indicator variables included in the six indices, and examine where additional variables are needed and refine existing ones to reflect the key drivers of the respective area of compliance capacity better. Currently the indices would be better described as measuring compliance infrastructure rather than capacity. The aim is to expand the scope of the variables in these indices to cover wider aspects of compliance capacity. Comments from stakeholders and practitioners in this regard are both welcome and encouraged.

As we move forward, and with a view to future issues of the TSCR, emphasis will be placed on expanding the scope of the analysis to include a wider portfolio of countries and strengthening

[55] Clumping is a common problem in studies using asset-based measures. Another problem is truncation of the asset index distribution which arises when there are no variables that poorly distinguish between classification groups (Mackenzie, 2005).

the data collection process. The ultimate aim is to derive compliance capacity indices for most industrialized and developing countries in order to provide a wider picture of the status of compliance capacity across developing countries. It will also enable the strength of capacity within particular countries to be compared with capacity across competitor nations. It is also important to address concerns with data quality, examples of which are cited in the text. It will be necessary, for example, to validate the data so far collected and revise the data collection instrument to remove ambiguities and minimize the time and effort needed to supply the required information. The next issue of the TSCR will thus report on the results for a wider set of named countries.

Figure 14. Array of compliance capacity in country 5

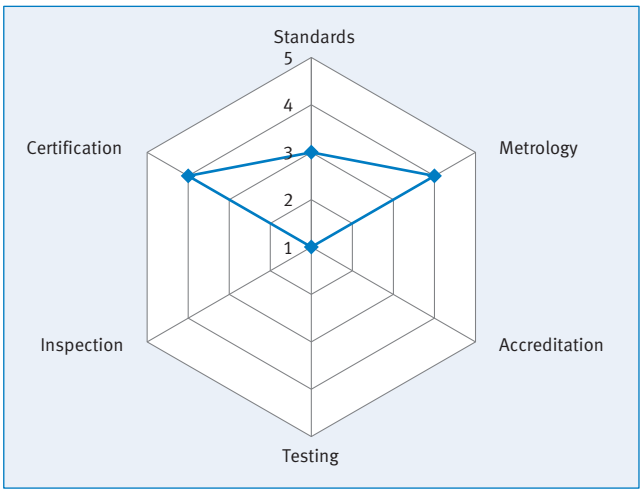


Figure 15. Array of compliance capacity in country 11

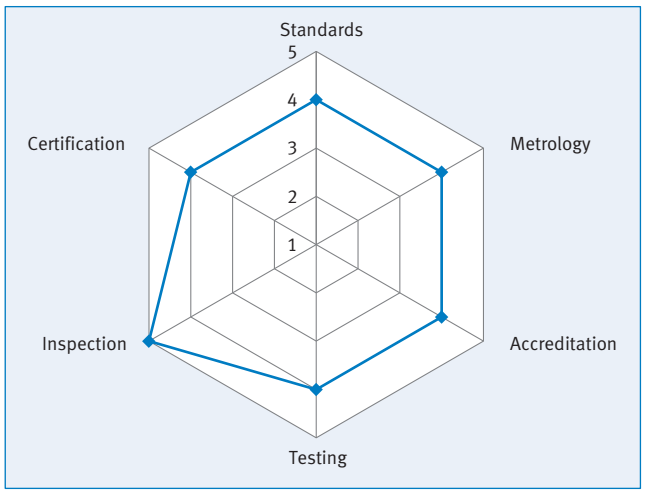
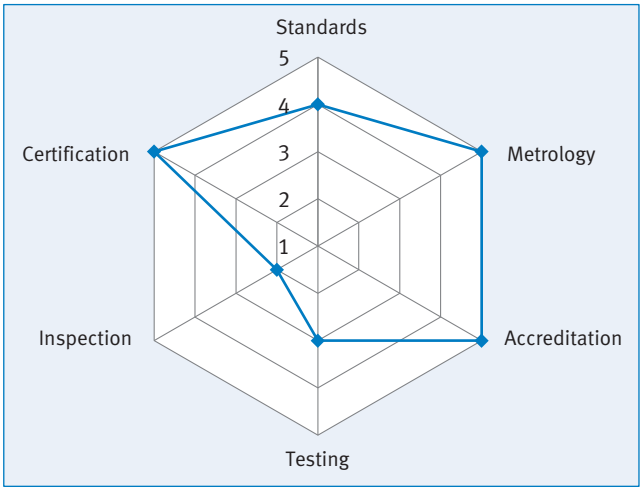


Figure 16. Array of compliance capacity in country 15



The SCCI will clearly be very useful as a diagnostic tool to guide capacity-building in developing compliance capacity. However, the trade performance of developing countries relates to a wider set of capacity constraints (UNIDO, 2005), which are the focus of investments by UNIDO and other bilateral and multilateral donors and technical assistance providers. The SCCI can easily be extended to these other areas of trade-related capacity, providing measures of relative capacity in a similar manner to standards-setting, metrology, and so on. Thus, while efforts are made to refine the data underlying the SCCI and to extend this analysis to more countries, a broader Trade Performance Index (TPI) will also be developed with the SCCI forming one component of it.

In defining the SCCI, it is important to view compliance capacity from a value chain perspective, inducing elements of compliance and conformity assessment that are both internal and external to key export sectors. Thought needs to be given to the other dimensions of trade-related capacity that could be included in the broader TPI, such as:

- **Export capacity:** This would examine the capacity of firms in priority value chains to produce and market products in a competitive manner for target export markets. It could include the number of exporting firms, the degree of certification to strategically-important standards, the status of innovative capacity, measures of international competitiveness, and so on.
- **Transportation, communication, and other logistical infrastructure:** This would aim to capture the status of the basic infrastructure in which priority value chains operate. Salient indicators could include: access to, reliability and/or cost of utilities (such as electricity and water); levels of mobile telephone and Internet capacity; prevailing road, rail and port infrastructure; and so on. Data for this dimension, at least in part, could be derived from the Logistics Performance Index (LPI) of the World Bank.
- **Trade finance:** The aim here is to assess the degree to which firms in priority value chains can access, for example, trade finance, the costs, and the requirements for collateral.
- **Quality and conformity assessment infrastructure:** This would assess the status of compliance services – predominantly external to the value chain, such as standards-setting capacity, metrology, and certification and testing services. This dimension is already covered by the existing SCCI and will be further elaborated for the next issue of the TSCR.
- **Customs and other trade procedures:** The aim here will be to capture the time and costs associated with impor-

tant trade procedures, including customs, official inspection and certification, and so on. Much of the data for this index could be derived from the Doing Business database.

Data to support the construction of the broader TPI will come from existing databases, supplemented by new data gathered through an extended version of the questionnaire used in this study. It is envisaged that the TPI will be reported in the TSCR and made available online, in a similar manner to the LPI. This would enable developing countries to examine their relative positions with respect to compliance and wider trade capacities and to help them make important capacity-building decisions.

To conclude, the SCCI is very much work in progress and the results presented above should be viewed as illustrative rather than a valid assessment of the status of trade compliance capacity in the countries included in the analysis.

This chapter has outlined the basic concept behind the SCCI and shown how indices can be derived for six areas of compliance capacity. Once the SCCI has been developed further, it is intended that the inevitable 'wrinkles' in the methodology and collection of data will have been addressed, so that a more reliable and comprehensive set of results can be presented. The concept of the SCCI will also be expanded into a broader TPI. Then it should be possible to start using the SCCI and TPI as tools to guide priority-setting for trade-related capacity development.

3.2 Causes of Compliance Failures in Developing Countries – An Insight from FVO Inspection Reports

Introduction

The analyses performed in the Trade Standards Compliance Report (TSCR) have been undertaken to shed new light on standards and technical regulations in international trade flows, and on their impact on developing countries.

In this part of the TSCR a specific commodity, fish, and the related compliance challenges will be analysed on the basis of the EC Food and Veterinary Office (FVO) inspection findings. The analysis focuses on fishery exports, which are particularly important for developing countries, as illustrated in Figure 1.

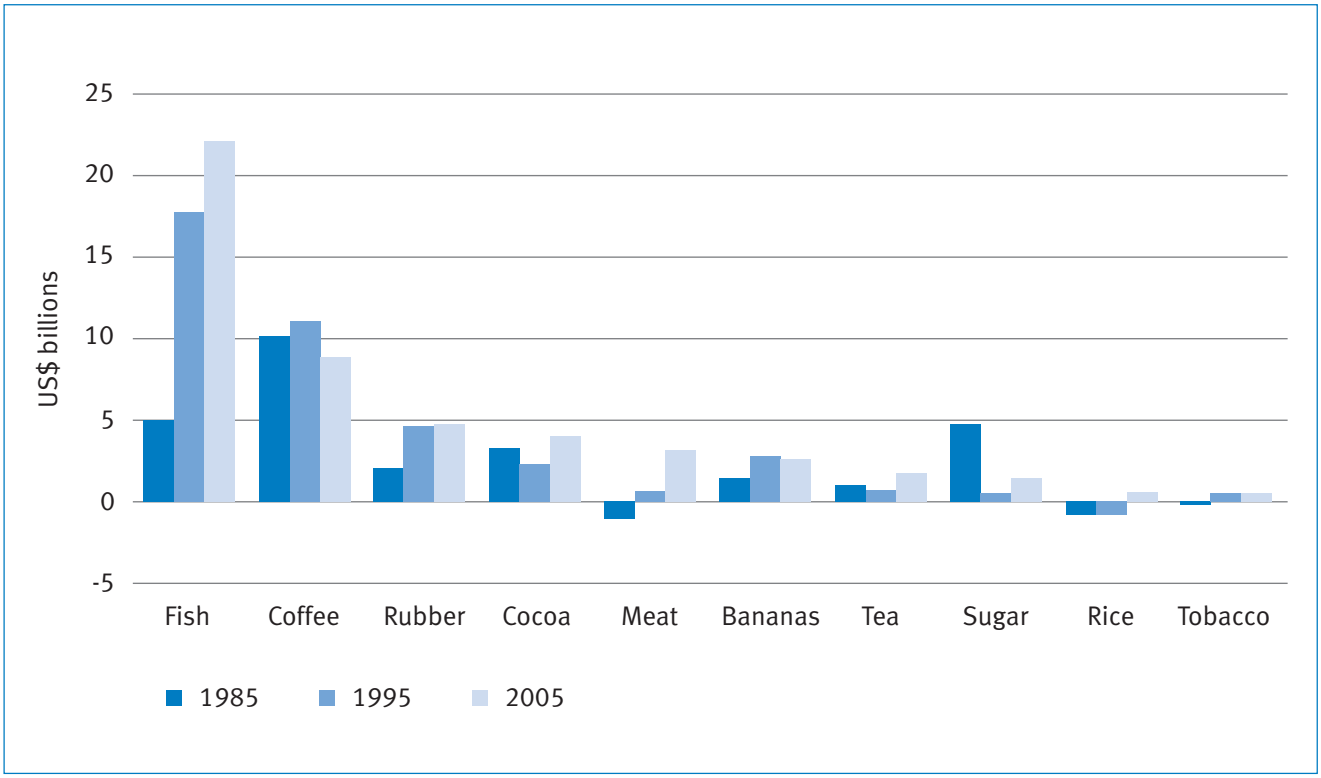
The use of existing data from the FVO auditing offers an absolute benchmark of developing country compliance performance in the area of fishery exports. This analysis can make an important contribution to governments seeking and donors providing trade-related assistance, while protecting livelihoods and sustaining employment across national economies.

Seafood exports – a strictly regulated export sector

This second part of Chapter 3 will use data from FVO inspections of countries exporting seafood products to the EU. The export of seafood products into the EU is an economically significant trade flow for developing countries worldwide (Diei-Ouadi, 2009). Food safety controls in the EU market are regarded, along with those in Japan, the USA and Canada, as some of the most stringent in the world (Ababouch *et al.*, 2005) but, whereas all four have entry point checks to ensure there is compliance with food safety law, only the EU inspects countries' compliance systems directly at exporting county level – the others focus solely on border inspection. The EU uses inspection as a check on its principle of equivalence: the matching of food safety/hygiene laws of the Competent Authority (CA) in the exporting country to the laws of the EU. The CA is the department within the third country that has the authority of the government to deliver food safety laws.

The US, Canadian and Japanese systems require inspections at the border, with discretion allowed in taking into account the past history of countries whose goods are being imported. The EU system uses a principle of inspecting the inspector rather than the traditional testing of the product. When the EU system works well, a country with an established and proficient CA enables new exporters to have an effective route to a premium market with less frequent import inspections. This, however, requires the introduction of control systems, which are generally very costly for low income countries.

Figure 1. *Net exports of selected agricultural commodities by developing countries*



Source FAO (2009)

The FVO is responsible for promoting effective control systems for the safety of all food and feed products consumed within the EU. Seafood products are divided into three categories: fishery products, aquaculture products and live bivalve molluscs. For this chapter, only data on seafood for human consumption will be considered. The analysis is taken over three years, 2006-2008, and is based on all of the FVO seafood inspection reports released within this period (publicly available at http://ec.europa.eu/food/fvo/index_en.cfm). The inspection data is cross-referenced against root cause analysis of the technical fiches for the Africa Caribbean Pacific (ACP) country group.

Fish-based inspection issues from developing countries have been highlighted previously by Ababouch *et al.* (2005), by Buzby *et al.* (2008) and by Allhouse *et al.* (2003). The present analysis shows that, from 2002 to 2008, fishery products accounted for 19.9 per cent of EU rejections and 20.4 per cent of US rejections. Relative rejection rates show that both large developing countries, such as Vietnam, Indonesia and Bangladesh, and small-scale exporters, such as Ghana, Nigeria, The Gambia and Congo, performed poorly. The moving average of detentions per $1m of exports for all food and feed products from 2006 to 2008 was 0.89 in the US and 0.0185 in the EU. The lower percentage from the EU potentially shows the lower reliance on entry point inspection systems. This was lower in fisheries, as reflected by figures presented previously by Allhouse (ibid). Buzby *et al.* (2008) tabulates the importance of imports of seafood to the USA, which have risen from 50.9 per cent to 80 per cent of all seafood consumed in the USA over the years 1981 to 2004. Similar trends of increasing dependence on imports are evident in the EU. This indicates the growing importance of border control for food safety in these sectors.

This robust approach to inspection and food safety control has been in place since the beginning of the EU, and its implementation has been evolving continuously since. The Bovine Spongiform Encephalopathy (BSE) crisis in 1996 caused a major reform of the EU food safety laws and contributed significantly to their current form (Ugland and Veggeland, 2004). Further developments in the Food and Feed Law of 2003 gave third country CAs less flexibility over interpretation of the EU laws and introduced increased inspection, with an EC inspection team established in Grange, Ireland in 2002. The 'from farm to fork' regulation in 2004 caused more frequent, closer and more coherent inspection along all levels of the food supply chain. With increasing globalization, there has been a need to synchronize legislation (Gitonga, 2007), which has only been partly achieved even after the ratification of the Agreement on Sanitary and Phytosanitary (SPS) Measures and the Agreement on Technical Barriers to Trade (TBT), as overseen by the World Trade Organization (WTO) (Ababouch *et al.*, 2005).

There are many factors that can lead to seafood compromising human health: histamine poisoning, high mercury levels, paralytic shellfish poisoning (PSP) and *vibrio* in oysters, to name just a few.

FVO inspection rationale

FVO inspection data will be used as an absolute benchmark of compliance performance. FVO missions in the seafood sector have three titles: fishery products, aquaculture products and live bivalve molluscs. The missions have the task of appraising CAs to ensure that the food safety of products entering the EU is adequately controlled. This works on two levels: an able CA will be granted equivalence with the EU and allowed to assess its own landing sites and vessels and issue approval for products to enter the EU (Level 1 status). If, however, the CA is assessed as being non-compliant with EU food laws, then it will be given Level 2 status and all its products will be inspected at the Border Inspection Post (BIP) upon entry. If there are serious non-compliances, the country will be banned from exporting seafood to the EU market. In some situations, a neighbouring country can provide the laboratory support: South Africa, for example, can provide support for the SADC region, and New Zealand for some of the South Pacific Island Groups.

FVO inspections are undertaken on the basis of:

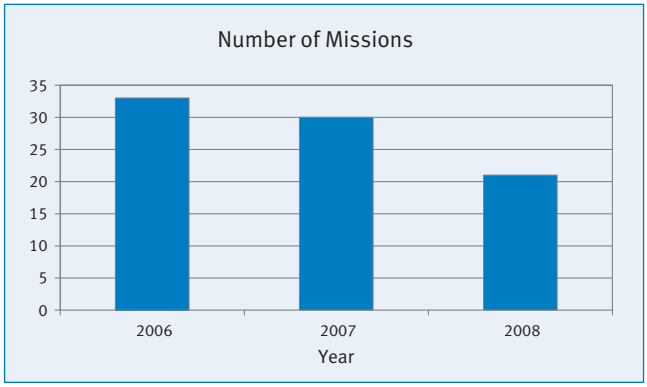
1. The volume of trade in relatively high risk products (i.e. live bivalve);
2. The nature and frequency of rapid alerts for food safety, animal health or plant health;
3. The results of previous inspections, particularly where weaknesses have been revealed;
4. Requests from third countries for approval to export to the EU.

(Adapted from (Wiig and Kolstad, 2005)

The role of harmonization in the development of equivalence agreements is covered in guidance by CODEX CAC/ GL – 1999. The use of equivalence in terms of exporting countries running inspection systems to the same standard as the receiving country is championed by the EU, but also used by Canada and advised by the USA. The fundamental difference in the EU system is that equivalence is controlled through frequent and stringent inspections. Although the EU equivalence system should result in less inspection at entry, in fact, border inspection is still widely used in the EU. So, although the dual approach of equivalence with inspection and border inspection increases food security, it adds to the cost of importing seafood, due to increasing lead times and bureaucracy, and can mean that the need for third countries to comply with EU rules and procedures acts as a TBT.

The FVO inspects more than just seafood; its mandate covers food and feed safety, animal health and welfare, and plant health.

Figure 2. *Number of FVO missions*



The trend in the number of FVO inspections (missions) has been downward over the last three years. Figure 2 shows seafood inspection missions from 2006-2008. This could be indicative of an improving global compliance performance.

Analysis of FVO inspection findings

The analysis presented below consists of two parts: firstly, the initial classification of FVO failures for, in turn, all countries and ACP countries; and, secondly, the root cause analysis of the three most important categories of ACP failure, based on the analysis of technical fiches.

All FVO inspection reports for seafood were analysed for classification of any failures/non-compliances. This was done for both all countries as a group and for the ACP countries as a group. The ACP countries are used as a proxy for developing countries: the ACP grouping is a subset of all developing countries which is already incorporated into EU data sets and working practices.

The sample comes with several caveats, including: (i) it is incomplete as it only captures countries who have tried to export seafood products to the EU – this would exclude countries which either cannot or do not trade with the region, for example those that have a dominant trading relationship with a large market in Asia or the Americas; and (ii) the data is collected by different inspectors who may have a different interpretation of issues.

The initial classification used the standard ten headings defined by the FVO, which are listed in Annex 1. This data is displayed for all countries and ACP countries. Inferences on the differences between the two groups' areas are then made.

Underlying cause classification took the three most important areas for failures in the ACP countries and examined the technical fiches to ascertain the underlying causes through a root cause analysis carried out using six sigma problem identification techniques. A technical fiche is a report which considers and evaluates the problems that have to be overcome in order to meet the standards required by the EU.

Results

Figure 3 shows the analysis of all FVO inspections over the years 2006-2008 for both developed and developing countries. It can be seen that there is an even distribution of failures but that the most frequent failure was from residuals.

As indicated in the rejection analysis, veterinary drug issues featured prominently in EU detentions for EU imports. Anecdotal evidence suggests that more developed third countries supplying aquaculture products, such as shrimp, panagasius spp. and tilapia, have more problems with chemicals and residuals. The import of these products from non-accredited countries through third countries is also an issue. The problems with antibiotics, poisons and veterinary chemicals have been highlighted previously by Allshouse *et al* (2008).

Figure 4 shows the three main areas of compliance-related failures detected during the inspections for ACP countries: CA, laboratories and establishments/vessels make up nearly 75 per cent of all non-compliances. Within these areas there are many specific factors that cause the failure/non-compliance – these root causes of failure are listed in Table 1 below. The concentration of failures in the ACP group suggests that developing countries face significantly different issues and environments to exporters in general. Technical assistance to address weaknesses in these areas can usefully be strengthened and expanded to level the playing field between lower and higher income countries.

The CA and the laboratory categories are an interlinked area of compliance failure. Both areas combined caused 42 per cent of FVO inspection failures and are central to the improvement of compliance in developing countries.

The joint highest level (21 per cent) of non-compliances was in the approval of establishments and vessels. The inspected country needs to be able to demonstrate its ability to inspect an establishment (processing factory), landing site, fishing vessel or factory ship before it can gain approval to export to the EU market. This area of non-compliance is vast, with some countries needing to upgrade fishing fleets of, often, over a thousand vessels. The EU stipulates the need to improve one fishery supply chain from vessel to landing site to processing establishment as an example. The successful approval of this supply chain allows the CA to prove they can administrate and regulate supplies in their country to EU standards. To gain widespread access to the EU market, the CA needs to have a strategy

Figure 3. *FVO inspections 2006-08*

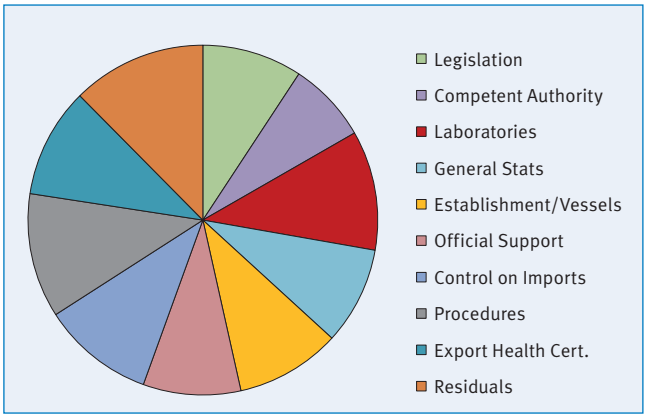


Figure 4. *Non-compliances: ACP*

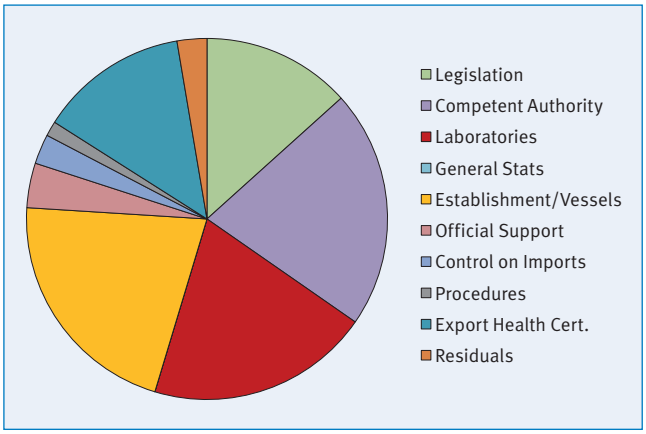


Table 1. Root cause analysis of failures

Section	Underlying Cause	Number	%
CA	Lack of knowledge and understanding	15	31%
	Weak governance	10	21%
	Lack of training	8	17%
	Poor management	6	13%
	Unwillingness to change	5	10%
	Lack of budget	4	8%
Laboratories	Lack of knowledge and understanding	14	40%
	Budget / lack of equipment	9	26%
	Staff numbers / staff retention	5	14%
	Poor management	5	14%
	Linkage to CA	2	6%
Establishments	Budget / Underinvestment	11	48%
	Poor management	4	17%
	Lack of knowledge and understanding	3	13%
	Linkage to CA	3	13%
	Lack of training	2	9%

to implement the improvements across the industry and raise standards. The establishments that are at the required standard are given an EU export approval number, as are vessels.

The analysis of underlying issues identified by FVO inspections in ACP countries highlights 'Knowledge and understanding' as a recurring issue for failures in the CA laboratories and establishments. Interventions need to address this gap and create a clear understanding of the relevant EU legislation and requirements. Insufficient budget is often a limitation on developing countries' ability to reach the standards required and is particularly a constraint for laboratories and establishments.

The lack of training of staff is a further serious constraint, related to budgetary insufficiencies and a recurring brain-drain of qualified staff.

Another key issue is poor management and insufficient linkage between different institutions responsible for compliance throughout the supply chain. In addition to strengthening existing skill upgrading and the upgrading of accredited laboratories, there is also a need to look at holistic strategies for engaging actors at all stages of the supply chain.

To be successful, the CA needs strong government support and to be committed to achieving exports to the EU market. Table 1 shows that 21 per cent of CA failures are caused by weak governance.

The root-cause analysis provided above can be usefully compared with the typical findings of root-cause analyses conducted under the six sigma technique. A standard list of root causes is:

- Lack of training
- Lack of management support/ Poor management
- Lack of organization
- Lack of discipline
- Lack of resources
- Lack of time

To achieve the goal of safe seafood exports in developing countries, CAs need graduate and postgraduate technicians, high-grade equipment and a management tier which can mange these resources effectively. Control systems must be managed within a changing regulatory and economic environment.

An example of a successful joined-up approach can be found in the ability of countries to work together and pool resources, such as the East African Community (EAC)'s ability to overcome FVO inspection failures for SPS within Lake Victoria Nile perch (Henson and Loader 1999). Another example of the benefit of cooperation is the ability to use other countries' laboratories to avoid the cost of running and equipping a laboratory for all tests (for example, Papua New Guinea uses Australian laboratories) (Gitonga 2007).

Conclusions

The objective of this chapter was to use FVO inspection data to examine the most common causes of compliance failure. This complements the SCCI analysis presented in the preceding section: the FVO analysis offers an objective third party analysis of the gaps in compliance capacity. The results of this analysis will allow NGOs, governments and donor agencies to undertake informed policy choices and to determine what to prioritize when funding compliance capacity-building, especially laboratories, government agencies and training programmes. Seafood

inspections were used as a sample population which presented both a dominant proportion of developing country exports and a stringent regulatory climate caused by microbiological and chemical risk factors.

The FVO inspections provided a set of data on self-selected countries which had experienced some form of compliance failure. The reports provided an absolute benchmark of compliance performance through the auditing of CAs and national supply chains.

The FVO reports were grouped into all countries and ACP countries, the latter providing a proxy for developing countries. The classifications of each failure used by the FVO were then tallied and presented. A root-cause analysis was conducted on the most significant categories of failure for the ACP countries.

The results showed that the experience of developing countries was significantly different to that of all countries. Whereas in the all countries group, failures were evenly distributed in each category, for ACP countries three categories were dominant: CA, Laboratory and Establishment/Vessel accounted for 75 per cent of all failures.

The root cause analysis demonstrated that both lack of budget and poor knowledge and understanding were cross-cutting issues for all three institutions. This indicates that the need to build physical and technical capacity in developing countries – laboratory infrastructure and relevant training – must form a part of future interventions. Case studies such as that of the East African Community have illustrated innovative approaches to effective capacity building.

However, secondary causes, such as poor management in establishments and lack of empowerment in competent authorities, also show up in the analysis. Experience of managing projects designed to develop compliance systems has highlighted the dependencies between factors such as lack of budget and poor management or resistance to change. For this reason, successful trade development demands innovative approaches beyond mandatory compliance requirements which bring in all those who are affected and can change compliance performance within a supply chain.

4. How can Technical Assistance stimulate Integration into Global Value Chains?

4.1 Trade Standards Compliance and Trade Development: a Value Chain Approach [56]

Introduction

Developing countries could accelerate their economic growth by expanding and diversifying their exports, but they are prevented from fully doing so by the difficulties they face in complying with public regulations and private standards. Standards and regulations affect many areas of trade, but they particularly challenge developing countries seeking to unlock their export potential in the agri-food sector. High levels of concern about food safety, among governments and consumers alike, mean that the production and sale of food is closely regulated to assure food safety and maintain consumer confidence. In addition to these concerns, food production, processing and trade raise a range of further issues in animal and plant health, environmental impact, product quality and social standards.

There is a well-established literature and policy agenda on trade, standards and compliance. This has identified the importance of developing national and regional capacity to meet standards, including the creation of standardization bodies, metrology systems (including accredited laboratories), and systems for certification, conformity assessment and accreditation. Such public services in support of export compliance are necessary for supporting trade, and governments in developing countries need assistance to develop them.

However, such supply-led capacity building is not the only way to secure compliance with regulations and standards. A supply-led strategy to trade capacity building can be complemented by a focus on strengthening links between enterprises and maximizing flows of resources and information to firms in developing countries. This is the focus of value chain approaches to trade capacity building. UNIDO's use of the value chain approach combines its overall concern with improving competitiveness and productivity, with issues relating to compliance (UNIDO 2009a). Within UNIDO's "3C approach" (compete; conform; connect) to trade capacity building, value chain analysis provides a framework for operationalizing the "connect" (i.e. to the market) element of this approach through its understanding of both the complexities of managing value chains in the context of increasing concerns about food safety and the potential it gives for inter-firm linkages to address these challenges and facilitate access for developing countries' producers, processors and exporters to global agri-food markets.

The challenges facing developing country exporters have grown as increasingly stringent public regulations are complemented, reinforced or extended by an array of private standards developed both by companies and by standard-setting coalitions, which may include retailers, food producers and non-governmental organizations (NGOs). They have grown, too, as the agri-food business becomes more international and it becomes more difficult to establish and maintain the integrity of food safety systems along value chains that often involve many different enterprises operating across different countries. The value chain approach focuses attention on both public and private bodies as drivers of standards and on the interaction between them.

At the same time, though, the global value chain approach emphasizes the importance of inter-firm coordination in agri-business value chains. Regulations and standards may directly impact on business models, creating new coordination challenges, but they also provide new opportunities to add value and differentiate products. Placing the evolution of regulations and standards in the context of business and competitiveness offers new insights into the dynamics of the regulatory environment and its potential for mobilizing business to act more effectively to improve compliance and open up new markets to developing country producers. The value chain approach identifies the roles of both the public and private sectors in responding to these challenges and the potential for public-private collaboration to improve response capabilities.

This section outlines how a global value chain approach to coordination challenges in the agri-food business can contribute to compliance with standards. Section 2 briefly describes the approach. Section 3 identifies four ways in which public policy can address value chain compliance challenges, using material taken from value chain cases studies. Section 4 presents specific questions for value chain analysis to address when considering how to identify and meet compliance challenges.

[56] This chapter incorporates material drawn from three short case studies commissioned by UNIDO on value chains and trade compliance value chain linkage promotion for Indonesian seafood exports by Dillon *et al.* (Dillon *et al.* 2010); the work of the Pesticide Initiative Programme by Webb (2010) (see also chapter 5.2); and Standards in Cut Flowers by Homer (2010). The author also appreciates many discussions with Spencer Henson that have developed his thinking on this topic.

The value chain approach

Value chain approaches to trade development and poverty reduction have been adopted by a wide range of development agencies, in particular as tools for promoting private sector development through business linkages. Among the agencies that have developed and employed these approaches are GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit) (2006; 2008), SDC (Sustainable Development Commission), and USAID through its microLINKS programme for enterprise development (http://www.microlinks. org/ev_en.php). The Donor Committee on Enterprise Development (DCED), which brings together donor agencies working on enterprise development, has a group and a website devoted to value chain approaches (http://www.value-chains.org/dyn/bds/bdssearch.home). Similarly, many international organizations have developed value chain initiatives[57], including those with an interest in trade and standards, such as FAO, ILO, UNCTAD and UNIDO.

A recent UNIDO report on value chain diagnostics highlighted the variety of approaches included under the value chain label (UNIDO 2009c: 3-5). Inevitably, as particular concepts and approaches become more widely used, they are adapted to meet differing demands and differing priorities, and the same name comes to encompass diverse approaches and uses. In the case of the value chain approach, this diversity is increased because of its emergence from differing analytical traditions. Value chain approaches can be used for a variety of purposes: for the analysis of large enterprises, their supply chains and their competitive strategies (in the work of Michael Porter); for the promotion of linkages between communities and external markets (Banjara 2007); or for disaggregating costs up and down the supply chain (World Bank 2005). Equally, value chain approaches can be used for different objectives: while some approaches focus on promoting growth in agriculture and manufacturing, others are more concerned with changing distributional outcomes (UNIDO 2009c: 20).

Within the broad spectrum of value chain approaches, the one adopted by Gereffi, Humphrey and Sturgeon (2005) is particularly useful for analysing how standards requirements can be met through more effective inter-firm linkages. This approach gives particular emphasis to value chain governance: the mechanisms firms use to coordinate their activities. Developments in global markets over the past few decades have greatly increased the complexity of inter-firm linkages in the global economy. The 2009 Industrial Development Report (UNIDO 2009b) highlighted the ways in which the vertically integrated enterprise has been decomposed through outsourcing and offshoring: electronics companies outsource assembly to specialist firms that are often based in other continents; pharmaceutical companies outsource manufacturing, testing and even parts of the innovation process to specialist companies; and leading brands design and market products without manufacturing any part of them.

This fragmentation of activities across different enterprises in different continents has to be complemented by mechanisms to coordinate these activities. The firms that slice up and distribute these activities are more concerned than ever before with the conditions under which products are made and the safety and quality processes that are in place. Regulatory compliance and brand image are at stake. Fish may be caught in the Arctic Ocean, filleted in China, made into ready-to-cook meals and supplied to supermarkets in Europe for sale as "own brand" products, and yet concern about how the fish is captured, stored, transported and processed is as great as it would be if all of these operations had taken place within a radius of 20 km. Maintaining oversight in control in spite of the challenges of fragmented ownership and great distances are essential both for the efficient operation of global value chains and for the protection of brand image: customers and regulatory authorities are as interested in activities taking place on the other side of the world as those close by.

This recent evolution of the global agri-food business has created new challenges that are particularly relevant for value chain coordination, trade compliance and trade capacity building:

- *The globalization of agribusiness value chains*. Global sourcing creates new sources of risk as food is subject to greater transformation and transportation and supply chains are fragmented across multiple enterprises. At the same time, globalization brings together diverse food production systems in terms of producer characteristics, regulatory frameworks, environmental conditions, technical expertise, etc. These factors will increase national governments' concern to ensure that imported food meets the same levels of safety as domestically-produced food, and this will raise issues of the equivalence of food safety systems or establishment-level controls over export-oriented food production and processing.

- *Food safety scares*. A string of high-profile food safety scares has led to more stringent specifications of allowable product characteristics and increasing emphasis on controls to identify and manage risks at multiple points in the value chain. In other words, food business operators have to control more factors and frequently within reduced limits of variation.

- *Increasing demand by consumers in global markets for greater information about products, their origin and how they are produced*. In many cases, these product attributes are not immediately or easily visible to potential buyers (neither firms nor consumers). Such claims about attributes are only credible if the integrity of the food safety system and the traceability of products are sufficiently well-established to ensure that particular products have been subject to reliable control processes. These consumer demands, however, present opportunities for developing countries to differentiate their products and add value through geographical origin or the adoption of particular production and processing methods.

- *Extension of controls along the value chain*. In the case of the EU, the adoption of a "whole chain approach" to food safety has increased concern with regulations and controls, both public and private, in developing countries. This approach gives greater attention to the processes that create food safety, rather than being

[57] See Humphrey and Navas-Alemán (2010) and Altenburg (2006) for reviews of development agency uses of value chain approaches for poverty reduction.

merely satisfied with inspections that verify food safety outcomes. This places new demands on food safety authorities in third countries and further promotes the introduction of process control, such as HACCP, along food value chains.

- *States are placing increasing responsibility on food business operators* to ensure the safety of the food that they sell to consumers, and this encourages these operators to develop their own systems of surveillance or to develop and/or adopt collective private standards to meet public regulations. Henson and Humphrey (2009) argue that a number of widely-diffused collective private standards in the global food industry are a business response to the increasing complexity of public food safety regulations and the emphasis on the responsibility of food business operators to ensure food safety.

In other words, there are new pressures in agri-food value chains. Buyers in developed countries must ensure that the products they sell meet public regulations and market requirements (private standards and consumer expectations). Equally, producers, processors and exporters in developing countries are expected to show compliance with regulations and standards. The salient feature of complex agri-food value chains is vertical coordination. This is the ability of firms to coordinate their activities through flows of resources and information. One prime motivation for this coordination is control. As agri-food business operators in developed countries are increasingly held responsible for what happens along the value chain, so they seek oversight and control. In the past, this might have been achieved through ownership. Now, oversight and control can be achieved through a variety of network relationships and through standards.

Oversight and control are also the central challenges for those who introduce regulations and create standards. Public regulations and private standards schemes lay down rules and create mechanisms for their reinforcement. These rules specify either what the characteristics of particular products or services should be (product standards) or what characteristics the processes that create these products and services should have (process standards). In both cases, organizations that create or adopt standards try to shape the behaviour of firms implementing the standard. As process standards are increasingly promoted as the route to food safety, so regulations and standards exert control over farming and processing activities in distant locations.

This evolution of standards arises as a policy issue because it may reduce opportunities for trade. Meeting these changing requirements may require capabilities beyond the capacity of firms or governments in exporting countries, or only be achievable at a cost which makes products uncompetitive. Further, responding to new compliance challenges may involve changes in value chain structure and/or governance that have consequences for producers in developing countries. These compliance issues arise not only with products that are currently exported, but also with products that countries might want to export. As businesses and governments develop strategies for new products, or new markets for existing products, or even new niches (quality, origin or other characteristics) in existing markets, compliance with standards may arise as an issue – either as an obstacle to market access or as an opportunity to add value and differentiate products.

The greatest concern is that countries or particular types of producers, notably small famers, will be excluded from export markets. This is not a new issue. Developing countries have long been largely excluded from substantial parts of global trade in agri-food products. Animal health concerns, for example, have greatly restricted participation by developing countries in global trade in meat and meat products. The fear is that new requirements will either force developing countries out of markets to which they have hitherto had access, or impose conditions that only large-scale operators can meet, resulting in the marginalization of small-scale farmers. In both cases, the potential development benefits from increasing global trade in agri-food products would be reduced.[58]

These concerns are not without foundation. A simple, market-based procurement system might suffice for sourcing products whose relevant attributes are readily discernible to the buyer (through inspection or testing), but if regulations and standards create new and difficult-to-monitor requirements for product safety, environmental impact or working conditions, they can be difficult to meet. Furthermore, the complexities of these requirements may shift enterprises' sourcing strategies towards more durable and complex relationships and towards larger suppliers. This is particularly so when compliance involves demonstrating that the correct procedures are being followed on the farm or in the processing plant. Some studies of the impact of introducing compliance with new regulations and standards have highlighted the ways in which these favour large establishments and create problems for small farmers and small exporters (Graffham *et al.* 2007; Mithöfer *et al.* 2007).

Other studies, however, have shown more positive outcomes. Some have pointed to the way in which coordination in global value chains creates linkages along the chain that facilitate flows of knowledge and resources of a kind that create more inclusive value chains that might create opportunities for small farmers. First, these studies have highlighted the importance of exporters in developing countries as key actors in value chains that provide an interface between developed country buyers and developing country producers (Gibbon *et al.* 2009; Henson *et al.* 2009). Second, developed country buyers need reliable suppliers of products that meet the required standards: there are many examples of developed country agri-food importers working closely with the supply networks to meet new standards. Third, there is scope for public policy to promote and support the development of more sustained and productive linkages along value chains that will facilitate the flows of resources and knowledge that will enable producers to improve their efficiency and product quality. Fourth, the development of new standards may also provide opportunities for value addition and increased income for producers in developing countries: the simplification of information transmission through standards will facilitate product differentiation and add value to products. Clearly, standards can present opportunities as well as threats.

[58] The consequences that the marginalization of small farmers from agri-food value chains will have for poverty levels is contested. Two studies of different patterns of production for fresh vegetables exported from sub-Saharan Africa suggest that large-scale farming for export has an impact on household poverty equivalent to that of small-scale farming. See McCulloch and Ota (2002) and Maertens and Swinnen (2009).

To summarize, the increasing complexity of global value chains and the evolving demands of final markets create new coordination challenges and new capability challenges. Many of these challenges are met by businesses as they build relationships with their suppliers and customers and take initiatives to meet changing market requirements. In many cases, the needs and capabilities of both buyers and suppliers „co-evolve“: over time, as actors in value chains, they build up their relationships and their capabilities in a process where both respond to changing market demands (for example, meeting more stringent public regulations or consumer expectations) and develop new product offerings that shift expectations and consumption patterns (for example, the development of ready-to-eat products and increased year-round supply of fresh produce).

Value chain responses to compliance challenges

Current trends towards enhanced concerns with food safety, origin and quality have created new opportunities for producers in developing countries to add value to their products and to create more and better employment. However, there are also three potential risks that arise from these trends. The first is that the process of co-evolution raises entry barriers: new entrants to markets are faced with complex market requirements. Second, the more complex that market requirements coordination challenges become, the greater the cost of incorporating new producers into value chains. Third, sudden changes in regulations or standards create knowledge or capability gaps. These risks can be addressed by public policy and public-private collaboration.

The potential for public intervention and public collaboration with private sector actors is illustrated here through reference to four case studies of value chains and public policy. These address the issues of identifying key actors in value chains, mobilizing value chain knowledge and resource transfers and identifying control points in value chains.

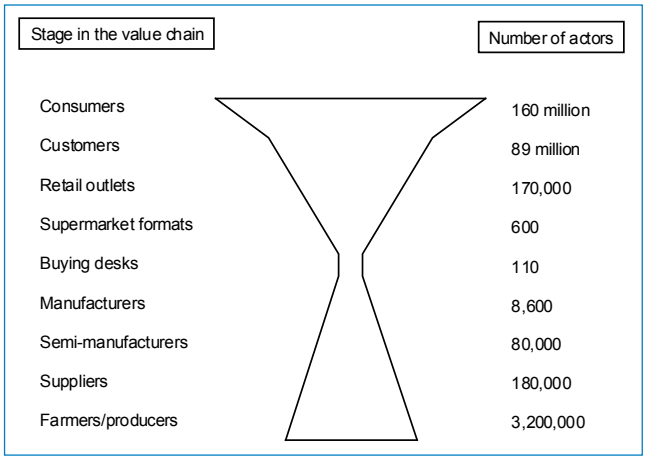
Identifying key actors

In the classic conception of the market, many buyers and sellers come together, and none of them have sufficient resources to change patterns of price determination. Value chains, in contrast, frequently bring together firms of different sizes and, at different points in the chain, there are varying degrees of concentration. Lead firms in value chains occur at points of concentration: they have either market power or control of strategic resources that enable them to act as gatekeepers to the value chain.

In studies of global agribusiness in the past decade, a lot of emphasis has been placed on the role of supermarkets as lead firms (see, for example, Dolan and Humphrey 2000). This is seen particularly in northern Europe, where supermarket chains are responsible for a substantial amount of retail sales of fresh and processed food. Grievink (2002) has shown this concentration of firms and buying power at the “pinch points” in visual terms in Figure 1. One hundred and ten supermarket buying desks (reduced in a later presentation to 60 buying desks) act as the pinch point between 3 million producers and 160 million consumers.

These firms have taken the lead in organizing supply chains and defining product strategies. In addition, they take the lead in defining (or approving) strategies to deal with external pressures. They make decisions about how to respond to changing consumer preferences (as well as trying to shape these preferences) and, in the case of fresh fruit and vegetables, they respond to the changing regulatory environment in Europe by promoting private standards schemes for both food processing plants and farm-level production.

Figure 1. Supermarkets and the supply chain „funnel“ in Europe



Source: Grievink (2002)

While lead firms attract a lot of attention in value chain analysis, public interventions may be focused not only on other actors involved in the production, processing and distribution, but also on service providers and standards-setters and agencies concerned with value chain promotion (UNIDO 2009c: 35). The value chain case studies identified a variety of partners for public interventions to promote compliance with the requirements of developed country markets. The case study of the Pesticide Initiative Programme (PIP), for example, highlighted the role of exporters as partners for farmers:

> “PIP worked principally through exporters; it did not follow the approach taken by many other programs targeting mainly producer groups or PMOs (produce marketing organizations). Exporters are in a better position to finance and maintain compliance systems, and have the greatest vested interest...By working through exporters, PIP reached all the players in the supply-chain: smallholder outgrowers, farm workers, drivers, packhouse workers, etc.” (Webb 2010: 3)

Just as retailers in some value chains define strategies to address key market and regulatory challenges, so exporters in fresh produce value chains frequently translate these standards and the specific requirements of buyers in external markets into processes and procedures that are adopted in domestic production and processing. How this translation process is managed partly determines the impact of these external requirements. The importance of exporters as gatekeepers to external markets and key actors in developing countries has also been emphasized by Gibbon (2009) and by Henson *et al.* (2009).

Public policy can affect these translations of requirements. For example, the PIP initiative recognized the importance of exporters and their role in incorporating small farmers into export value chains for fresh produce, and put considerable emphasis on building the capacity within companies to train and support smallholder outgrowers:

> "By developing and implementing training for their smallholders, PIP made it easier (and affordable) for companies to continue sourcing from them, and for the latter to maintain their foothold in the supply chain. Similar support was given to extension workers in a number of project/NGO/public bodies working with smallholder groups." (Webb 2010: 4)

The importance of standards in shaping value chains is already an indication of how inter-firm linkages in global value chains are shaped, in part, by the contexts in which they operate. The case studies also show how actors not directly involved in the production, processing, transport and sale of products can also have an impact on how the business is conducted. The study of the trade in cut flowers between developing and developed countries by Homer describes how, in the 1990s, German NGOs campaigned about human rights and labour abuses in the Colombian flower industry, putting pressure on the German Flower Wholesale and Import Trade Association (BGI). After the BGI adopted the Flower Label Program code of conduct, a boycott of non-certified flowers led to a fall of 25 per cent in Colombian flower exports to Germany (Homer 2010: 3). In the case of Kenya, similar pressure was applied, although there it started with an international NGO event in Nairobi organized by the Kenya Human Rights Commission. The outcome of this process was the development of more robust standards in the Kenya flower industry, under the auspices of the Kenya Flower Council.

Finally, standard-setting organizations themselves are important actors in value chains, and can be engaged by policymakers. PIP, for example, "attempted to engage with the main standard-setting bodies" to ensure they were aware of problems with certification and inappropriate criteria (Webb 2010: 3). Donors in Kenya engaged with GLOBALGAP and benchmarked to it in establishing national standards. Even when the standard-setting organizations are initially established by firms in the value chain (for example, EurepGAP or the British Retail Consortium), they can enter into a new dynamic, modifying and extending the array of standards they create in order to generate more business and provide greater services to clients. Given the intense competition in the standard-setting business, this is one of the factors that drive the proliferation of standards, and the tendency for the product attributes they cover to expand.

Bridging capability gap: mobilizing value chain knowledge and resources[59]

States have an important role to play in bridging capability gaps in value chains. Some of the gaps can, however, be managed through collaboration between firms in value chains and by restructuring the value chains themselves. In their most pared-down form, business transactions involve an exchange of products or services for money. However, relationships between firms in value chains may involve much more than this. As information and coordination requirements become more complex, value chain relationships incorporate not only flows of information about market requirements and demand patterns, but also flows of resources, such as credit and technical assistance. These resource flows are designed not only to meet capability challenges, but also to manage relationships and address the problems of opportunism and incentives that arise when relationships between enterprises become more sustained and more complex.

The Trade Corridor Programme, developed as part of UNIDO's trade compliance programme and described by Dillon *et al.* (2010), was designed to overcome some of the barriers to increasing exports of fish from Indonesia to Europe. An initial diagnosis of this sector in Indonesia revealed that product quality was low, hygiene and handling at the point of capture did not comply with international standards, some opportunities for value adding were being missed, and, from the point of view of potential buyers of the product – a fish processing company based in the UK – the overriding issue to be addressed was compliance with regulations.

The Trade Corridor Programme addressed these issues by partnering the Indonesian export sector with importers based in the UK, with a two-fold aim: creating awareness among UK importers of the potential of Indonesia as a supplier, and raising awareness in Indonesia of the requirements and opportunities in the UK market. These linkages might also begin to develop the trust relationships that are important for sustaining trade in products that must meet requirements related to food safety, labour regulations and environmental impact.

By reducing the initial costs for both parties of exploring the trade opportunities, and by overcoming the lack of information about the potential for expanding trade, the programme opened up the possibility of increased contact. Once companies become interested in mutual trade opportunities, then knowledge and resource exchanges become viable: exporters will have a direct incentive to work towards meeting the demands of buyers, and buyers will begin to see the opportunities for investing in the capabilities of these suppliers.

Such buyer investments, however, are far from automatic. Buyers have no obligation to provide technical assistance to their suppliers, nor do they necessarily have the capacity to do so. Assistance of this kind is more likely to be forthcoming when there is a generalized scarcity of capable suppliers, and the buyer, seeking a stable and guaranteed supply, uses technical assistance to tie in suppliers. This was not the case here. The Trade Corridor Programme therefore also worked with the Indonesian government and international organizations to improve infrastructure and the performance of firms in the sector. The identification of the potentials for adding value and accessing export markets provided the justification for these efforts. The analysis of the export potential of the sector was then used to develop an economic impact model that provided a planning tool for the Indonesian government.

This case shows how public interventions can promote knowledge flows and the building of trust in value chains. Equally, public programmes to promote capabilities can channel their

[59] This section draws from an analysis of the Trade Corridor Programme funded by UNIDO, which aimed at promoting inter-firm linkages in the seafood industry between the UK and Indonesia. This initiative was developed and presented by Dillon *et al.* (2010).

efforts through value chain linkages. Two development projects in Bangladesh illustrate how this can happen. In one, shrimp hatcheries were encouraged to provide better knowledge for farmers to improve poor pond cultivation techniques (de Ruyter de Wildt 2007). In the other, retailers of farm inputs were used as a conduit for information about good vegetable farming practices in a programme designed to improve the low productivity of Bangladeshi vegetable producers (Gibson 2005). A value chain approach can identify business-based information conduits and use them to access target groups.

Effective interventions: identifying control points in value chains

Compliance strategies depend upon instituting control points. At which points in the value chain are controls required, and who is responsible for their functioning? One lesson from the value chain approach is that there are choices about the positioning of control points, and hence differences in the location and in the responsibility for compliance. Being imaginative and flexible about where control is exerted can change the nature of compliance challenges.

For process-based standards and regulations, control point choice is limited. Process controls are placed at the points where risks occur: a requirement that food processing establishments should be registered by the national government or an agency of the importing country and should adopt HACCP procedures necessarily involves action at the level of the establishment. But when the compliance requirement focuses on product characteristics (for example, products that do not contain contaminants or residues), there may be multiple options for controls. The value chain approach suggests focusing on "pinch points" where chains are consolidated and, with relatively few actors to control, the controls are easier to exercise. An example of this is shown in Box 1.

In this case, working with a small number of chemical companies was easier than attempting to regulate the problem in the highly complex and fragmented leather tanning sector. This case shows, too, how there can be a choice in where controls are exercised in the value chain.

The case also highlights the identification of key actors in the value chain as the starting point for collective action to address compliance challenges: often these challenges require collective action by enterprises and collaboration with other institutions. Value chain methodologies employed in business promotion (and in other types of business promotion initiatives, such as the local economic development approach) have addressed the issues of building confidence and mobilizing collective action in the private sector.

Box 1. ***Identifying key points of intervention in value chains***

In the 1990s, the Indian leather industry faced a challenge in complying with restrictions by the German government on azo dyes and PCPs in leather products. This challenge was particularly difficult to overcome because of the highly fragmented nature of the Indian tanning industry. With many small establishments and elaborate divisions of labour within the sector, controls based on the traceability and control of substances at the point of production would have been difficult to implement. It would have been unlikely that all enterprises would comply with any regulations introduced, and linking particular products to particular establishments through traceability systems would have been difficult. In spite of this, the Indian industry managed to comply through the development and marketing of compliant dyes and the removal from the market of non-compliant products. The keys to this success were collaboration between the government and the chemical industry and, in particular, subsidiaries of multinational chemical companies, on the one hand, and the active involvement of a well-organized leather industry through the Council for Leather Exports, on the other.

Source: This case is taken from Tewari and Pillai (2005).

Which actors in the value chain need to be capable of meeting standards requirements?

The development of process-based standards and regulations, particularly those that apply at the farm level, creates new challenges for producers and processors. If these are not met, the risks of exclusion increase. The recognition of this has led to substantial investments in farmer training to meet new requirements. Unfortunately, training alone will not create robust compliance schemes that satisfy the requirements of companies and regulatory authorities in importing countries.

Value chain analysis shows that there are multiple ways to respond to capability challenges, including the restructuring of value chains to meet compliance challenges. Two ways are especially important. The first concerns the transfer of activities between agents in value chains. An example of this process is shown in Box 2. An important risk area and control point for complying with regulations on pesticide residues is the management of crop spraying. Various risks have been identified in spraying, including the use of inappropriate or banned substances, and using incorrect quantities due to mistakes in mixing crop protection preparations or defective spraying equipment. Added to this are the environmental and human health risks associated with the poor preparation, application and disposal of crop protection products. A much higher level of compliance is required to meet currently acceptable standards than was the case in the past. This opens up a capability gap.

The GLOBALGAP standard responds to this critical hazard by specifying elaborate rules for identifying spraying needs, selecting appropriate crop protection products and ensuring that workers are adequately trained. However, it should be noted that the hazard and the need to contain it can be addressed in different ways. Box 2 shows several ways of managing crop spraying to contain risk. One option is to provide training for small farmers so that they can spray their crops safely. Three other options all involve some degree of restructuring of the value chain: farmer groups and training for some specialist workers; use of specialist service providers; and exporters arranging spraying themselves.

A second form of value chain restructuring in response to regulations and standards is segmentation. If not all parts of the production system can be made compliant at reasonable cost, then one strategy is to segment the production system so that only compliant products are sent to compliance-requiring markets. Segmentation means that only those horizontal segments of the value chain that are considered capable of compliance gain access to export markets. The viability of the strategy does depend, however, on the ability to segment different parts of the value chain. Where the non-compliance can be handled within firms or particular establishments through process controls or corrective action, segmentation can be at the level of the firm, or even of particular establishments owned by the firm. In cases where ha-

Box 2. *Applying pesticide to crops*

One key control point for maintaining compliance with pesticide residue level requirements is in the method of applying pesticides. It is important to spray only when necessary, use appropriate and approved chemicals, mix them carefully and apply the right quantities. How can this be managed when production involves many small farmers? There are at least four 'solutions' to this problem, each with their own implications for industry and government action:

Train farmers to use crop protection products correctly. *This involves developing training programmes so that farmers are informed about different chemical products and when they are to be used, about mixing chemicals, about the maintenance of spraying equipment and about the safe disposal of unused chemicals. Training large numbers of independent small farmers will mean the development of public sector training programmes backed up by regular support and supervision.*

Farmer groups. *There may be economies of scale and specialization if farmers are encouraged to form into groups. Within groups, specialists (particular farmers or hired labour) could be trained to provide spraying services. Here, the training challenge is reduced through specialization, but extension services do need to pay attention to the challenges of forming and sustaining farmer groups.*

Promote market provision of spraying services. *In this case, the spraying operation is unbundled from the work of growing and tending to crops and allocated to a specialist company. In Kenya, a programme developed by Kenya Business Development Services (KBDS) to promote tree crop production by small farmers for both the domestic and export markets also promoted the growth of local spraying companies who could provide services for farmers on a fee-for-service basis (Sebstad and Snodgrass, 2008). The spraying services might be bundled with other services for farmers, such as financing of inputs, transport of produce and supply of seeds.*

Provision by exporters. *When small farmers are organized into outgrower schemes, activities that are critical for compliance may be transferred to the organizing company, which, in the case of vegetable production in Kenya, would be an exporter. It is not unusual for the exporter to provide technical assistants to 'scout' crops for problems and to use specialist spraying teams to apply crop protection products. The procedures for doing this are specified in the GLOBALGAP standard for fresh fruit and vegetables. These outgrower schemes are a good example of captive networks, where the buyer maintains a high level of supervision over suppliers.*

zards spread easily – for example, fruit fly infestation in mangoes, or foot and mouth disease in cattle – segmentation may be based on area-wide controls or particular processing treatments.

Operationalizing the value chain approach to compliance

As compliance issues vary greatly from sector to sector, from market to market and even from product to product, there is no single set of questions for a value chain analysis of compliance issues. There are, however, pertinent questions that need to be asked when framing value chain interventions.

Key actors

1. What are the main compliance challenges in the chosen sector or that arise in the chosen thematic topic?
2. Who is driving these compliance challenges? Are they agents in the value chain or outside agents?
3. Which agents in the value chain might take the lead in finding solutions to compliance challenges?
4. How do these vary in different export markets and for different types of buyers in these markets?
5. In what ways can standard-setters be influenced to make requirements more appropriate and cost-effective for producers?

Value chains linkages, knowledge flows and trust

6. What knowledge and support is provided within the value chains, and between which agents (buyers, input suppliers, etc.)?
7. How can public policy accelerate these knowledge flows or use value chain actors to deliver services?
8. Who are the key institutions, government agencies and private sector actors whose collaboration is necessary for the compliance challenges to be met?

Control points

9. Where can the value chains controls be most efficiently located?
10. What can public provision do to facilitate private sector compliance?

Value chain structure and coordination

11. Can challenges be dealt with by segmentation or compartmentalization? What implications do such strategies have for reducing inequality and poverty?
12. Are there different options for meeting this challenge? For example, is there a choice between addressing the problem at source or identifying and eliminating it at a subsequent point in the value chain?
13. Can tasks be transferred between value chain agents in response to the identified mismatches in capabilities?

Concluding remarks

This paper has outlined how a global value chain approach to coordination challenges in the agri-food business can contribute to identifying and resolving issues relating to compliance with standards and can thus be of guidance for technical assistance providers.

It has shown how control and oversight (value chain governance) that have previously been achieved through ownership are – owing to the increasing fragmentation of value chains – replaced by requirements to comply with certain standards. Subsequently, new challenges and opportunities for operators along the value chain are created: while non-compliance with these standards quickly leads to exclusion, in particular with regard to smallholders, value chains facilitate flows of resources and knowledge that enable compliance.

Public interventions can support an increased flow of resources and knowledge and help to sustain strategies to ensure that smallholders are not excluded. The paper has shown that training alone is not sufficient to sustain smallholder inclusion and that complementary strategies such as the transfer of activities between agents and market segmentation can support inclusion.

However, as compliance issues vary from sector to sector, technical assistance providers need to identify key actors and control points along the value chains as entry point for their intervention. Some key questions have been provided to facilitate this process.

4.2 Evolving Challenges for the ACP Horticultural Export Sector: Case Study of the COLEACP-PIP (2001-2009)

Over the past 20 years, the international market for fresh fruit and vegetables has been transformed. Alongside a rapid increase in volumes traded, the supply chain has been subject to dramatic changes in both its structure (vertical integration, consolidation, globalization) and the "trading rules" (commercial and regulatory requirements) of the major markets. Together, these changes have created big challenges for suppliers in the Africa-Caribbean-Pacific (ACP) value chain.

During the 1990s, consumer confidence in Europe was undermined by a series of food safety incidents, and the European Commission (EC) reacted by initiating a process of regulatory reform. This transformed the general approach to food safety; it was based on the principle that food safety is a risk management operation that targets critical (risk-sensitive) points, and requires the efficient integration and operation of all elements of the supply chain. Suppliers were now required to apply good agricultural, processing and distribution practices at all stages, and provide a paper trail of evidence that they had done so. This meant introducing traceability systems that allowed a product, and all processes and procedures applied to it, to be followed and recorded in detail from "field to fork". In theory, EU regulations required traceability only from the point of export, but in practice EU buyers increasingly demanded traceability along the entire supply chain. This posed a huge challenge for ACP export industries, particularly where traditionally there were large numbers of smallholder outgrowers or informal sourcing of produce via intermediaries.

Over time, several new items of EC legislation were introduced, including the Maximum Residue Level (MRL) Harmonization Programme, which set new limits for pesticide residues in foodstuffs sold in Europe. It posed a particular problem for ACP suppliers as many plant protection products (PPPs) used on ACP horticultural crops were old, inexpensive, off-license, and registered before there was a requirement for MRLs. When a PPP had no existing MRL, this was automatically set at the Limit of Detection and, as a result, many ACP producers risked losing their main PPPs, even if they posed no particular food safety problem. On top of this, ACP growers needed the production techniques, knowledge and skills essential to ensuring that produce complied with the new MRLs.

The phasing-in of EU regulatory reform coincided with a parallel and dramatic growth in the use of industry self-governing systems based on codes of practice or "private standards". These controlled production, manufacturing and distribution and, in terms of food safety management, were often more complex and stringent than the EC regulations. Though not a legal requirement, they were becoming de-facto obligatory for suppliers wishing to access the high-value end of the retail market.

In the face of these new challenges, ACP suppliers found themselves at a disadvantage. Many of their companies lacked the necessary information, infrastructure, or resources. High investment costs meant that SMEs were particularly affected, and there was a risk that ACP horticultural industries could become consolidated in the hands of a small number of large companies. Value chains that involved small-scale outgrowers were also problematic: it would be difficult and expensive to provide large numbers of hard-to-reach and often poorly organized smallholders with the necessary information and skills to apply Good Agricultural Practice. It was feared that exporters would respond by shifting production away from smallholder outgrowers to company farms. The difficulties faced by the ACP private sector were often compounded by poor public infrastructure (e.g. lack/shortage of analytical laboratories), weak institutional support and – crucially – a lack of quality and affordable local service providers. Companies generally had to resort to hiring expensive European expertise to advise, train, audit and support their operations.

PIP: Supporting ACP suppliers

PIP (Pesticide Initiative Programme) is a technical assistance programme financed by the European Development Fund (EDF) and designed within the framework of the EC strategy for supporting the development of the private sector. It is managed by COLEACP (Europe-Africa-Caribbean-Pacific Liaison Committee), an association of EU importers and ACP producers and exporters of horticultural produce. During the latter part of the 1990s, COLEACP lobbied policy-makers and worked with the ACP Secretariat and the EC to put together a project proposal (PIP) that would provide assistance to ACP suppliers.

The original objective of PIP was to ensure that ACP suppliers (and, in particular, smallholder growers) could maintain their share of the EU market by assisting them to comply with the new regulations. However, over time the scope of PIP activities evolved in response to the changing pressures faced by ACP suppliers. If the programme was to enable them to maintain their foothold in the EU market, it was no longer sufficient just to target compliance with official food safety controls; it also became necessary to help them meet the growing buyer demands for certification with private standards.

Phase 1 of PIP ran from 2001-2009 and operated in 28 ACP countries. The total budget of € 38.2 million was managed through a grant contract with ex-post financial and technical control by the donor, a funding mechanism that awarded considerable power of decision-making to PIP and gave it the flexibility to evolve and respond to changing needs. This, together with its relatively long duration, undoubtedly contributed to PIP's success as a cooperation programme.

The leverage points

The challenge for PIP was to address a common subject (food safety) over a very diverse range of conditions (small vs. large companies; different commodities; different countries; different players; different needs). It required an approach that was

sufficiently structured to allow a central team in Brussels to implement a programme of capacity building in several countries, while at the same time being sufficiently flexible to accommodate the considerable variation between and within them. The programme opted for an approach that worked on three distinct leverage points:

1. Lowering the barriers: improving conditions for market access by challenging and/or ameliorating the regulatory or commercial requirements;
2. Helping suppliers to climb the barriers: direct support to ACP producers and exporters to help them achieve a sustainable capacity to adapt and comply with regulations and standards;
3. Developing the enabling environment: direct support to public and private ACP service providers to ensure that the horticultural industry has continuing access to local and affordable services.

Lowering the Barriers

To ensure that the MRL Harmonization Programme did not suddenly leave some ACP producers without effective and affordable methods of pest management, PIP pursued several routes, including setting new MRLs, extrapolating existing MRLs, and establishing Import Tolerances (ITs). These activities are expensive and normally undertaken by the PPP companies. However, in the case of old, generic PPPs for use in minor crops in ACP countries, this was simply not an attractive investment and unlikely to happen without external (public) input. PIP took responsibility for these normally industry-led functions in the most critical cases, working in partnership with PPP companies and ACP regulatory authorities. In total PIP secured 39 new MRLs or ITs and 3 Extrapolations between 2001 and 2009.

As demands for certification against private (commercial) standards grew, PIP became increasingly involved in raising awareness of the impact that these were having on ACP suppliers. Their content and modus operandi tends to be designed for a "European" context, and they are often poorly adapted to the agronomic and socio-economic conditions of the tropical production environment. As PIP worked to help exporters prepare for certification, real difficulties were faced in trying to meet compliance criteria that were inappropriate, sometimes unachievable, or not economically viable. PIP attempted to engage with the main standard setting bodies to ensure that they were aware of these problems, and to advocate on behalf of ACP suppliers, who had little influence or voice in the standard setting process. PIP also began to actively explore ways to make the private standards more locally appropriate, for example through the benchmarking of local (ACP) codes of practice (e.g. KenyaGAP).

Helping suppliers to climb the barriers

To ensure that food supplied to the EU was safe, traceable, and compliant with EU MRLs, PIP adopted the "field to fork" philosophy of the new EU regulatory framework. An approach was developed to manage risk and promote good practice along the supply chain from field to point of shipment (production/transport/packaging/export). This meant helping exporters to install and maintain durable risk managements systems for food safety, traceability, in-house training, and integrated pest management (IPM). It was achieved not through one-off training, but by targeted support over time (1-5 years) that aimed for a change in behaviour, mindset, and company restructuring.

Box 1. ***Key principles underlying PIP support to ACP producers and exporters***

- *PIP worked principally through exporters; it did not follow the approach taken by many other programmes of targeting mainly producer groups or producer and marketing organizations. Exporters are in a better position to finance and maintain compliance systems, and have the greatest vested interest. Compliance is expensive and, for long-term sustainability, must be resourced through the supply chain; a top-down approach was felt to have the greatest chance of success.*
- *By working through exporters, PIP reached all the players in the supply-chain: smallholder outgrowers, farm workers, drivers, packhouse workers, etc.*
- *Support was provided to all exporters, from the very small to the very large but, in the case of the latter, was confined to actions that enabled and encouraged these companies to continue to source from smallholder outgrowers.*
- *A conscious decision was taken to work only with suppliers that already had a place in the supply chain and existing links with export markets. This was, in part, to meet the given PIP remit of protecting and maintaining existing export flows in the face of new market requirements. It also focused the use of limited resources where greatest impact was likely to be achieved.*
- *To ensure involvement and commitment, PIP used a participatory approach and based support on cost-sharing principles; success ultimately depended on money, time and resources being invested by the beneficiary.*

To provide the necessary technical background, PIP worked with researchers, agronomists and IPM specialists to develop a series of 30 crop protocols and guides for the main ACP horticultural crops. These good practice guides provided itineraries which, if followed, ensured that produce complied with EU regulations and MRLs.

Standardized training modules (complete with training tools and publications) were developed for different players in the chain, from company managers to food safety managers, packhouse workers, field workers, drivers, outgrower managers and smallholders. A total of 11 modules were compiled on topics such as the safe use of pesticides, hygiene, IPM, traceability, and HACCP. These courses were used in all countries and by all trainers to promote consistency. Traceability tools were also developed that could be customized according to company resources and circumstances, and that varied from simple, paper-based systems to comprehensive software.

Company training took a "cascade" approach. This started with general information for company directors, moving to specialist training for middle management (food safety, packhouse and farm managers). Middle managers were subsequently assisted by PIP to deliver training to staff under their responsibility (packhouse managers to packhouse workers, farm managers to their spray teams and field workers, and so on). Technical training at each level was accompanied by dedicated train-the-trainer courses to improve communication and training skills and

ensure that company staff were better able to deliver a training programme in the future. In this way, PIP attempted to create a sustainable in-company training system rather than to simply impart knowledge or skills.

Because of the large number of countries and companies requiring support, and to make best use of limited funds, PIP held some training courses collectively, where managers from several companies were trained together. This collective training was combined with in-house support customized according to company needs, resources, aims, and "way of life". It generally followed the following sequence:

- STEP 1. Following an application for support from a company, a PIP consultant conducts a needs assessment and identifies weak points (from field to point of shipment). Consultant and company staff work together to develop a project action plan.
- STEP 2. Company middle managers attend PIP collective training courses, and PIP provides additional customized training or support according to needs.
- STEP 3. Company staff install and implement food safety, training, IMP and traceability systems, with backup and support from PIP. This ensures ownership and "internalizes" the systems.
- STEP 4. The systems are validated: PIP provides consultants for blank audits. Many companies then opt for certification against a private standard.

To avoid the risk of exporters shifting production away from smallholder outgrowers to company farms, PIP put considerable emphasis on building a capacity within companies to train and support smallholder outgrowers. By developing and implementing training for their smallholders, PIP made it easier (and affordable) for companies to continue sourcing from them, and for the latter to maintain their foothold in the supply chain. Similar support was given to extension workers in a number of projects/NGOs/public bodies working with smallholder groups.

The company support framework was originally designed to enable compliance with EU food safety and traceability regulations. However, over time and with the increasing pressure on ACP suppliers to become certified to private standards, the scope of PIP activities evolved. Crop protocols and training had to be adjusted so that they enabled exporters to adopt the practices and procedures needed to meet the standards, which often went beyond the regulatory requirements. Certification for small-scale growers was especially challenging, and considerable energy was directed to help companies achieve outgrower certification where there was particular risk of market exclusion.

From 2001-2009, companies supported by PIP together supplied over 80 per cent of fresh fruit and vegetables coming into the EU from ACP countries, and sourced from over 100,000 smallholders.

Developing the Enabling Environment

To give the support and training needed by exporters, at the outset of PIP 1 it was generally necessary to fly in costly European consultants. Local, affordable, up-to-date expertise in specialized areas such as food safety was simply not available in most ACP countries. This put ACP suppliers at a disadvantage, but also endangered the sustainability of programme impact. In the same way that support to companies was designed to be "internalized" in order to have some degree of sustainability, it was also important to ensure that export industries had access to local services that would support them over the long-term.

PIP worked with national stakeholders to identify the need for capacity building of key players, and to develop the wide range of services (public and private sector) needed to meet EU food safety requirements. These included:

- Private consultants to train and advise on food safety, pesticide use, and IPM;
- IPM providers;
- Local/regional certification bodies;
- Extension services and smallholder support organizations;
- Universities, agricultural colleges and adult education centres;
- Pesticide registration systems compatible with EU requirements;
- Accredited laboratories for pesticide residue analysis.

Support was tailored according to the needs of the recipient. It included attendance at PIP technical and train-the-trainer courses; international training courses; study tours; and the deployment of short-term resident experts (e.g. pesticide chemists, IMP specialists, regulatory affairs). On-the-job training was also widely used whereby local service providers shadowed EU consultants and trainers during field missions. In half of the cases, training led to recognized qualifications (including HACCP, BASIS, ISO 9001:2000 Lead Auditor).

PIP also put considerable effort into supporting professional associations and public-private stakeholder platforms. Meeting industry challenges, such as new regulations, requires dialogue, and having strong associations and a national stakeholder platform in place is increasingly important. Associations were assisted to develop member services and information resource centres. The creation/functioning of nine national platforms was facilitated, each representing a wide range of stakeholders, including, for example, exporter associations, grower representatives, service providers, and Ministries of Health, Agriculture, and Trade. When functioning well, they provide a forum for dialogue that allows stakeholders to address shared problems, conduct joint actions, and lobby and advocate on behalf of the industry.

In total, assistance was given to 153 support structures. This allowed for the creation of a competent and recognized ACP expertise in food safety. Of 167 individual experts trained through PIP, half were subsequently used by the programme to conduct local (and international) consultancies and training. By 2009, locally trained specialists had largely (more than 80 per cent) replaced EU expertise in the delivery of PIP support to suppliers.

Lesson learning

As already mentioned, the scope of PIP activities evolved in response to the changing pressures faced by ACP suppliers. Over time, the methodologies themselves also evolved as the programme developed and gained experience.

At the very outset, support was provided to export companies on a case-by-case basis, customized to meet their individual needs. Though this was effective, it was also resource-intensive and limited the number of potential beneficiaries. As time progressed and PIP worked with more and more companies, the process began to generate considerable information about their collective needs. This accumulating body of knowledge was used on an ongoing basis to develop and update generic training courses. It allowed PIP to deliver progressively more support to companies through collective training, and gradually reduced the need for customized support, as well as considerably increasing efficiency and the number of companies that could be reached. Furthermore, this growing knowledge base allowed PIP to better target the enabling environment and the building of local capacities to service the industry.

Some PIP methodologies evolved through trial and error. For example, an expensive on-line question and answer/diagnostic system was discontinued because it was insufficiently used – PIP had over-estimated the access that most ACP stakeholders have to IT equipment. The same problem affected PIP's policy of distributing PIP publications (crop protocols, training modules) by Internet. This reduced costs, but it became evident that materials were not getting through to the people who needed them; PIP returned to paper copies as a back-up. Lack of Internet access for lower-level company managers also restricted the uptake of distance learning packages. The programme overcame this to an extent by hiring local facilities that gave access to computers and software for designated time periods.

PIP found that activities had to be adapted according to the value chain. Exporters supplying UK supermarkets met with buyer demands (e.g. for GLOBALGAP certification) that were more stringent, and appeared some years earlier, than elsewhere. Developing and implementing company support programmes was also considerably more difficult in the case of commodities grown seasonally. For example, French beans are grown almost continuously in Kenya, but in Senegal production is seasonal, and PIP had to adapt support for suppliers and service providers that operated on a periodic or transient basis. Impact also varied with value chain. Added value was possibly greater in countries such as Uganda, where suppliers had further to go to achieve compliance; but impact was probably greater in countries such as Kenya, where stakeholders were in a better position to capitalize on the support available.

New and emerging challenges

At the close of PIP 1, the goalposts were moving again, and ACP suppliers now face new challenges. There is growing anxiety among European consumers about the environment and climate change, and ACP fresh produce has come under scrutiny with the focus on carbon footprints and food miles. Jostling among EU retailers anxious to demonstrate green credentials has led some supermarkets to label air freighted produce. Counter arguments highlight the lower carbon footprint of ACP versus EU production of out-of-season fruit and vegetables, and the potential social impact of hitting a trade that provides income and employment in some of the world's poorest countries. Negative messages about ACP fresh produce and food miles are, to an extent, being offset by positive messages about developmental impact and the important role that the horticultural trade plays in meeting the Millennium Development Goals.

A consequence of this new public interest in environment and social issues, and the trend towards "moral" purchasing, is that areas that were previously the domain of NGOs and government are now coming within the sights and jurisdiction of the big European retailers. Company private labels are tending to go beyond quality and food safety messages to include the environment as well as fair/ethical/sustainable trade. GLOBALGAP – a private sector body that sets voluntary standards for Good Agricultural Practice – has now introduced a social element. This trend may create opportunities for ACP suppliers; there may be more openings for niche markets, and some quarters are discussing the relative merits of a development label. However, there are also risks. These new requirements need to be carefully managed if they are to benefit and not further disadvantage ACP suppliers.

Alongside this new interest in social accountability, there are new developments in the food safety arena. Pressure from NGOs and consumers has led some EU retailers to go beyond what is required by legislation to satisfy "guarantees" of safe food. For example, several stipulate residue limits well below the official MRLs. Coupled with this, a new EU regulation (replacing 91/414/EC) came into force during 2009 that is likely to restrict the range of pesticides available for use on horticultural crops for export. During PIP Phase 1, crop protocols were designed to ensure that pesticide residues were within existing EU MRLs. Now, in the current climate, the aim must be to reduce as far as possible any pesticide residue on harvested crops.

PIP phase 2

Inevitably, these trends will have major consequences for the ACP horticultural export industry, and there is a need for continued support and technical assistance. In recognition of this, and to capitalize on the operational framework already in place, the ACP Secretariat requested a second phase of the PIP programme. The global objective of this new phase is to: "Maintain and, if possible, increase the contribution made by export horticulture to the reduction of poverty in ACP countries".

PIP Phase 2 retains the same framework and the same modus operandi, and will use the same leverage points. However, the scope and objectives have been broadened to address new difficulties and opportunities facing ACP exports, and there is increased emphasis on the achievement of a development (poverty focused) impact.

Progress made over the past eight years provides a strong foundation for PIP (and ACP stakeholders) to launch an effective response to new challenges. For example:

- Now that the most critical needs (food safety systems, traceability, etc.) are being met for the bulk of ACP exports, support can move on to new areas, and with increased emphasis on particularly disadvantaged groups;
- An internal capacity has been developed within a large proportion of ACP export companies to adapt and implement change;
- There is a body of competent and affordable local service providers that can diversify to cover new topics;
- There are public-private stakeholder platforms which can articulate the needs of the sector and influence policy;
- PIP has acquired an in-depth understanding of the functioning and needs of ACP suppliers that improves the targeting and delivery of technical assistance;
- The proven "PIP Methodology" can be adapted for relatively little cost to cover new topics, new geographical areas, and for different beneficiaries (e.g. horticultural production for local and regional markets, or for processing).

Phase 2 of PIP was launched in October 2009 and is financed by the EDF to the amount of €32.5 million. It will run for the next 5 years.

5. Towards measuring the Impact of Trade Capacity-Building

Non-compliance with standards has a major impact on developing countries' exports. The analysis of border rejections in both the US and the European market undertaken in earlier chapters of this Report has provided a glimpse of the quantitative losses accrued every year and, even more importantly, of the possible root causes and key compliance challenges preventing exports from emerging at all. One of the main reasons for the non-compliance of products is that of deficiencies in the compliance capacity of exporters in many developing countries and parallel weaknesses in their countries' quality infrastructure. This two-fold deficiency is reflected in the analysis of the inspection reports of the Food and Veterinary Office (FVO) of the European Union, which reveals a number of recurrent gaps in the compliance capacities for the specific case of fish and fishery product exporters and gaps related to institutional regulatory capacities for the assessment of product compliance in exporting countries.

In recognition of these challenges, a broad consensus has developed in the global donor community that developing countries need support to be able to participate more successfully in global trade. Global trade negotiations now systematically take into account capacity-building and technical assistance, as evidenced in the Aid for Trade Initiative, a major outcome of the current Doha Round of WTO negotiations. As a result, Aid for Trade flows have increased significantly. Compliance-related projects are only a sub-group of these flows, and cannot be easily separated analytically from very broad categories such as trade-related infrastructure and the building of productive capacity. However, judging from the data available in the joint OECD and WTO Trade Capacity Building Database[60], the share of interventions focused on trade policy and regulations, and in particular on TBT and SPS measures, while small, has increased in absolute terms. For 2005, of a total of US$906 million of assistance to trade policy and technical regulation reported to the database, US$103 million went to technical standards.

Not surprisingly, the increase in financial flows goes hand in hand with the call for more thorough evaluations of the impact of Aid for Trade. However, the difficulties faced in identifying a meaningful and measurable indicator have so far prohibited the establishment of a standard, or even a widely accepted and practised approach (OECD, 2010a; 2010b). This general observation certainly applies to efforts to link Aid for Trade investments to reductions in poverty, but also to the arguably more readily identifiable impacts on trade. While recognizing the inevitable attribution problems in establishing substantive linkages between Aid for Trade interventions and observed outcomes and impacts, there is a clear need for some form of economic analysis framework that can provide guidance to donors, beneficiary governments and private sector stakeholders in defining coherent plans for trade-related capacity-building and technical assistance; for example:

- Setting priorities for the establishment or upgrading of local trade standards compliance capacity, both at the level of enterprises and at the level of quality infrastructure;
- Assessing the returns on specific investments in trade standards compliance and comparing these returns across sectors, through time, etc.;
- Demonstrating the most efficient path towards access to trade standards compliance support services, given the level of development of strategic export sectors, namely through building local capacity versus international procurement.

To facilitate such analyses, there is an evident need for some form of cost-benefit analytical framework for assessing investments in trade standards compliance, initially narrowly defined in terms of the more immediate impacts on trade but ultimately extended to assess resulting effects on poverty.

Development of a cost-benefit model for analysis of investments in trade standards compliance is beyond the scope of this first edition of the TSCR. Thus, the major focus of this chapter is on demonstrating that such investments can yield appreciable returns, even if, at the moment, quite narrowly defined. This is showcased through a case study of efforts to enhance trade standards compliance, specifically of technical assistance supported development of laboratory testing capacity, in Sri Lanka. This case study is based on an accounting-based assessment of costs and benefits. Thus, it also illustrates the need for more sophisticated approaches to the identification and quantification of costs and benefits over time, and also to addressing the inevitable problems with attribution.

[60] http://tcbdb.wto.org/index.aspx. This database is discontinued and is being replaced by the OECD Creditor Reporting System (CRS, www.oecd.org/dac/stats/qwids) which now includes a trade development policy marker to identify Aid for Trade measures.

5.1 The Impact of Trade Capacity-Building: The Case of Sri Lanka's Fisheries Exports

The scenario[61]

The Democratic Socialist Republic of Sri Lanka is a small island country in South Asia, located about 31 kilometers off the southern coast of India. The fishery industry is one of its oldest industries and has contributed significantly to the country's development over the last two decades. Being an island nation with 1,770 kilometers of coastline, marine fisheries are of considerable social and economic importance. The recent end to the civil war has also seen the opening up of nearly two thirds of the coastal belt that had been unreachable by local fishermen for the past two and a half decades. The Exclusive Economic Zone (EEZ) that Sri Lanka has jurisdiction over covers an ocean area of 51,700 square kilometers, which is approximately six times the country's land area. Of a population of about 20.1 million, over 700,000 depend on the fishery industry for their livelihood, with 170,000 employed directly and another 50,000 in related activities. In 2008, the sector accounted for 1.5 per cent of GDP. It serves both the domestic and export markets, with the domestic market attracting 75 per cent of marine fish production.

The Sri Lankan fishery sector can be broadly divided into two subsectors: marine (coastal and offshore/deep sea fishing) and inland freshwater. In 2008, the inland and aquaculture production was only 14 per cent of a total fish production of 319,120 MT (metric tones), while the total marine production was 274,630 MT, of which 60 per cent was from coastal fishing. Production from offshore and deep sea fishing had increased rapidly from 8 per cent in 1990 to 40 per cent in 2008 in response to the higher demand from markets in industrial economies for tropical fish, particularly tuna. In line with this growth, the Government of Sri Lanka has developed infrastructure, such as fishing harbors, anchorages and associated facilities. Currently there are 13 functioning fishery harbors, controlled and managed by the Ceylon Fishery Harbour Corporation (CFHC), with the main fishery harbor in Colombo.

In 2008 the number of active fulltime fishermen in the marine fishery value chain was 171,470, of whom approximately 90 per cent operated in coastal and offshore subsectors, with the remaining 10 per cent in the deep sea subsector. The total marine fishing fleet of 41,733 were mostly small to medium-sized crafts, such as day boats with an inboard engine, fiberglass reinforced plastic (FRP) boats with outboard motors, traditional motorized and non-motorized craft, and beach seine boats owned and operated by private individuals. Sri Lanka employs the most sustainable fishing method for catching tuna, namely surface longlining.

Export-quality fresh fish are mainly supplied by foreign vessels, and Sri Lankan trawlers and multi-day boats. In certain cases, processors use their own multi-day boats to meet their requirements and import fresh fish from countries such as the Maldives, Yemen and Thailand to maintain continuous production during off-seasons. The fishery industry is supported by a number of state and private-sector fishery-related services, including boat building, fishing gear manufacture, ice production, credit provision, research, extension services, marketing and export promotion.

In recent years, the fishery sector has emerged as an important source of foreign exchange, with exports (shrimps and other fishery products) amounting to US$174 million in 2008, or 2.15 per cent of total exports. The total quantity of all fishery exports was 20,594 MT, of which chilled and frozen fish alone comprised 15,014 MT, or 73 per cent of the total. Tuna has rapidly become Sri Lanka's main fish export, overtaking cultured prawns, which have dominated exports over the last two decades.

The European Union (EU) is the main buyer of Sri Lankan fisheries' exports. Its main competitor in the EU market is the Republic of Maldives, which is duty free and cost competitive.

Fishery exports grew at a moderate pace between 2002 and 2004, and unexpectedly maintained the rate even in 2005, in spite of the devastating Tsunami that struck the country in 2004, damaging the fisheries infrastructure and disrupting the livelihood of the fishing community. With the number of EU-approved fish processing establishments increasing from 13 in 2005 to 24 in 2008, a high growth rate of exports was also recorded, with the export quantity increasing from 10,960MT in 2005 to 15,014MT in 2008. The main products exported, chilled and frozen tuna, are manufactured under stringent quality control and maintenance of the required hygienic conditions.

This rapid growth could, in all probability, be attributed to quite an extent to the expansion of exports to the EU following Sri Lanka's accession to the preferential trade regime GSP+ (Generalized System of Preferences Plus) in 2004, which enabled duty free access for Sri Lankan exports to the EU. Simultaneously there has also been a shift in demand from the EU towards Sri Lankan fish, with Sri Lanka now one of the oldest and most important tuna producing island nations in the Indian Ocean. The major commercial tuna species are yellow fin tuna (Thunnus albacores) and skipjack tuna (Katsuwonus pelamis).

[61] For this case study, the following websites have been consulted:
Department of Commerce Sri Lanka
http://www.doc.gov.lk/web/tradestatistics.php
Department of Fisheries and Aquatic Resources
http://www.fisheriesdept.gov.lk/
EU Import conditions for seafood and other fishery products
http://ec.europa.eu/food/international/trade/im_cond_fish_en.pdf
Fish INFOnetwork News http://www.eurofish.dk/
Fisheries Year Book 2008
http://www.nara.ac.lk/yearbook%202008/
Food Standards Agency http://www.food.gov.uk/foodindustry/imports/want_to_import/fisheryproducts/
Ministry of Fisheries and Aquatic Resources
http://www.fisheries.gov.lk/
National Aquatic Resources Agency http://www.nara.ac.lk
Sri Lanka Export Development Board
http://www.srilankabusiness.com/

Legislation and quality assurance

In Sri Lanka, the principal legal instrument governing the fishing industry is the Fisheries and Aquatic Resources Act, No. 2, of 1996, which comprises a number of regulations and provides for conservation and management at both national and regional levels. Responsibility for the implementation of policies, laws, plans and programmes is centralized around the Ministry of Fisheries and Aquatic Resources (MFAR) as well as departments and state organizations functioning within its purview. One of the latter, the Department of Fisheries and Aquatic Resources (DFAR), is the Competent Authority (CA) for the export of fishery products. The main objective of the DFAR as the CA is to ensure the quality and safety of exported fishery products intended for human consumption.

Fishery exports are regulated by the 1998 Fish Product (Export) Regulations, and amendments in 2000, 2002 and 2007, to ensure that Sri Lankan exports meet specific international quality standards. The Act and the amendments satisfy the requirement of the EU that the country's legislation requirements are at least equivalent to those governing EU domestic production. Exporters have to obtain certificates of health and food safety in compliance with legislation by Government of Sri Lanka gazette to obtain approval of the DFAR to export to the EU.

All processing establishments which are intended to be used for the purpose of processing fish products for export have to comply with the relevant requirements of the Fish Processing Establishments Regulations, 1998, and be certified by the CA. At present there are thirty-four such licensed establishments, hereafter referred to as 'certified establishments'. Out of this thirty-four, twenty-eight are involved in preparing, processing, chilling, freezing, packaging and storing fish products, the other six being involved exclusively in shrimp and other seafood products. For renewal of licenses, the establishments are inspected and monitored by the Sri Lanka Standards Institution (SLSI) (which is RVA-accredited for HACCP and ISO 22000 certification) as per an annual monitoring programme of the CA.

In conformity to the Fish Products Export Regulations (1998) Amendment 2002, five testing laboratories, viz. Industrial Technology Institute (ITI), Sri Lanka Standards Institution (SLSI), National Aquatic Resources Research and Development Agency (NARA) and two private laboratories have been approved. The CA also designated the ITI as the official laboratory for testing required for the National Residue Control Plan (NRCP) and for the regular monitoring programmes for exports to the EU. It is mandatory that laboratories approved for testing products as per the DFAR quality control system for the export of fishery products comply with the ISO/IEC 17025:2005 standard. However, at the time this approval was granted in 2001, the laboratories identified had not been accredited to comply with this standard.

The challenge

The buying market for Sri Lankan fishery products is dominated increasingly by EU countries, who made up 53 per cent and 56 per cent of exported quantity and 66 per cent and 72 per cent of exported value in 2007 and 2008, respectively. In 2008, the market distribution on export value among the EU countries was the UK (25 per cent), France (17 per cent), Netherlands (9 per cent), Italy (9 per cent) and Germany (8 per cent). Other EU countries to which Sri Lanka exports fish and fishery products are Sweden, Norway, Spain and Austria. Noteworthy non-EU markets in 2008 in value terms were Japan (7 per cent), USA (4 per cent), Hong Kong (2 per cent) and Singapore (2 per cent). The UK, Germany and the Netherlands are the fastest growing markets for Sri Lankan fishery products, with growth rates of 16 per cent and around 15 per cent respectively during the period 2003-2007.

With the EU being the major importer of fishery products from Sri Lanka, it was inevitable that Sri Lanka had to conform to the EU import regulations that seek to guarantee that all imports fulfill the same high standards as products from the EU Member States with respect to hygiene and consumer safety. This was particularly important as all 27 EU member countries share the same market access rules for fishery products. For non-EU countries the European Commission (EC) is the negotiating partner that defines import conditions and certification requirements. Also, for most countries with existing trade, the EC negotiates on behalf of the 27 Member States. The EC's Directorate-General for Health and Consumer Protection (DG SANCO) is responsible for food safety in the EU.

In 1995, with the conclusion of the Cooperation Agreement on Partnership and Development between the European Community and Sri Lanka, the contracting parties agreed to promote cooperation in fisheries, including fish processing, amongst several other activities. To this end, in a spirit of cooperation and goodwill and taking into account the laws of both parties on such issues, the EU and Sri Lanka agreed to examine, in particular, the opportunities for increasing trade in agricultural and fishery products. Sri Lanka has, since a decade ago, had a regulatory framework in place to ensure that its fishery exports comply with international standards of quality and food safety.

As per EU requirements, for all fishery products the countries of origin must be on a positive list of eligible countries for the relevant product. Exporting countries must have a Competent Authority (CA) which is responsible for official controls throughout the value chain. EU authorization of an exporting non-EU country is based on a classification system where countries are classified as List I or List II for exports of fishery products or bivalve molluscs or both. List I countries are non-EU countries that have been issued with specific conditions for importing fishery products or bivalve molluscs into the EU following a visit by the EU Commission to establish whether standards of hygiene are equivalent to those required within the EU. The standards reviewed by EU inspectors cover harvesting, handling, treatment, packaging, transport and storage of consignments intended for human consumption.

The CA (appointed by EU issue license) is responsible for implementing quality control, auditing activities and issue license for verifying and certifying compliance for export as per Council Directive 91/493/EEC of 22 July 1991, which laid down the health conditions for the production and placing on the market of fishery products. Thus, the formal recognition of the reliability of the CA was a pre-requisite for Sri Lanka to be eligible and authorized to export to the EU. The CA also provides services such as supervision, factory approval, export certification and

awareness-raising programmes on EU procedures for exporters; is responsible for managing, regulating, conserving and developing fisheries and aquatic resources; and is accountable for certifying that health and safety standards laid down in EC legislation are correctly applied and checked. In 2008, the CA issued 18,335 health certificates for exports to EU countries as against 1,920 to non-EU countries.

Through the EC's programme for providing training, technical assistance and facilities for institutional capacity building to help developing countries comply with EU rules, the Swedish International Development Agency (Sida) assisted Sri Lanka to build up knowledge on EU standards so that Sri Lanka legislation could be formulated in line with these standards and the country's access to the fisheries sector of the EU market eased.

To ensure that Sri Lanka complies with the EU regulations, the Food and Veterinary Office (FVO) of the EC undertakes missions in all exporting countries to confirm compliance with all requirements. Such an inspection mission is the basis of establishing confidence between the Commission and the CA. When the first EC FVO mission visited Sri Lanka in 2000 to evaluate the implementation of the national measures aimed at the control of residues and contaminants in live animals and animal products, as part of its published programme of inspections in Member States and third countries, Sri Lanka did not have a single accredited laboratory for monitoring the quality of fishery products. To overcome this predicament, the CA approached the SLSI and the ITI, the two major public sector testing organizations in the country, and NARA (the apex national institute charged with the responsibility of carrying out and coordinating research, development and management activities on aquatic resources in Sri Lanka) together with two private sector laboratories to develop the existing testing facilities. The labs were identified, as all of them (ITI, SLSI & NARA) did have basic laboratory facilities and manpower, though to varying extents.

One of the key requirements (but not the only one) that has to be satisfied for the official control activities is the presence of adequate laboratory capacity in the country to monitor and guarantee the quality of the product. For such a monitoring programme, the CA approval required: (i) the presence of laboratories that could carry out analysis of the fishery products for exporters in compliance with the general criteria for testing laboratories, as laid down in the ISO/IEC 17025:2005 standard; and (ii) the designation of an official laboratory that conforms to ISO 17025:2005 requirements to undertake analysis of products and process water and ice and to meet the requirements of the National Residue Control Plan (NRCP). The EC/CA also provided an interim approval based on a verifiable accreditation plan with clearly defined milestones to be followed for laboratories that had not gained accreditation for specific parameter/parameters. However this approval is valid only until 2010.

Since Sri Lanka is a developing country without a credible accreditation facility that accords with ILAC requirements, obtaining internationally recognized accreditation status for the laboratories for testing fishery products was a major challenge. The main areas of concern were the quality of process water (chemical for 56 parameters and microbiology), ice (chemical and microbiology) and product safety in microbiological quality and histamine and residue control (heavy metals).

Even though many external contributions from the Government of Sri Lanka and other donors were received by both the ITI and the SLSI from 1985 onwards, the laboratories had not gained international accreditation status, since many of these inputs were for buildings, upgrading general infrastructure facilities and providing awareness on quality management systems (QMS). The assistance received is briefly enumerated below.

The SLSI received LKR100 million from the Government of Sri Lanka (1985–2001) for a well equipped laboratory complex; US$1,350,250 from UNDP (1986–1991) for equipment and consultancy and training on quality management and laboratory accreditation; LKR250 million from Japanese Grant Aid (1994–1999) for upgrading laboratory facilities and initiating a metrology laboratory; and contributions from Sida (1996–2000) to strengthen the National Quality Infrastructure and from the EU (1998–2000) for the development of a food safety management system.

The ITI received assistance from a number of sources: the World Bank (1994–1995) donated US$225,000 for upgrading laboratory practice and methodology; the EU (1998–1999) facilitated the introduction of laboratory staff in the food analytical laboratories to QMS and the implementation of laboratory QMS as a part of the project with SLSI on food safety management; Sida (1998–2000) provided consultancy and training to introduce laboratory staff to QMS and its implementation in food analysis as a part of the Sida project on upgrading the fishery industry to meet the EU requirements; the Asian Development Bank (ADB) (2000–2004) provided LKR19.8 million and the Government of Sri Lanka LKR125 million for a new chemical and environmental R&D laboratory, the purchase of major analytical equipment, and support for the training of officers and the services of consultants (2001–2003) and LKR6.5 million for renovating and refurbishing the existing laboratory building of the metrology laboratory.

Technical assistance

In 1999, the UNIDO Trade Capacity Building (TCB) Technical Assistance (TA) programme for Sri Lanka was launched with a significant financial contribution from UNIDO and the Government of Norway (through NORAD), the major beneficiaries being the ITI and the SLSI, who were identified as suitable counterparts because the UNIDO assistance was a direct investment with the Government of Sri Lanka, and they are within the purview of the Ministry of Science and Technology (MOST)[62]. At this time, Sri Lanka did not have a credible accreditation system, and hence no accredited laboratories. One of the many initiatives undertaken was, therefore, support towards enhancing standards, metrology, testing and quality (SMTQ) capacity so that Sri Lanka could increase its participation in global trade. The intervention laid heavy emphasis on a compliance infrastructure for testing, food safety and metrology in conformity to the ISO/IEC 17025:2005 standard.

The UNIDO/NORAD assistance to the fishery export sector was approximately US$1,170,000 in value, with the TA implemented in phases I and II of the project during the periods 1999-2004 and 2005-2007 respectively. The major cost elements were the

[62] G/TBT/GEN/63, 2007

supply of equipment (54 per cent), sub-contracts (26 per cent), which included support towards maintaining the SWEDAC accreditation status over three years, training and study tours (12 per cent) and international consultants (8 per cent).

This UNIDO TA thus complemented the assistance that had previously been received by the ITI and SLSI, with the added advantage of being specific, targeting accreditation and equipment gaps to meet key test parameters and providing in-depth knowledge on accreditation. With UNIDO's MOUs with ILAC, IAF, ISO and BIPM – the key international bodies on standards and accreditation – and experience in assisting developing countries in accreditation and capacity building, Sri Lanka gained a clear lead over other developing countries, with the chemical and microbiological laboratories of the ITI and SLSI achieving internationally recognized SWEDAC accreditation in 2002. Subsequently, the ITI expanded its scope of accreditation to cover all major requirements for fishery exports: the analysis of process water, ice and fish for chemical and microbiological parameters. In 2004, with further UNIDO/NORAD funding, the ITI calibration laboratory also achieved SWEDAC accreditation for mass, temperature and volumetric measurements. Traceable calibration is a technical requirement for the fishery exporting establishments as well as the laboratories in order to maintain traceability to SI units in their measuring equipment and for compliance to food safety management systems and ISO/IEC 17025:2005 standard requirements.

The training and study tours made available by the UNIDO intervention were also extremely relevant to laboratory accreditation, allowing staff to acquire knowledge and experience of laboratory quality management and accreditation, calibration, testing of fishery products, and the operations of accredited laboratories.

Impact of technical assistance

The impact of the UNIDO TA is evaluated on the basis of benefits at laboratory level as well as those to the fish processing companies from the accredited laboratory services that were provided. The laboratory level impact is determined by the capability of the accredited laboratories to provide recognized testing services on a sustainable basis. The required sustainability has been clearly proven: both the ITI and the SLSI have maintained the SWEDAC accreditation status subsequent to the cessation of UNIDO support, and have been able to meet the high costs for such accreditation of the chemical and microbiological laboratories from 2005 onwards; and the ITI has maintained the accredited status of the calibration laboratory from 2007 onwards. Sri Lanka is yet to establish an ILAC-recognized accreditation system, and hence internationally recognized accreditation had to be secured from a foreign accreditation body.

UNIDO planned carefully to ensure the laboratories' self-sustainability. It provided assistance for their operation as independent units with business-oriented devolved budgets, costing methods and a pricing strategy for services that remained competitive; strategic plans in place to sustain the market; a strategic orientation towards client needs; and an operational-performance-based incentive scheme to ensure staff commitment. With this assistance and UNIDO's clear exit strategy with respect to accreditation fees, the accredited laboratories geared themselves to be self-sustaining in all areas under their control, and function as independent entities with a self sustainability of over 100 per cent.

It is also significant that, with the growing number of certified fish processing establishments, the ITI also increased their client base and achieved enhanced revenue (Table 1).

***Table 1.** Services provided by ITI*

	2002	2003	2004	2005	2006	2007	2008
Services to fish exporters							
No. of fishery processing establishments registered with CA	8	8	9	13	19	22	24
No. of EEC approved establishments	8	8	9	13	19	22	24
Analytical services (chemical & microbiology)							
No. of clients	2	5	8	10	10	16	13
No. of services	19	45	82	69	47	84	58
Income (LKR)	221,500	557,800	990,124	892.363	891,388	1,520,700	1,055,600
Calibration services							
No. of clients	4	3	4	5	6	10	8
No. of services	7	10	13	27	29	60	67
Income (LKR)	14,100	20,800	31,350	55,900	105,200	179,650	243,155
Services to DFAR							
Analytical services (chemical & microbiology)							
No. of services	55	75	74	71	63	77	124
Income (LKR)	**701,900**	**665,983**	**1,070,600**	**1,059,400**	**1,236,900**	**1,201,250**	**2,013,400**
Grand total Income (LKR)	**937,500**	**1,244,583**	**2,092,074**	**2,007,663**	**2,233,488**	**2,901,600**	**3,312,155**

Table 2. Major testing requirements for fishery exports to the EU and analyses carried out by laboratories

Matrix	Test	ITI	SLSI	GNPL	NARA	LOPL
Process water	Chemical (56 parameters)	S	nu	N	nu	nu
	Microbiology	S/L	S/L	N/L	L	na
Ice	Microbiology	S/L	S/L	N/L	L	na
Fish	Microbiology	S/L	S/L	N/L	L	na
	Chemical (histamine)	S/L	nu	N/L	L	na
	Chemical (heavy metals)	S/L	na	N/L	na	nu

GNPL – Globally networked private laboratory
LOPL – Locally-owned private laboratory
S – SWEDAC accredited
N – NABL accredited
na – not accredited
nu – not undertaken
L – SLAB (Sri Lanka Accreditation Board) accredited (ILAC/MRA in progress)

The processing companies have benefited in that laboratory facilities are in place for regular periodic cross-checking of their 'own-checks' by the certified fishery exporting establishments and for the analysis of process water, ice and fish for chemical and microbiological parameters – since both the SLSI and ITI laboratories were approved for the testing of products according to the CA quality control system. The SLSI services were utilized by three establishments and the ITI services by up to sixteen certified fishery exporting establishments. It is mandatory for the fishery exporting establishments to carry out their 'own-checks' to ensure compliance to the requirements for microbiological analysis of incoming raw material, process water, ice and the histamine content (in susceptible species such as tuna).

The ITI laboratory that is designated as the official laboratory of the CA is used for the official sampling programmes for the maintenance of food safety requirements and residue control as per the Minimum Residue Levels (MRLs) of the NRCP of the products. ITI services have also been used for monitoring factory hygiene through microbiological analysis of the working environment and utensils to ensure compliance to food safety management systems as stipulated by the CA.

A significant event was the contracting of the ITI laboratory by three fishery exporters in the Republic of Maldives from 2006 onwards for analysis of process water and fish, and by SLSI and NARA as a sub-contracting laboratory for testing process water, ice and fish.

Yet another major impact of the UNIDO TA was the accreditation of the ITI calibration laboratory for mass, temperature and volumetric measurements, so that it became the first and only accredited calibration laboratory in the country. Such an internationally recognized accreditation facility is mandatory if laboratories are to maintain their accreditation status, and fish processing establishments are to ensure measurement traceability for their in-house testing of products as well as for a range of process control requirements: temperature measurements in cold rooms, storage freezers, chillers, etc., and for the calibration of thermometers, weighing balances, weights, temperature gauges, etc. This achievement was all the more significant as the designated National Metrology Institute (NMI) of the country, the Measurements, Units, Standards and Services Department (MUSSD), lacked the basic requirements in manpower and infrastructure to maintain traceability to BIPM standards.

A key spillover effect of the UNIDO intervention was the increasing competition faced by the DFAR-approved globally-networked private laboratory (GNPL) operating in Sri Lanka with the ITI and SLSI laboratories. With the market recognition of the importance of internationally recognized accreditation and the competition from ITI, this private laboratory too obtained accreditation from NABL (National Accreditation Board for Testing and Calibration Laboratories, India) in 2005. The other competitors, viz. NARA in the public sector and another locally-owned private laboratory (LOPL), both also approved laboratories of the CA, are now working towards gaining international accreditation status (Table 2).

Benefits of technical assistance

A key benefit of the UNIDO TA is that Sri Lanka was now compliant with EU regulations for fish imports. The EU requirement of a quality infrastructure in place within the country was fulfilled since both the ITI and SLSI testing laboratories now complied with the ISO/IEC 17025 accreditation standard. This meant that the monitoring and control activities of the CA had credibility in that the testing required for the monitoring programme, and the testing services required by the licensed fishery export establishments were carried out by accredited laboratories.

The EU requirement for Sri Lanka's consideration for List 1 of 'harmonized' or approved countries for the export of fishery products was also met, with the CA identifying the ITI as the designated laboratory for testing samples of the official sampling programme, for monitoring product quality for conformity to the hygienic requirements of microbiological quality and to safety requirements.

Yet another advantage of the quality infrastructure being in place was the enhancement of the systems operations, in that the presence of the accredited laboratories further assured product quality since process water quality, factory hygiene and raw material quality could be monitored with minimum turnaround time, thus avoiding sample quality deterioration and contamination, and minimizing the risk of border rejections of fishery exports.

Further, the operational effectiveness of the accredited testing services was maximized subsequent to the UNIDO TA: without the UNIDO intervention and accredited testing facilities at ITI and SLSI, this service could only have been obtained from

a globally-networked private laboratory which gained accreditation in 2005, whereas the ITI and SLSI laboratories had already achieved this status in 2002. Even subsequent to 2005, it is doubtful that this private laboratory would have been in a position to bear the entire load of testing that is now carried out at the ITI and the SLSI (both together providing services to around 70 per cent of the fishery processing establishments, and ITI having around 98 per cent of the market share from the CA). This means that the clients would either have had to send samples for testing overseas, with the consequent delays and inconveniences, or suffer a loss of potential fishery product exports.

Yet another benefit of the UNIDO TA was the recurring cost reductions as domestic provision of proof of conformity services is lower by about 10 per cent than out-sourcing to India, the closest country for obtaining such services (Table 3). In fact, as costs of transport and packaging have to be taken into account for out-sourcing, the cost reduction increases to approximately 20 per cent.

Significant cost reductions have also been effected with equipment calibrations, since calibration costs in countries such as Malaysia and Singapore are two to four times the cost of the comparable ITI and SLSI laboratories (Table 4). The cost of calibrating equipment for fish export testing by the private lab, ITI and fishery exporters was approximately a total of US$7,000 in 2008. The time factor together with risks associated with transportation are further disadvantages. All this would have reflected on the pricing of the services, and this would have been ultimately passed down to the fishery exporter.

The benefits of the UNIDO TA can also be assessed on the basis of the increase in fishery exports. These recorded a significant upward trend during the period 2002 to 2008 (the period of the TA), from 7,724MT in 2002 to 15,014MT in 2008, with the percentage of fish of the total of fishery products (that includes, fish, shrimp and others) exported increasing from 57 per cent in 2002 to 73 per cent in 2008 in terms of quantity, and from 36 per cent to 77 per cent in terms of value (Table 5). This was a noteworthy contribution to the national economy and would also have had an obvious impact on the fishery community.

However, due to the many continuous public and private sector investments, both domestic and foreign, that have been made in the fisheries sector, the increase of fishery exports cannot be attributed to the UNIDO TA alone. In Sri Lanka, the private sector is the engine of growth in the fisheries sector, as in the other sectors of the economy, and handles the majority of fish production, processing and marketing, including exports. The investment figures of the private sector are not readily available. However, the total realized local and foreign investment for fish processing was LKR 523 million in 2008 under the Sri Lankan Board of Investment (BOI) Law No. 4 of 1978 and amendments enacted thereafter, the principal law applicable to foreign investments (which grants these establishments special benefits but also requires that all processed products should be exported). Fisheries sector investments under BOI law are specified as deep sea fishing, shrimp farming and fish processing industries. Under section 17 of the BOI law, aimed at the export of fish and fishery products, there were 25 registered companies as of 31st December 2008, of which 10 were fish processing companies.

In spite of the investments that have been made for fish processing over the years, it is reasonable to assume that the upgrading of the ITI and SLSI laboratories to international accreditation status made a major contribution to the enhancement of fishery exports. The availability of internationally recognized accredited testing laboratories played a key role in assuring that the quality of exported products was in keeping with the EU requirements. The laboratories also played a major function in monitoring factory hygiene through the regular analysis of

Table 3. ***Domestic test pricing of some selected tests as compared to pricing from laboratories in India (2009)***

Test	Lab 1 Sri Lanka	Lab 2 Sri Lanka	Lab 3 Sri Lanka	Lab 4 India	Lab 5 India	Lab 6 India
	US$	US$	US$	US$	US$	US$
Water/Ice (microbiology)	64	50	50	70	110	80
Fish (microbiology)	77	78	65	84	125	80
Fish (histamine)	34	nu	36	33	70	30
Fish (heavy metals – As, Cd, Pb, Hg)	52	44	68	60	60	75

nu – not undertaken

Table 4. ***Equipment calibration pricing relevant to fish export testing as compared to pricing from laboratories in Malaysia and Singapore (2009)***

Equipment	Lab 1 Sri Lanka	Lab 2 Sri Lanka	Lab 3 Malaysia	Lab 4 Singapore
	US$	US$	US$	US$
Performance test on water bath	30	24	85	80
Pressure gauge 0 – 100 bar	25	26	120	110
Performance test of incubator (3 point)	36	27	85	80

Lab 3 & Lab 4 are National Metrology Centres

Table 5. Export performance of fishery products (2002-2008)

	2002	2003	2004	2005	2006	2007	2008
Quantity of fishery products (MT)							
Fish	7,724	7.562	8,017	10,960	14,301	15,473	15,014
Shrimps	3,368	4,468	2,462	1,800	1,837	2,023	854
Other	2,440	2,975	3,202	3,225	2,509	3,926	4,726
Total	13,532	15,005	13,681	15,985	18,647	21,422	20,594
Fish (%)	57	50	59	69	77	72	73
Value of fishery products (LKR Mn)							
Fish	2,887	3,301	4,476	6,335	10,037	13,560	14,701
Shrimps	3,286	4,165	2,359	1,769	1,987	2,487	1,082
Other	1,874	2,077	2,600	2,591	2,416	3,076	3,294
Total in LKR Mn	8,047	9,543	9,435	10,695	14,440	19,123	19,077
Total in US$ Mn	83	99	94	103	138	171	174
Fish (%)	36	35	47	59	70	71	77

*Other comprises of crab, lobster, molluscs, chank, dried fish, beche-de-mer (sea cucumber) etc.

surface swabs of processing area and utensils. With accredited laboratories in place, Sri Lanka additionally gained an advantage over other South Asian fish exporting countries, such as Pakistan, Bangladesh and the Maldives, who at this time were still working towards accreditation of their testing laboratories. This is further validated by the fact that Sri Lanka faced three EC inspection/verification missions and successfully demonstrated the competence of its critical laboratory infrastructure. With the success of these missions, the export of fishery products (mainly fish (tuna), chilled and frozen) to the EU increased from around 30 per cent in 2003 to 60 per cent in 2007 and to almost 70 per cent in 2008.

It is also noteworthy that Sri Lanka had a significant opportunity to exploit export prospects and integrate into the global trading system in 2001 at a time when the EU was offering GSP+ tariff concessions and to be considered by the EU for List 1 of "harmonized" or "approved" countries for export fish and fishery products to the EU. A key requirement for fishery exports is demonstrating the quality and safety of the product and process with accredited testing facilities. The TA initiative had a positive impact on this as the laboratories were in the process of implementing ISO 17025 QMS in 2001 at the time Sri Lanka was placed in List 1. The international accreditation of the laboratories demonstrated competence and significant confidence in the test reports submitted.

The UNIDO intervention also created a "culture change" amongst the testing laboratories in Sri Lanka. Private laboratories which did not have international accreditation and no traceable calibration opted for accreditation in conformity to ISO 17025 to remain in the competitive market to meet global demands. These private laboratories also obtained calibration services from the accredited ITI metrology laboratory to maintain measurement traceability.

An unplanned spillover benefit was the flow of knowledge about EU requirements for the fishery sector from Sri Lanka to other countries. Four countries, viz. Pakistan, Vietnam, Bangladesh and the Maldives, in particular, benefited through training, consultancy and calibration services provided by ITI. Significant assistance was provided (i) to the Marine Fisheries Department (MFD) of Pakistan with expertise loaned by ITI in the field of histamine analysis, services for equipment calibration and training on laboratory quality management and microbiological analysis of water and fish to obtain Norwegian Accreditation (NA); (ii) to the National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) of Vietnam to obtain Norwegian Accreditation; (iii) to the Department of Fisheries of Bangladesh by ITI's hosting a team of seven of their laboratory personnel to provide them with an overview on meeting EU requirements for fishery exports; and (iv) to the Republic of Maldives, whose fish exporters recognized the value of the ITI laboratory's testing of their products for the export market.

Conclusion

It is clearly demonstrated that the UNIDO intervention, which resulted in the upgrading of the chemical, microbiology and metrology laboratories in Sri Lanka to internationally recognized accreditation status, paved the way for Sri Lanka to gain a stable foot-hold in the export of fish to global markets, especially to the EU. Accredited testing and calibration facilities were absolutely essential to access these global markets since investments for improving safety and hygienic conditions and process improvements in the certified establishments alone were clearly insufficient. The accreditation of laboratories in Sri Lanka made it possible for the country to remain in List 1 of countries for export of fish products to the EU. The trade opportunity given to Sri Lanka by the EU's bestowal of preferential market access led to a doubling of the overall export value of its fish during the period 2002 to 2008, and this would not have been realized without internationally accredited laboratories. Laboratory accreditation was thus extremely significant: developing countries like Sri Lanka face many challenges in complying with the quality and safety requirements and with the WTO TBT/SPS

agreement provisions needed to fully make use of the opportunities provided by the global trading system. This enhancement of Sri Lanka's export potential also secured the livelihood of the fishing community.

In addition to these direct benefits, the intervention also led to a significant spillover benefit, with the private sector laboratories, too, achieving internationally recognized accreditation status and thus strengthening the national quality system (NQS), where testing is a key component. The UNIDO-supported ITI chemical, microbiology and metrology laboratories also developed into centres of excellence for sharing knowledge and expertise with countries in Asia and Africa in the area of laboratory development and accreditation. With this final important and unexpected benefit and all the other benefits detailed above, the case study amply demonstrates the significant advantages that UNIDO intervention brought to Sri Lanka.

5.2 The Need for a Cost-Benefit Model of TCB Technical Assistance

Towards a cost-benefit model for trade standards compliance capacity

Given the limited availability and cost of finance in developing countries and the often precarious nature of their competitiveness in international markets, a key concern is policy support to investment decisions into compliance with trade standards[63]. Such costs are related not only to the act of achieving compliance itself, which is predominantly borne by the private sector, but also to demonstrating that compliance has indeed been achieved. The latter depends on the state of quality infrastructure which may be positioned in the public and/or private sectors. There is an evident need for public and private decision-makers to establish the most efficient ways in which to enhance their trade standards compliance capacity and to prioritize the use of scarce resources, which requires an appreciation of the level and composition of compliance costs and the balancing of these costs against the resulting flow of benefits over time.

A range of services are associated with trade standards compliance including: standards-setting, testing, metrology, system certification, inspection, traceability, packaging and labelling. In turn, the availability and cost of such services is a critical determinant of the costs borne by exporters in achieving and demonstrating compliance with trade standards, and to the ability of potential, new exporters to enter export markets. Table 1 details some of the key related requirements for exporters and the institutional mechanisms or infrastructure to support such compliance. In many cases it is possible for these services to be provided by, and the related infrastructure to be situated in the public or the private sector. Further, these services can be delivered at the firm/farm, sector or macro levels, with attendant levels of adaptation and customization (Kaeser and Goonatilake, 2006).

Decisions on the development of domestic capacity for the provision of compliance services, where such services should be positioned and the degree to which they are amenable to customization across sectors and over time will reflect a range of factors, notably: (i) unit cost; (ii) frequency of delivery; (iii) predictability of demand; and (iv) urgency of delivery. On the basis of these dimensions, two key service clusters can be envisaged:

- Services with a relatively high unit cost, low frequency, high predictability and low urgency. Examples include calibration of testing equipment and management system certification to ISO 9001, ISO 14001, HACCP, ISO 22000, and their related private standards, etc.
- Services with a relatively low cost, high frequency, low predictability and high urgency. Examples include product testing and access to international standards.

The costs and benefits of a country developing its own capacity to provide such services will likely be quite different across these two clusters of services. Everything else being equal, there would appear to be a far stronger case for establishing domestic

Table 1. *Elements of trade standards compliance* [64]

Compliance Area	Need of the Exporter	Necessary Service
Product standards/technical regulations, including packaging and labelling	Access to standards/ technical regulations	Reference centre in standards body or other
Product testing	Conformity assessment recognized by the (international) client	Laboratory testing services internationally recognized through accreditation
Accuracy of measurement	Internationally recognized, calibrated testing and measurement equipment, measurement traceability to SI (measurement) standard	Metrology laboratory services internationally recognized through accreditation, inter- calibration schemes
Product characteristics and quality	Consistency and reliability of enterprise quality management	Consultancy services and internationally recognized system certification capacity (ISO 9001, etc.)
Management of environmental impact	Consistency and reliability of enterprise environmental management	Consultancy services and internationally recognized system certification capacity (ISO 14001, etc.)
Food safety	Consistency and reliability of food contamination control and food safety management	Consultancy services and internationally recognized system certification capacity (HACCP, ISO 22000, etc.)
Social accountability	Assurance of consumer concerns relating to child labour, worker exploitation etc.	Consultancy services and internationally recognized certification capacity (SA 8000, etc.)
Examinations of shipment content to order	Internationally recognized product inspection services	Internationally accredited cross border inspection services
Traceability of products and inputs from farm to fork	Traceability system	Consultancy capacity and internationally recognized certification capacity for traceability systems

[63] WT/AFT/W/9, 2006 and WT/COMTD/LDC/M/46, 2007
[64] (Goonatilake and Kaeser, 2008)

capacity where services are required frequently and urgently, and where these services are low cost. For example, while it might be reasonable to make use of international certification services, laboratory testing is likely to be better supplied domestically. It is also reasonable to expect the incentives for the private sector to provide compliance services to be quite different between these two groups of services, with far less incentive for private provision where costs are high and frequency is low. For example, we might expect quite weak incentives for the private sector to provide metrology services unless the market base is large.

Underlying the provision of compliance services is the necessary standards, metrology, testing and quality (SMTQ) infrastructure, as detailed in Figure 1 on Page 54. The individual elements of the quality infrastructure operate together as a whole and are each necessary to ensure that reliable and credible compliance services are provided. For example, the NSB establishes standards, while laboratories and/or certification bodies that are accredited by the NAB assess conformity. If any critical elements of the quality infrastructure are missing or weak, compliance services may not be recognized internationally, for example by export markets and key trading partners. In such instances it may be necessary for exporters to obtain such services, perhaps at higher costs, from elsewhere. Thus, many firms in sub-Saharan Africa, for example, obtain certification to ISO 9001, ISO 14001, ISO 22000, or their related private standards using certification services from South Africa or Europe.

The foregoing discussion suggests that the enhancement of quality infrastructure, and in turn the provision of compliance services, should be guided by some critical questions:

- What is the cost incurred by a developing country in complying with standards in international markets?
- What investment is needed by a given country to establish the capacity to comply with and prove compliance with standards in international markets faced by the country's exports?
- What is the annual cost of maintaining compliance and the domestic infrastructure to prove compliance?
- What is the required threshold level of productive activity/export potential to make investment worthwhile, both in support to enterprise compliance capacity and in the domestic conformity infrastructure?
- Should the domestic compliance infrastructure be developed by the government or donors or should the exporters resort to services from private sector service providers?
- Will the provision of the infrastructure lead to more potential exporters being able to enter international markets?
- Will the provision of the infrastructure lead to enhanced export income?

Clearly, the answers to these questions will differ across countries according to local circumstances. The route to the establishment of particular services and the underlying infrastructure may also differ, for example in terms of whether these can and/or should be provided by the public or private sectors.

The trade capacity-building efforts of developing countries in the area of compliance services are necessarily undertaken in the context of acute financial, technical and human resources constraints that make the above questions even more pertinent and also drive the need for priority-setting and efficiency in capacity development. In turn, this necessitates a focus on the costs of developing the quality infrastructure that underlies the provision of compliance services and on the on-going costs of service provision. There are several pertinent questions. Which elements of quality infrastructure cost the most to put in place and what benefits are likely to flow from the resultant trade standards compliance services? Can such services be provided more efficiently in the public or the private sectors? Are the additional short-term costs of investing in domestic quality infrastructure justified by the longer-term savings of compliance services compared to using the services of foreign providers? A cost-benefit framework can provide useful guidance in addressing such questions.

Cost-benefit analysis is a long-standing approach to decision-making support in economics (Layard and Glaister, 1994). The standard approach to cost-benefit analysis is to compute and then compare the costs and benefits of the options under consideration, here investments in trade standards compliance services. In general, cost-benefit analysis compares the scenario where a particular intervention is made to a baseline that reflects the state of the world should the intervention not be pursued (Henson, 2009). The measured difference between these two scenarios is taken to reflect the impact of the intervention. Because the costs and benefits of interventions are frequently realized at different points in time, cost-benefit analysis uses discounting in linking present and future financial flows. Further, where the costs and benefits of an intervention are not certain, probabilities can be assigned to the various potential outcomes and expected costs/benefits computed.

The results of cost-benefit analysis can be expressed in terms of the benefits per dollar spent, often presented as a benefit-cost ratio, or as a net benefit with the flow of costs over time deducted from the flow of benefits. Options with a negative net benefit are rejected outright. The ordering of options with a positive net benefit is on the magnitude of the computed net benefit. Thus, cost-benefit analysis can be used to undertake the initial 'weeding' of 'bad' from 'good' options, and also to guide the choice between those options that are considered feasible a priori. Of course, this information can be used not only to make a straight choice between the options under consideration, but also to adjust options, reducing their costs and enhancing the benefits so as to improve their impacts.

At the outset of any economic analysis, it is necessary to identify the candidate interventions – the alternative investments in trade standards compliance services being considered – that themselves define the options under consideration and the confines of the analysis. These options might include gaps in diverse compliance services (for example, laboratory testing versus certification capacity) or alternative means through which any one of these gaps might be plugged (for example, establishing laboratory testing capacity in the public or private sectors). The aims of cost-benefit analysis in this context are twofold: first, to identify which of the options fails to yield a net benefit, such that they should be rejected outright; and, second, to rank the remaining options from 'best' to 'worst' according to the estimated net benefit.

In order to undertake cost-benefit analysis of proposed investments in trade standards compliance services, it is critical to be able to identify and then to quantify in monetary terms the costs and benefits (Goonatilake and Kaeser, 2008) [65]. On the cost side of the equation are the one-off and recurring costs of establishing, maintaining and operating the target compliance services. These might be derived, for example, through an accounting process that identifies the likely investments needed and imputes costs on the basis of local market prices or through extrapolation of comparable investments elsewhere (for example, in another sector or in the same sector in another country). The benefit side of the equation is more complicated. The immediate impact of investments in compliance services is presumably a decline in the costs of trade standards compliance faced by exporters. Indeed, the raison d'être of trade capacity-building is to enhance the efficiency of trade standards compliance by bringing down the related costs relative to, for example, purchasing compliance services from international providers. In turn, therefore, such investments are expected to enhance the net benefits for firms of trade standards compliance, meaning that more firms strive for compliance and could potentially become new exporters, and/or reductions in on-going compliance costs act to enhance international market competiveness.

The foregoing discussions suggest that the immediate focus of cost-benefit analysis of investments in trade standards compliance services should be on the costs of establishing and providing these services and on the stream of compliance costs faced by exporters in strategic markets under the alternative scenarios that domestic service capacity is or is not enhanced. Here the counterfactual is evidently the next best source of these compliance services available to exporters. In many cases this will be international (and presumably more costly) service providers. The expected benefits of domestic capacity-building in this scenario are declines in the one-off and recurring compliance costs borne by exporters. It is possible, however, that, in the absence of domestic compliance services, exporters are unable to achieve or to demonstrate compliance with trade standards, meaning that they fail to export or direct exports instead to less exacting markets, presumably resulting in lower export earnings. Estimates of such firm-level costs can be obtained through accounting exercises, firm surveys, individual firm case studies, etc.

In turn, investments in compliance service capacity are expected to result in the enhancement of trade, expressed through increases in the volume or value of strategic exports. At least three factors determine the economic impacts through trade of compliance with standards (Popper et al., 2004): (i) fixed and recurring costs of compliance; (ii) scope of the standards measure – whether it is imposed by one, some or all importing countries; and (iii) the extent to which importers and exporters have market power – the ability to influence world market prices by virtue of their size. Thus, the magnitude of any impacts on trade performance are likely to be diverse across sectors, exporting countries, importing markets, trade standards, etc. This makes any attempts to generalize the trade impacts of investments in compliance service capacity problematic. At the same time, a variety of other factors (for example, transport costs and exchange rate fluctuations) are often key determinants of the volume or value of exports. Recognizing the inevitable problems with attributing expected or observed changes in export performance, great care is needed, although basic frameworks do exist for such an analysis that can be built upon in moving forwards.

Moving one step (or perhaps more accurately multiple steps) forward to the ultimate impact of enhancements in trade compliance service capacity on poverty presents, not unsurprisingly, even more challenges. Indeed, existing evaluation frameworks are relatively weak at revealing the linkages between trade capacity-building, trade performance and poverty, let alone attempting to quantify the relationships. This implies that significant work is needed to develop a framework in which to assess the poverty-level benefits of trade compliance service capacity-building.

Looking forwards to future editions of the Trade Standards Compliance Report, UNIDO aims to develop a robust, cost-benefit framework for assessing investments in capacity to undertake trade standards compliance services in developing countries. The focus of this framework will be on the one-off and recurring costs of establishing, maintaining and providing compliance services, and the resultant benefit streams in terms of enhanced efficiency through lower cost and time in trade standards compliance by export firms and trade performance. This framework will be tested and indicative cost and benefit estimates derived for a series of case studies, following the Sri Lanka example provided above but employing more rigorous analysis. Looking further forwards, UNIDO aims to propose a systems-based framework for identifying and quantifying the poverty impacts of enhancements in trade compliance capacity in general, and in trade standards compliance capacity specifically. While the core elements of this framework are likely to have been developed in time for the next issue of the TSCR, applications of the framework will be reported in subsequent editions.

Conclusions

The sole aim of this chapter was to set out the need for economic analysis of trade capacity-building, both generally and with particular reference to trade standards compliance. While the case of Sri Lanka demonstrates that there can be considerable gains from establishing or enhancing capacities to undertake core compliance services, there is an evident need for more sophisticated analysis which not only provides estimates of costs and benefits that are more rigorous, but also facilitates more general conclusions that can guide policy decisions and processes of capacity-building at the level of exporting countries. Indeed, the long-term aim has to be the derivation of guiding principles for donors, beneficiary governments and private sector stakeholders as to which investments are likely to yield the greatest returns, in terms not only of trade performance but also of poverty reduction.

[65] UNIDO did a first approximation of compliance-related costs and investment needs for Sri Lanka, which is further elaborated in the case study presented in this chapter.

6. Perspectives and Emerging Priorities on Compliance Issues

6.1 Food and Agriculture Organization (FAO)[66]

Emerging Food Safety Issues affecting International Trade Compliance

Introduction

Agri-food products are a major component of international trade. Exports of fresh and minimally processed products have expanded in recent years, fuelled by globalization, changing consumer tastes, and advances in production, transport, and supply chain technologies.

The capacity of countries and producers to trade agri-food products is highly dependent on their ability to demonstrate effective control of food safety. Breakdowns in food safety not only impact on consumer health, but can severely damage market access and reputation and lead to trade disputes.

The Codex Alimentarius General Principles of Food Hygiene provide the internationally-agreed basis for preventative approaches to food safety management. This requires that farmers, producers, processors and marketers of food products implement outcome-based safety management systems that focus on reducing or eliminating food borne hazards at the most appropriate point of the food chain. Systems such as Good Agricultural Practice (GAP), Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP) and the Hazard Analysis and Critical Control Point (HACCP) now form the basis of this 'farm to table' approach, and most governments have embraced these systems as the cornerstone of food control regulation.

This emphasis on prevention has resulted in changed approaches in government programmes aimed at ensuring industry compliance with food safety requirements: increasing effort is placed on auditing food safety production, processing and distribution systems and less on end-product inspection and testing, although the latter remains an important component of overall control and verification. It is also important to recognize that food safety is not achieved only – or even primarily – by regulatory measures. Non-regulatory measures, such as programmes of information dissemination, training and technical assistance aimed at promoting compliance by the industry, are a crucial part of national food safety systems.

Countries need to plan for and invest in the development of national food safety systems in order to meet international expectations. Many countries have made considerable advances over the last decade in national food regulatory governance and technical capacity, appropriate infrastructure, and the education of farmers and manufacturers. However, a number of developing countries continue to struggle to implement the changes needed to address current food safety challenges.

Food systems are not static, and systems of food safety management cannot remain static either, if effective control of food safety hazards is to be maintained and appropriate levels of public health protection upheld. Making sound decisions on planning the development of capacities for food safety management requires awareness of emerging issues, such as new hazards, new technologies and new market demands, and an understanding of what is required to prepare to either embrace them or provide safeguards against them.

This contribution examines both these and other emerging trade-related food safety challenges, and highlights activities on which international food control capacity-building efforts and strategies should be focused to ensure that trade in safe food can continue and countries can reap the related health, economic and social benefits.

Emerging food safety regulatory issues

Increasing attention to mutual recognition and demonstration of equivalence

The principle of equivalence in food safety regulation is based on the premise that the same level of food safety can be achieved by using different but 'equivalent' measures. However, the demonstration of the equivalence of food safety systems is difficult and costly. It involves extensive consultation and cross examination of country systems, which requires the availability of adequate data and expertise in risk assessment, both of which are often lacking in many developing countries. So far, demonstration of

[66] This contribution was prepared by Renata Clarke, Senior Officer, Food Control and Consumer Protection, Nutrition and Consumer Protection Division, FAO and Dennis Bittinsnich, FAO consultant

equivalence of food safety systems has been extremely limited and has mainly involved developed countries with strong mutual bilateral trade interests. Enabling the use of the SPS equivalence provisions by developing countries will require enhancing their capacity to undertake risk analysis and technical disciplines so that they can make credible, science-based arguments in support of the equivalence of their food control systems.

Increasing volumes and changing patterns of trade can lead to increased 'global' food safety emergencies

Globalization facilitates the movement of increasing volumes of agri-food products to multiple destinations virtually simultaneously and these products increasingly originate from "non-traditional" sources. The global interconnectedness of food businesses and the rapid movement of products provide a pathway for food hazards emanating in an exporting country to rapidly impact on a large number of importing countries. This situation is rendered even more complex by the fact that a single product may contain multiple ingredients, each of which may originate from a number of countries. As global agri-food trade links continue to grow, new means of rapidly investigating and acting on food safety incidents at the global level have to be developed and implemented.

Increasing political interest in regional trade blocks and trade agreements could influence approaches to food safety management

There seems to be increased interest on the part of many countries in developing or strengthening regional groups as a means of furthering common economic and trade interests among countries with geographic, cultural and developmental similarities. This trend can influence food safety and its regulation in many ways. These economic groupings can become an effective vehicle for achieving improved collaboration and coordination among countries in identifying and addressing food safety issues, thus ensuring a stronger voice in multi-lateral food safety forums and a more effective and efficient enforcement of food safety at national and regional levels. However, it is important that, during their development, regional and bilateral trade agreements be fully consistent with WTO SPS obligations in relation to food safety and implement effective connections with multilateral systems aimed at managing food safety.

Greater analytical sensitivity to contaminants and residues can unduly compromise agri-food trade

Advances in analytical techniques now enable the detection of chemical contaminants and residues at previously unattainably low levels. In some cases these low levels represent unavoidable environmental contamination that cannot be prevented through available production or processing technologies or control strategies. Importing countries may impose overly restrictive enforcement measures and trade barriers due solely to the detectable "presence" of these chemicals, rather than applying enforcement measures that are developed and implemented according to actual risks posed by these low levels. Greater effort is required to determine the risks of such contaminants and chemical residues so that international benchmarks and limits can be set in order to avoid international disputes and trade conflicts.

Private food safety standards can both enhance and compromise agri-food trade

A number of private standards schemes have been developed in recent years which aim to protect retailers and processors against the commercial risks arising from food safety breakdowns, and in response to consumer and market demand for ethical, environmental or other factors to be incorporated in retailed foods. While private standards have driven investment in food safety systems (including in developing countries for specific products) and facilitated access to some markets, the diversity and plethora of private food standards impose additional cost pressures on producers, and there is growing concern about the scientific basis of a number of food safety requirements incorporated in some private standards (particularly in relation to chemical residue limits). Developing countries are particularly concerned about the potential of these standards to undermine WTO rules and the international consensus provided through Codex Alimentarius standards. Some work toward harmonizing or benchmarking private standards has been carried out in recent years, and this has the potential to reduce compliance cost pressures. However, there needs to be a better understanding of the impact of private standards on the market access of developing country food products and greater attention paid to promoting the consistency of these standards with those of Codex Alimentarius.

Increasing involvement of non-government third parties in food control

Private services providers are playing a growing role in food control, particularly as third party auditors/certifiers of food safety management systems and through the provision of private laboratory services. This can have the dual benefit of reducing government costs in food control and reducing business transaction costs. In well-functioning food control systems, this shared responsibility works well when there is effective official oversight of the quality of private service providers. If inadequately governed, however, private food control services can result in inaccurate certification of food products, resulting in potential weakening or undermining of government oversight of food control. This can have a direct negative impact on trade if, for instance, third party auditors are not reliable and food safety hazards are detected or distributed in exported products. It can also have a negative impact on the government's understanding of and intelligence on the national food safety situation, further weakening national governance of food safety.

New technologies may have an increasing impact on food systems and on food safety management

New technologies applied to the food and agriculture sectors can influence food safety and its management in many ways. Firstly, scientific opinion on the safety of foods produced using new technologies can often be difficult to reconcile, especially in cases where there are unknowns and data gaps. This creates difficulties in reaching international consensus on risks and appropriate risk management measures, leading to different regulatory regimes being adopted by different countries. Secondly, emerging technologies could provide new tools for food safety management such as nano-technology-enabled information systems that are expected to have applications in traceability

systems, and rapid nano-enabled contaminant testing that could have applications in routine food safety controls. The availability of such technologies may, however, lead to new requirements being placed on suppliers, and, if they are not readily accessible to developing countries, these technologies may present yet another challenge to their exporters. Thirdly, scientific and technological developments may offer opportunities to developing countries to address common food safety challenges, such as affordable water purification systems. Applying new scientific knowledge to solving development problems will, however, require developing countries to make adequate investment in science and technology.

New patterns of plant and animal disease

Outbreaks of new zoonotic disease (e.g., bovine spongiform encephalopathy (BSE), avian influenza, swine flu) have caused considerable trade disruption due to actual or perceived risks that these diseases can be transmitted via foods. Changing patterns of plant pests have also been noted. Drivers of these changes include changing production systems, increasing movement of plants and animals and their products, and climate-related changes. Countries with weaker veterinary and phytosanitary services may experience difficulties in ensuring good practices in veterinary drug and pesticide use which may lead to added problems of residues affecting trade.

There are also increasing concerns that the therapeutic, prophylactic and growth-promoting use of antibiotics in animal production could lead to antimicrobial resistance in humans and animals. This issue is presently being investigated by national and international risk assessment bodies.

Potential impact of safety issues on technical assistance strategies

A large number of developing countries have been working steadily over the last decade to improve their systems of food control. In many cases, institutions have been re-organized to promote coordinated control at all stages of the food chain, and legislation has been assessed and revised in line with changed institutional roles and with international obligations, particularly in relation to the WTO agreements. Technical assistance has also focused on building the technical services – human resources, facilities and equipment – necessary to implement food control programmes and to improve the capacity of food chain operators to adopt good practices. While technical assistance has resulted in significant achievements, there is still much to be done and, in order to address existing and emerging challenges, some adjustment of technical assistance strategies will be required.

Increased efforts at coordinating and promoting best practices in food safety capacity development

Food safety is now seen as a priority for the health, agriculture (including livestock and fisheries) and trade sectors, and this has resulted in growing numbers of donors and agencies providing technical assistance in this field. This is a positive development but it is accompanied by a need to give increased attention to coordination and communication among players in the design and implementation of technical assistance programmes, otherwise there will be diminishing gains from the investments made. The establishment of the Standards and Trade Development Facility (STDF) is a clear response to this need. FAO, the World Bank, WHO, and the WTO are the founding members of this Facility, which provides a forum for sharing experiences on good practice and lessons learned, and also for upstream coordination among technical agencies and donors in designing technical assistance programmes. A number of beneficiary countries are also taking steps to improve national mechanisms that serve to integrate external technical assistance into national development strategies. Assistance to countries in assessing their national food control systems as a means of developing plans of action for building these capacities could make an important contribution to driving coherence among technical assistance providers. Building the capacities of regional economic groupings in food safety and its management is also likely to be an important aspect of the global strategy for forging better coordination in planning and delivering technical assistance and in keeping food safety and food quality issues near the top of national political agendas.

Greater attention to supporting the development of sound national policies on food safety/quality

The experience of past food safety projects has shown that, in many cases, progress achieved in the strengthening of technical food control services is not maintained in the medium term, due to inadequate political commitment to provide the level of funding required to maintain or further develop these services. Greater effort needs to be dedicated to providing policy makers with the tools and information on which they can make optimal decisions on the role and value of such services in relation to national development targets in public health and well-being, food exports, agro-industrial development, etc. Building stronger political support for food safety/quality management programmes will require greater efforts at demonstrating the contribution of food control services to national development. It will also require the availability of better data on the consequences of poor investment in food safety/quality capacities: data on the extent of food-borne disease, on its impact on market access, etc.

Greater attention to the need for food safety data from developing countries

Food safety/quality interventions are often designed to demonstrate impacts on health, trade or poverty alleviation in the short term according to the political interests and orientation of the donors. There has been less enthusiasm up to now for funding projects which focus primarily on developing the capacities of countries to generate national and local food safety data that are not likely to lead directly to trade or poverty alleviation outcomes in the short term. However, it is clear that this capacity is fundamental within a national food safety system: it is highly relevant to the ability of countries to argue for or against the recognition of equivalence of safety management systems; it is necessary to allow countries to understand where the real problems lie and therefore how to prioritize the use of scarce food control resources; and it is indispensible for the effective

participation of developing countries in international risk assessment processes and in the elaboration of international standards – in particular Codex Alimentarius standards – to ensure the global relevance of decisions taken in these forums.

Accompanying the assistance provided to developing capacities for generating food safety data, there must be improved efforts at enabling developing countries to make optimal use of these data to support national food safety decisions in an international trading context that recognizes arguments based on risk assessment. There has been much training provided on food safety risk analysis, but there is a need to better design and deliver such training to ensure that it enables national counterparts to apply the concepts concretely.

Strengthened international food safety information networks

All governments recognize the need for the rapid sharing of information related to the safety of foods in international trade. Technical assistance for strengthening international information networks to support the rapid flow and effective use of food safety information will need increased attention. It is important to recognize that the improved ability of developing countries to generate food safety data enhances the value of the information networks that they are involved in.

Strengthened capacities for food-borne disease surveillance and increased attention to integrated surveillance

The lack of objective data in most developing countries on the extent of the public health impact of unsafe food on the market is a major obstacle to drawing political attention to addressing these problems. WHO recognizes the need to address this situation and is leading international efforts to mobilize donor support for improving systems of food-borne disease surveillance.

These data on the occurrence of food-borne diseases are not only relevant at a national level; they also contribute to global capacity for the early detection of emerging trends in food-borne diseases and to the facilitation of an effective response. Greater advocacy and support is needed for improving information sharing among programmes of surveillance on human and animal health, as well as sharing information from environmental and food contaminant monitoring, in order to improve intelligence at national and international levels on emerging trends in the food chain and to facilitate the establishment of programmes and partnerships that will improve the control of infectious diseases and other food chain crises. FAO has recently launched a programme – EMPRES-Food safety – that will focus on the collection and analysis of food safety intelligence at a global level and, in so doing, improve the capacity for early warning and effective early response at global, regional and national levels to prevent food chain emergencies or to minimize the negative impacts when they do occur.

Public – private partnerships in strengthening the global food safety system

Effective prevention of food safety problems is only possible when the food chain operators are able to implement effective food safety management programmes. Governments have a role in promoting compliance with hygiene rules and not only in punishing non-compliance. There needs to be greater attention to holistic programmes of assistance that consider the creation of an enabling environment for private sector investment in its food safety capacities. At national and international levels there needs to be enhanced dialogue between the public and private sectors in relation to the development and application of private food safety standards aimed at reducing – or even eliminating – negative impacts on the competitiveness of developing country producers. Certainly a part of the solution will be the provision of more focused technical assistance aimed at facilitating compliance with requirements through: (i) the development of national schemes benchmarked against private standards to ensure consideration of local conditions in determining the most appropriate measures; (ii) training and support for upgrading producers' food safety systems; and (iii) mechanisms to reduce the costs of certification.

Building scientific/technological capacities to serve development

While certainly not considered as food safety technical assistance, programmes to develop basic scientific and technological capacity in countries will have increasing relevance to their preparedness to meet emerging food safety challenges and improve their competitiveness in international trade. For example, nanotechnologies appear to have the potential to provide affordable solutions for water purification, for rapid contaminant detection and for a number of other applications that could contribute to the production of demonstrably safe food in developing countries. Furthermore, optimism continues to be expressed about the potential role of modern biotechnologies in developing crops that offer benefits in countries with fragile eco-systems and low productivity. Developing countries will need the capacity not only to develop new applications but also to carry out the research required to assess potential food safety risks that might be associated with them. In order to facilitate trade, risk assessment carried out by developing countries needs to pass international scrutiny.

6.2 International Labour Organization (ILO)[67]

International Labour Standards: Closing the Labour Protection Gap for Rural Workers

Approximately 3.4 billion people, slightly under half of the world's population, now live in rural areas. Of these, approximately 1 billion are employed in agriculture and 97 per cent live in developing countries. Because the extent and severity of poverty are greater in rural than in urban areas, providing opportunities for productive employment and decent work for rural workers is a major development challenge.

Many rural workers[68], especially in agriculture, experience severe difficulties and gaps in protection as regards freedom of association, forced labour, child labour, discrimination, wages, working time, occupational safety, and health and social security. For example, 70 per cent of child labour is found in agriculture, and bonded labour is prevalent in certain countries. The level of accidents and work-related illness in rural areas accounts for half the global total, with an average of 170,000 agricultural workers killed at work annually. Rural workers, too, often fall outside the scope of national labour laws; in a number of cases, they are explicitly excluded, either fully or partially, from the relevant laws, or, when they are covered under the law, they are excluded from protection in practice. Such exclusions are often due to their employment status (e.g., self-employed, smallholder farmers, casual and seasonal workers) or because they belong to vulnerable groups (e.g. women, migrant workers, indigenous peoples, lower castes), making them particularly susceptible to abuse. In addition, labour inspection is often non-existent or weak.

International labour standards are essential to guide national legislation and policy and to help address these gaps. They provide an internationally recognized framework for governments in the implementation of decent work principles in all areas of work, including the rural economy. The ILO supervisory system, especially the ILO Committee of Experts on the Application of Conventions and Recommendations (CEACR), plays a key role in ensuring that real progress is made towards decent work for all by guaranteeing the effective implementation of standards and providing a reference framework supporting the efforts of Member States to implement international labour standards.

Since its foundation in 1919, the ILO has been concerned with the protection of rural workers, especially in agriculture. In 1921, ten instruments were adopted to protect agricultural workers; these covered freedom of association, minimum working age, child labour, hours of work, social security, living conditions and vocational training. Since then, 19 new instruments have been adopted. In addition to these specific instruments, many other ILO standards include rural workers in their scope of application.

Freedom of association

While nearly half the world's workforce is found in rural areas, in many countries agricultural and rural workers are still denied the right to organize and bargain collectively. The ILO recognized the need to protect the rights of those working in agriculture as early as 1921 with the adoption of the Right of Association (Agriculture) Convention, 1921 (No. 11), which has been ratified by 122 Member States to date. The ILO continued to recognize the importance of an organized rural sector with the adoption of the Rural Workers' Organization Convention, 1975 (No. 141), and Recommendation, 1975 (No. 149). It should also be borne in mind that agricultural workers continue to benefit from guarantees provided in all freedom of association Conventions, particularly the Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87), which provides that workers and employers, "without distinction whatsoever", have the right to establish and join organizations of their own choosing, and the Right to Organise and Collective Bargaining Convention, 1949 (No. 98), which provides that workers are to enjoy adequate protection against acts of anti-union discrimination in respect of their employment.[69]

However, workers engaged in agricultural activities continue to frequently experience difficulties arising out of legislation or practice when organizing in trade unions. This is due mainly to the fact that rural employment has distinctive features, with small enterprises with relatively few employees predominating and widespread self–employment, and much of the wage employment being temporary or seasonal. The number of agricultural trade union members is usually relatively small compared to the total number of workers in the sector. On large commercial farms and plantations where large numbers of workers are employed, it is more common for the workforce to be represented by trade unions and to be covered by collective agreements. Nonetheless, restrictions on the right of temporary workers or those employed by out-growers to join trade unions are reported. Furthermore, there is still evidence

[67] This contribution was prepared by the International Labour Standards Department of ILO

[68] The term "rural workers" is defined by Article 2 of the Rural Workers' Organisations Convention, 1975 (No. 141), as "any person engaged in agriculture, handicrafts or a related occupation in a rural area, whether as a wage earner or, subject to the provisions of paragraph 2 of this Article, as a self-employed person such as a tenant, sharecropper or small owner–occupier."

[69] Conventions Nos. 87 and 98 are part of the eight ILO fundamental, or core, Conventions along with Conventions Nos. 29 and 105 on forced labour, Conventions Nos. 100 and 111 on equality of opportunity and treatment and Conventions Nos. 138 and 182 on child labour. According to the ILO Declaration on Fundamental Principles and Rights at Work, 1998, all ILO Member States, even if they have not ratified the Conventions in question, have an obligation – arising from the very fact of membership of the Organization – to respect, to promote and to realize, in good faith and in accordance with the Constitution, the principles concerning the fundamental rights which are the subject of those Conventions, namely: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labour; the effective abolition of child labour; and the elimination of discrimination in respect of employment and occupation. These rights are even more important in that they are enabling rights, i.e. they create conditions to allow access to other rights.

of government interference restricting the exercise of this basic right. The most common legal obstacle in the sector remains the full or partial exclusion of agricultural workers from legislation guaranteeing the right to freedom of association and collective bargaining. There are often excessive requirements regarding minimum numbers of members as a condition for a trade union to be recognized. The supervisory bodies of the ILO have, during these past years, examined serious cases of violations, including mass dismissal, anti-union discrimination, refusal to grant union recognition, and also violence, death threats and even murder.

Collective agreements in agriculture are, in most cases, tailored to the conditions of employment in specific crops or particular subsectors. Agreements between a single employer or company and a trade union are common but there are also many cases where agricultural employers' organizations of a particular subsector would conclude agreements with trade unions that are applicable to all their members. Collective agreements in agriculture are essential for securing decent conditions of work and ensuring stable labour relations in the sector. This is important since labour codes frequently treat the agriculture sector differently from other sectors, and the agreement thus clarifies the applicable rules and law. In many sectors, wages are at the heart of collective bargaining in agriculture. The role of collective bargaining in wage setting is crucial since many countries exclude agricultural workers from minimum wages protection.

Forced labour

Forced labour is prevalent in many rural areas, especially among migrant agricultural workers and victims of trafficking. The Forced Labour Convention, 1930 (No. 29), provides that all Member States undertake to suppress the use of forced or compulsory labour in all its forms. In accordance with the Abolition of Forced Labour Convention, 1957 (No. 105), Member States shall undertake to suppress and not to make use of any form of forced or compulsory labour, for example as a method of mobilizing and using labour for purposes of economic development or for having participated in strikes. These core Conventions cover all workers from the exaction of forced labour. This broad protection is afforded regardless of the sector of activity (whether in the formal or informal economy) or the legal status of the worker.

The ILO supervisory bodies have drawn attention to situations where slavery-like conditions are transmitted by birth to individuals who are compelled to work for their master without pay. The CEARC has on several occasions addressed the issue of bonded labour with regard to plantation workers, as well as other agricultural and rural workers, including indigenous workers (in particular, in Asia and Latin America), in its comments made under the Forced Labour Convention, 1930 (No.29). In some cases, the CEARC has noted situations where non-respect of rights concerning payment of wages and working time has led to the imposition of practices of forced labour, such as the obligation to do overtime work under the threat of a penalty. Furthermore, in some countries, national laws still provide for the possibility of imposing work in the agricultural sector, for example in the form of compulsory cultivation, etc.

Child labour

Nearly seventy per cent of working children are in the agricultural sector – over 132 million girls and boys aged 5-14 years. The Minimum Age Convention, 1973 (No. 138), seeks to progressively eliminate child labour by enforcing the minimum age for admission to employment (determined by governments to be between the ages of 14 and 16, depending on a country's level of development) and to promote compulsory education of children up to this minimum age. The Convention encourages the application of the minimum age to all sectors of the economy, though countries with insufficiently developed economies and facilities are permitted to initially limit its scope of application. Several countries where children are traditionally employed in agriculture have excluded certain types of agricultural production. At a minimum, the Convention obligates governments to prohibit work under the minimum age on plantations and other agricultural undertakings which produce mainly for commercial purposes. Nonetheless, the CEACR has observed that some countries that do not legislate any minimum age for children working in agriculture are in violation of the Convention.

Around the world, children become farm labourers at an early age, sometimes as young as 5 or 6 years of age, and in many countries the highest rate of children working below the minimum age is in the agricultural sector. This often results in missed education opportunities, especially given that rural areas are often characterized by lack of schools or schools of variable quality (particularly due to problems of retaining teachers in remote rural areas), and poor school attendance during harvest seasons.

It is important to point out that the Convention does not prohibit all agricultural activities for children under the minimum age. Article 7 of Convention 138 allows governments to determine types of "light work" (types of work which are not likely to be harmful to a child's health or development or to prejudice their attendance in school), which can be performed by children up to two years below the minimum age (between the ages of 12 and 14 in countries with a minimum age of 14, and between the ages of 13 and 15 years in countries where the minimum age is 15).

Certain agricultural tasks have frequently been determined by governments to constitute light work activities, such as the preparation of seeds and crops, the maintenance of crops without the use of insecticides or herbicides, the harvesting of fruit, vegetables or flowers, picking and sorting in farms, and herding. The Convention also allows for the temporary exclusion of limited categories of work, and many governments have excluded work performed by children on family farms. In some countries, work performed by children on these family farms occurs on weekends and holidays, and does not affect a child's school attendance. Nonetheless, due to the invisible nature of this work, effective regulation in this sector is difficult, and exploitation may still occur.

Convention No. 138 is complemented by the other major ILO Convention on child labour, the Worst Forms of Child Labour Convention, 1999 (No. 182). One of the worst forms of child labour prohibited for children under 18 by this Convention is work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.

Agriculture is one of the three most dangerous sectors in which to work at any age. Because children's bodies and minds are still growing and developing, exposure to workplace hazards can be more devastating and long lasting for them and can result in lifelong disabilities. The CEACR has noted the incidence of serious health problems in children linked to agricultural work in numerous countries, often caused by prolonged exposure to dangerous pesticides, and by dehydration. The CEACR has noted that, in some countries, children in agriculture have higher rates of work-related injuries than their counterparts in other sectors.

To prevent children engaging in hazardous work, governments are obligated to determine (through legislation or regulation) a list of prohibited types of hazardous work. Examples of agricultural activities which governments have included on lists of types of work prohibited for children under 18 include the preparation and use of pesticides, herbicides and fertilizers, work involving the care of sick animals and the handling of farm machinery, work on plantations and work in certain crops (such as cotton or tobacco).

Despite these prohibitions, CEACR has observed in several countries that the majority of hazardous work performed by children is in the agricultural sector. In a number of countries, the agricultural sector is excluded from the prohibition against hazardous work. The CEACR has repeatedly drawn the attention of Governments to types of agricultural activities that are clearly hazardous for children to perform. It has encouraged governments to take measures to update their list of hazardous types of work to reflect the dangerous nature of these activities and to protect children against these risks. Nonetheless, even when legislation prohibits such hazardous work for children under 18, the enforcement of this prohibition is often inadequate due to limited monitoring mechanisms in the agricultural sector, which the CEACR has noted in both developed and developing countries.

A less frequent, yet still important, problem is the use of forced child labour in the agricultural sector. The CEACR has noted cases where this worst form of child labour has been used for agricultural production, such as where school-aged children have been obliged to participate in the harvest rather than attend school, or where children are trafficked to neighbouring states or internally to work on plantations.

Equality of opportunity and treatment

With 169 Member States having ratified the Discrimination (Employment and Occupation) Convention, 1958 (No. 111), and 167 the Equal Remuneration Convention, 1951 (No. 100), there is general acceptance of the principles of non-discrimination and equal remuneration. These Conventions apply to all workers, including agricultural workers. While considerable progress has been made in the adoption of legislation and policies on equality and non-discrimination, certain categories of workers are often excluded from legislative protection or from the scope of the policies, and this includes agricultural workers. The Equal Remuneration Convention, 1951 (No. 100), provides that Member States are to ensure the application to all workers of the principle of equal remuneration for men and women workers for work of equal value. Under the Discrimination (Employment and Occupation) Convention, 1958 (No. 111), Member States undertake to declare and pursue a national policy designed to promote equality of opportunity and treatment.

The CEACR has stressed, in a number of its comments, the absence of legislation providing equality of treatment and equal remuneration for agricultural workers, which particularly affects women and workers belonging to disadvantaged groups. Even where legislation is in force, agricultural workers, in particular women, indigenous workers, migrant workers and lower-caste workers in this sector, may face discrimination or abusive or insalubrious working conditions, and are often paid lower wages. In many developing countries, this issue has become more critical as export-oriented agriculture has become an important source of paid work for women in the last decade.

Employment policy and promotion

The promotion of productive employment lies at the heart of decent work. The Employment Policy Convention, 1964 (No. 122), has been identified as a significant instrument from the viewpoint of governance by the 2008 Social Justice Declaration. Convention No. 122 serves as a blueprint for Member States as they implement active employment policies in their effort to recover from the global economic crisis that has also badly affected the rural sector. It provides that ratifying Member States shall declare and pursue an active policy designed to promote full, productive and freely chosen employment. Priorities for the rural sector in this regard include developmental policies, rural development policies, and educational and skills training policies. Article 3 of Convention No. 122 is of particular relevance to rural workers because it requires governments to consult with representatives of employers and workers and take their views and experiences into account when formulating and implementing employment policies. The report form for the Convention specifies that consultations with representatives of other sectors of the economically active population, such as those working in the rural sector and the informal economy, should take place on employment policy measures.

The Employment Policy Recommendation, 1964 (No. 122), provides that special emphasis on a broadly based programme to promote productive employment in the rural sector should be incorporated within the framework of an integrated national policy. The promotion of rural employment is also present in the Employment Policy (Supplementary Provisions) Recommendation, 1984 (No. 169), which states that all Member States might implement special public works programmes, such as rural infrastructure projects, in order to create and maintain employment, raise income levels and reduce poverty.

In its recent General Survey of 2010 on employment instruments, the CEACR highlighted the importance of rural employment when the national authorities and the social partners prepare, adopt and implement national employment plans and poverty reduction strategies. Both industrialized and developing countries should make efforts to address both urban and rural development to ensure equitable regional development. Representatives of workers and employers in the rural sector are key actors in ensuring the effective implementation of human resources development policies and programmes.

The CEACR also indicated in its 2010 General Survey that, based on reports received from 108 governments, the negative impact on employment of the present downturn is likely to be stronger in countries that are more integrated into the global markets. In countries exporting primary commodities, the decline in demand for agricultural commodities and in their prices will mean that the rural sector will face a rise in underemployment and a decline in income. In developing countries, the need to give priority to rural employment arises not only from the weight of this sector in total employment, but also from the fact that the majority of the poor population in low-income countries is typically located in rural areas. If employment policy is to have a large impact in predominantly rural economies, both in terms of increasing aggregate productive employment and contributing significantly to the reduction of poverty, it must emphasize the promotion of rural employment.

Some employment-related standards, like the Human Resources Development Convention, 1975 (No. 142), and the Human Resources Development Recommendation, 2004 (No. 195), contain general provisions that are particularly useful for the rural sector. Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No. 159), refers specifically to rural and remote areas when encouraging governments to promote employment opportunities for peoples with disabilities living in the rural sector.

Some countries have provided information in their reports to the CEACR on specific labour regimes for rural workers and micro-enterprises and SMEs. The CEACR stressed in its 2010 General Survey that policies and programmes designed to promote full employment and to encourage the creation of productive and sustainable jobs in the rural sector should be adopted in line with the Job Creation in Small and Medium-Sized Enterprises Recommendation, 1998 (No. 189).

Some countries have recently adopted measures that promote the international labour standards related to employment; for instance, the CEACR noted with interest the implementation of the National Rural Employment Guarantee Act (NREGA) in India, which aims to provide 100 days of guaranteed unskilled waged employment to each rural household in more than 600 districts of the country. The success of the Grameen Bank in managing microcredit programmes in Bangladesh and in many other countries has also been observed, and the Philippines and Mexico have given specific attention to the promotion of SMEs in rural areas. Among other initiatives in industrialized countries, the CEACR noted the Rural Business-Cooperative Service (RBS) programme in the United States, which provides support for research, management and marketing and is also responsible for establishing vocational education and training services for agricultural and rural workers.

The CEACR concluded that most developing countries show a clear commitment to the objective of employment promotion and have adopted a wide range of policies and programmes towards this end. Nevertheless, the rate of unemployment remains high in a significant proportion of developing countries. The traditional view that unemployment rates in developing countries should be low, in part because of a lack of social protection measures, runs counter to actual experience over the past two decades. The employment instruments point to three useful policy options for reducing unemployment which do not appear to have received sufficient emphasis in the current policies of some of these countries. The first is to identify and adopt measures to increase the labour intensity of economic growth; the second is to devote increased attention to employment promotion in the rural areas, since this is where the majority of the labour force in many developing countries is still located; and the third is to provide access to funding to encourage an entrepreneurial spirit for young people and women. The protection of groups of special concern may also be enhanced. [General Survey concerning employment instruments in light of the 2008 Declaration on Social Justice for a Fair Globalization, Report III (Part 1B) International Labour Conference, 99th Session (June 2010).]

Labour inspection

Labour inspection is the most important tool that governments have at their disposal to ensure compliance with labour laws and to identify gaps in national legislation. The CEACR has emphasized the need to develop labour inspection activities in agriculture, especially to protect young workers and tackle child labour.

The year 2009 was the 40th anniversary of the adoption of the Labour Inspection (Agriculture) Convention, 1969 (No. 129), which requires governments to establish a system of labour inspection in agriculture. Three main functions of labour inspection are identified: securing the enforcement of the legal provisions on conditions of work and the protection of workers; providing technical information and advice to employers and workers on how best to comply with relevant legal provisions; and bringing to the attention of the competent authorities defects or abuses that are not specifically covered by the law and submitting proposals on how to improve laws and regulations. Thus, labour inspection has a crucial and proactive role to play. This Convention was also included, along with Convention No. 122, among those characterized as particularly significant from the viewpoint of governance in the ILO Declaration on Social Justice for a Fair Globalization, 2008, and is currently subject to a plan of action for the promotion of its ratification and full implementation.

The CEACR has, however, noted the reluctance of several Member States to extend labour inspection systems to the agricultural sector, due in part to administrative, technical and economic obstacles. Only a small proportion of agricultural enterprises are legally covered by labour inspection systems worldwide. In addition, in many developing countries these enterprises are rarely visited in practice, due to a lack of resources allocated to labour inspectorates. The influence of labour inspection is, in practice, mostly confined to formal activities in urban areas.

In most developing countries, particularly in Africa, Asia and South America, where the majority of the population depends on agriculture and where the environment comprises more and more hazards, the main obstacle noted by the CEACR to the application of Convention No. 129 is the lack of resources. In English-speaking Africa, there is a particular tendency to tackle the diminishing public resources by decentralizing the labour inspection service, which often impedes its functioning even further. An especially acute problem in developing countries in

general is the lack of transport facilities to perform inspection visits of the workplaces since worksites are often scattered and inaccessible. In certain countries, roving safety representatives are put in place to mitigate this difficulty.

The CEACR has stressed that the increase in ILO technical co-operation and assistance activities in the area of inspection, as well as in a certain number of international initiatives in which the ILO is involved, has demonstrated that, even if somewhat belatedly, collective awareness of the need to develop labour inspection systems in agriculture is increasingly noticeable, and labour inspectors' duties, powers and prerogatives and their field of intervention have been substantially expanded in the agricultural sector in some countries.

Wages

Wages in agriculture tend to be low, with many workers paid below the national minimum wage. Wage setting is one of the most contentious rural labour issues, especially as payments are often delayed. The Minimum Wage Fixing Machinery (Agriculture) Convention, 1951 (No. 99), calls for the creation or maintenance of adequate machinery to fix minimum wage rates. The national competent authority may exclude from the scope of application of this Convention certain categories of agricultural workers, such as members of the farmer's family. Workers are to be guaranteed a minimum wage sufficient to meet their needs, but also to preserve the purchasing power of the wage. The Convention provides that the employers and workers concerned may participate in, or be consulted with regard to, the operation of the minimum wage-fixing machinery on a basis of complete equality. Guidelines for the fixing of minimum wages are found in the accompanying Minimum Wage-Fixing Machinery (Agriculture) Recommendation, 1951 (No. 89). Other relevant ILO standards are the Minimum Wage-Fixing Machinery Convention, 1928 (No. 26), and the Minimum Wage Fixing Convention, 1970 (No. 131).

The protection and timely payment of wages is dealt with by the Protection of Wages Convention, 1949 (No. 95), which applies to all workers, without qualification. It provides that wages are only payable in legal tender. The partial payment of wages in the form of allowances in kind may only be authorized in certain circumstances for certain occupations. Partial payment in kind is often used in the agricultural sector. Full payment in kind with no cash remuneration, when it is used, poses serious problems for agricultural workers.

Over the years, the supervisory bodies have raised a number of problems with the application of these Conventions to rural workers, including non-payment or deferred payment of wages; exclusion of agricultural workers from national legislation; non-respect of periodic readjustment of minimum wage rates; the lack of adequate sanctions to deter abuse of the minimum wage system, where it exists; and the lack of statistics and data on workers covered by minimum wages in this sector. The CEACR has also commented for many years on practices that result in ten of thousands of indigenous agricultural workers being in debt bondage through the use of systems of advances on wages, stores located in camps which charge excessive rates compared to market prices, compulsory deductions from wages for savings schemes, payments in kind and the deferred payment of wages.

Occupational safety and health

Agriculture is, along with construction and mining, one of the three most dangerous occupations to work in. Despite the hazardous nature of the work, and the high levels of risk, agriculture is, however, often excluded from coverage under national occupational safety and health regulations or is the least well covered sector of the economy.

The Safety and Health in Agriculture Convention, 2001 (No. 184), and its accompanying Recommendation No. 192 are particularly significant because, for the first time in international law, agricultural workers are formally guaranteed the same rights and protection for their health and safety as other categories of workers. They provide a framework for the development of national policies and mechanisms to ensure the participation of workers' and employers' organizations in that process. However, the Convention does not cover subsistence farming, industrial processes that use agricultural products as raw materials, and the industrial exploitation of forests. Furthermore, it allows Member States to exclude certain agricultural undertakings or limited categories of workers from the application of this Convention, or certain provisions thereof, when special problems of a substantial nature arise. Where Convention No. 184 is not ratified, the more comprehensive Occupational Safety and Health Convention, 1981 (No. 155), may apply, along with its Protocol of 2002, as well as the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).

Convention No. 184 calls for the adoption of a national policy on safety and health in agriculture and the setting up of an appropriate system of inspection for agricultural workplaces, and prescribes preventive and protective measures for machinery safety and ergonomics, the handling and transport of materials, sound management of chemicals, animal handling and protection against biological risks, and the construction and maintenance of agricultural facilities. It provides that 18 years is the minimum age for employment in agriculture in dangerous jobs and 16 years for other farm jobs. Other provisions require that temporary and seasonal workers receive the same level of protection as permanent workers, and that the special needs of women agricultural workers in relation to pregnancy, breastfeeding and reproductive health are taken into account. The Convention also regulates working time arrangements and coverage against occupational injuries and diseases. The Recommendation provides further guidance on occupational safety and health surveillance and recommends preventive and protective measures in the areas regulated by the Convention. While it may be some time before this new instrument achieves wide ratification, it already provides comprehensive guidance to ILO Member States and the social partners working to improve their national law and practice. This Convention and Recommendation are also important new reference texts for those working with voluntary initiatives, codes of conduct and social labelling schemes since occupational safety and health is the workplace issue most frequently addressed in codes of conduct.

Under Convention No. 184, the CEACR has dealt with questions relating to: adequate and appropriate systems of inspection for agricultural workplaces; the right of workers to select safety and health representatives; ensuring that information is conveyed and understood; an appropriate system for the importation,

classification, packaging and labelling of chemicals; disposal of chemical waste; protection against biological risk; appropriate training; temporary and seasonal workers; and the reproductive health of women agricultural workers.

Indigenous and tribal peoples

Many indigenous peoples work in agriculture. If they earn their livelihood as subsistence farmers, their main problems frequently arise from unequal access to land with respect to land title and ownership rights, credit, marketing facilities and resources. If they work for others, they often face de facto discrimination in the conditions of employment. They are also often subject to forced dispossession of land for the creation of agricultural undertakings as well as logging and mining activities. In all such cases, legislation and policies should provide measures to allow indigenous peoples access to resources, including the means to carry out the activities from which they earn their living.

The Indigenous and Tribal Peoples Convention, 1989 (No. 169), provides protection and rights for indigenous workers in seasonal and casual employment, including in agriculture. The establishment of appropriate and effective mechanisms for the consultation and participation of indigenous and tribal peoples in matters that concern them is the cornerstone of the Convention. It is important to ensure the right of indigenous and tribal peoples to decide their development priorities through meaningful and effective consultation and their participation at all stages of the development process, particularly when development models and priorities are discussed and decided. These peoples may often consider agriculture to be the priority. The Convention deals in Part II with the rights and ownership of land that has been traditionally occupied by indigenous peoples as well as the safeguarding of their rights to natural resources. Part III provides that they are to enjoy the same protection in national law and practice as other such workers in the same sectors, and to be fully informed both of their rights under labour legislation and of the means of redress available to them. Part IV addresses vocational training, handicrafts and rural industries, and advocates for the strengthening and promotion of rural industries and traditional occupations as a tool in maintaining indigenous cultures, their economic self reliance and their development.

Plantations

When the Plantations Convention, 1958 (No. 110), was adopted, plantations constituted an important economic sector for many countries in tropical and subtropical regions, and the poor living and working conditions of plantation workers were widely recognized. The principal objective of the Convention was to afford broader protection to those workers. The working and living conditions of plantation workers continue to be a source of concern in most parts of the world. Recent comments by the CEACR have focused on particular instances of "lawlessness" that seems to prevail in some plantations, as reflected in violations of several fundamental governance and other ILO Conventions. Recourse to child labour and the prevention of workers' unionization seem to be the most recurrent phenomena, while instances of compulsory pregnancy testing and debt bondage have also been reported. Another problem specific to plantations is the scarcity of labour inspection visits (or the non-transparency of inspection results) as, in many cases, private security forces are used to prevent all unwelcome visitors from penetrating into plantation zones. Mention should also be made of the increased health risks to which plantation workers are often exposed, for instance due to the widespread use of pesticides. Finally, abusive practices in the regular payment of wages or the payment of the established minimum wage, seem to be a common feature, especially among migrant plantation labourers.

6.3 The International Plant Protection Convention (IPPC)[70]

Emerging Plant Health Issues in Trade

Plant health and international trade

These days, trade moves plants and plant products (including those from forestry) across the world at unprecedented rates and volumes. This movement, coupled with the rapid transport of people, can, intentionally or unintentionally, transport pests of plants that have a significant impact on plant resources (see the box below). For example, a plant imported for landscaping purposes can become invasive and result in major damage to food production systems or the ecological landscape of the importing country. In addition, such pests can move through unexpected pathways as, for example, when seeds of an invasive plant "hitch a ride" on a shipment of plants, other commodities, or the pallets and containers that transport nearly all traded goods.

> ***Pests**, under the IPPC, are defined as "any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products", for example virulent fungi, bacteria, viruses, phytosplasmas, mammals (such as rodents) and weeds.*

Pests of plants can have severe impacts on economies, food security, market access and natural landscapes. The introduction and establishment of new pests can cause significant economic and physical damage to the environment by destroying forests and native habitats, affect food security by lowering domestic food production, and threaten trade by reducing access to export markets. The management and eradication of pests is extremely difficult and expensive, so stopping them before they move to new destinations is the best way to avoid their negative impacts.

Regulatory framework for plant health

The International Plant Protection Convention (IPPC) forms the basis of an international regulatory framework for the transboundary movement of plants and plant products through which member countries agree to science-based international standards. These standards help to facilitate international trade while minimizing risks to plant health. This is achieved by providing guidance that helps harmonize measures to assess appropriate levels of risk and ensure that the necessary safeguards are put in place to protect plant resources. These standards are recognized by the World Trade Organization's Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) and assist countries to address part of the broader goal of the IPPC: to protect the world's cultivated and natural plant resources from the introduction and spread of pests of plants while minimizing interference with the international movement of goods and people.

The IPPC's mission extends beyond trade to cover any activity with the potential to move pests. However, trade has become an increasingly important vehicle for the movement of pests of plants. The IPPC's 173 contracting parties play a key role in the international regulatory framework by each establishing a national regulatory body called the "national plant protection organization". Under the IPPC framework, a country's national plant protection organization (NPPO) is responsible for all plant health regulatory issues, participates in the international standard setting process, and supports international technical assistance programmes to foster global cooperation to prevent the movement of pests of plants. In order to assist in strengthening national capacity, Regional Plant Protection Organizations (RPPOs) play a key role in assist countries implement the IPPC standards and meet their obligations under the IPPC.

Benefits of protecting plant health

Regulatory mechanisms to prevent the movement and spread of pests of plants provide far-reaching benefits. Consumers are better able to secure food when production systems are not adversely affected by low yields. Farmers benefit from fewer outbreaks of devastating pests as well as avoiding the costly impact of pest control and eradication programmes. Agricultural and environmental systems benefit from maintaining biodiversity, including genetic resources, that could otherwise be lost due to the effect of invasive species, and industries benefit from more reliable markets.

Key emerging challenges for plant health and international trade

Volumes and patterns of trade

As global and regional trade volumes continue to expand, there is an increased risk that new pests of plants will be introduced. And, in addition to its growing volume, trade in agricultural products has become increasingly complex. For example, products may be cultivated in one country, processed in another, and repacked in yet another. The responsibility that national plant protection organizations have for the plant health status of exports and imports that they certify as free of pests is further challenged by the increased complexity of supply chains, especially when commodities travel through multiple countries.

Prioritizing the needs of developing countries

Developing countries face heightened vulnerability to the introduction of pests of plants and often have comparatively weak institutional regulatory frameworks to address this issue. As their economies and societies contend with development issues such as health and education, the introduction of a devastating plant pest can strain scant national resources and impact food security. In addition, pests of plants can affect native landscapes that may not be cultivated for agriculture but serve as local recreational resources or have cultural, touristic or ecological value. To protect national plant resources (both

[70] This contribution has been prepared under the IPPC Secretariat's own responsibility and without prejudice to the positions of Members.

cultivated and uncultivated), developing countries require plant health strategies that establish managerial and documentation systems, the capacity to conduct long-term planning, technical expertise to implement plant health programmes in accordance with international standards, and funding to sustain these programmes. In short, countries need to build strong regulatory frameworks and institutions that integrate academic, private and public institutions to implement the IPPC effectively and establish appropriate measures to manage plant pest risks.

Implementation

The IPPC encourages global implementation of its internationally agreed standards to secure common and effective action to prevent the movement of pests, particularly in trade. This focus on the application of IPPC and associated standards fosters an open, mutually beneficial process for all parties rather than having the adversarial framework of a compliance mechanism. The IPPC has initiated a system to provide a systematic and prolonged review of contracting parties' application of the IPPC and its standards, as well as to support further implementation. This implementation review and support system (IRSS) aims to facilitate improved implementation of the IPPC's standards by identifying key implementation issues and developing plans to address these challenges. A help desk will be a key feature of this new initiative.

Non-compliance

Non-compliance has a very specific meaning under the IPPC: it relates to non-compliance with the phytosanitary certificate on the import of a commodity and this is bilateral in nature. With regard to general compliance to the IPPC and International Standards for Phytosanitary Measures (ISPMs), more needs to be done by countries to meet their obligations in terms of implementation and reporting. The IPPC standards, especially ISPMs 13 and 17, which deal with non-compliance and pest reporting, go a long way to ensuring safe and transparent trade while complementing the pest risk analysis standards (ISPMs 2, 11 and 21).

Leveraging the benefits of trade while minimizing phytosanitary risks

Expedited trade brings both opportunities and phytosanitary risks. Transport times have been reduced by improved communication and transportation infrastructures. This allows economic markets to broaden and the range of products that can be traded to increase. For example, perishable products can now arrive at distant destinations more quickly and in better condition than ever before. However, this increased speed and volume of trade creates greater risk of transporting live pests that can wreak havoc on food crops and on uncultivated plants of cultural value, and reduce access to export markets at their destinations. On the other hand, the benefits of an improved communication infrastructure can reduce or mitigate the plant health risks of trade by facilitating better documentation and traceability systems. For example, improved information exchange systems can allow management measures or import requirements that implement science-based standards, such as pest risk analysis, to be notified to wider audiences and specifically to a country's trading partners.

Upcoming challenges for plant health regulatory systems

The following challenges have been identified by the IPPC and are currently being addressed through the IPPC work programme.

Standard setting

There is a backlog of internationally agreed topics that need to be developed into new IPPC standards.

Improved science base

The availability of scientific information needs to be improved to support scientific decision-making for justifiable phytosanitary measures. In addition, given the decline in funding available to support plant health, it is foreseen that further scientific expertise will be lost.

Changing risks

The range and numbers of pests that can be moved on plants and their products and the range of pathways in which they can be transported from one location to another is staggering. In countries where traded commodities originate, pest occurrence (including types and life stages) may vary depending on seasonality, geography and the type of plant part that may be affected. Together, these factors constitute the principal risks that a country may have to analyze when considering importation of commodities. The IPPC has already developed a robust pest risk analysis system that can deal with climate change and the potential risks associated with biofuel crops.

Resources

There is a severe under-resourcing for plant health, particularly when compared to the resources available for animal health and food safety regulatory frameworks. This is of primary concern at the national level but also applies to regional organizations and the Secretariat of the IPPC, which manages the IPPC work programme.

Reporting and transparency

The existing official reporting system, as determined by the IPPC, needs to be more fully implemented by countries – see http://www.ippc.int. This will facilitate trade as more information will be available to trading countries and industry, and transparency will be improved, which will improve trust between trading partners.

Implications for capacity building

National and regional plant protection capacities form the foundation of functional and effective regulatory systems for plant health. The implementation of science-based plant health standards has the potential to safeguard natural and agricultural resources, maintain access to export markets and prevent unnecessary limitations on imports. However, successful

implementation requires sound knowledge of existing pest distributions, strong partnerships between regulatory and research institutions, and solid governance institutions that can adapt to regulate quickly changing trade conditions.

Institutional development

Political will and financial support are required to establish and maintain national and regional plant regulatory frameworks. National plant protection organizations are responsible for reducing the risk of pests of plants being introduced through any of all the possible pathways. The national plant protection organizations depend on capacity levels and strong institutions, which in turn rely on steady and sufficient political and financial support.

The IPPC Secretariat has developed a phytosanitary capacity evaluation (PCE) tool to facilitate the process of developing national strategic plans for plant health regulatory systems. This tool, developed with input from developing country plant health officials, leads users through a set of survey questions that promote discussion and reflection on the current status of national plant protection systems. This allows for an analysis of the needs and current status of the plant regulatory system and identifies the existing gaps in the structure. Countries can then use these outputs to obtain the support and resources to design or refine institutional regulatory frameworks targeted at the risks they face.

Resourcing

To achieve the level of capacity that countries need if they are to implement strong, science-based plant health regulatory systems, a substantial increase in resourcing of both national plant protection organizations and the IPPC is vital. This should be undertaken in a way that strengthens existing programmes and enhances the synergies that exist between current initiatives.

Implementation of standards

There needs to be a great improvement in the implementation of IPPC standards, but in a way that is consistent with the principles of the IPPC and the SPS-Agreement and within the structure of the IPPC capacity development strategic framework.

Information exchange and advocacy

National programmes need to place greater emphasis on official information exchange and communication. This includes creating awareness of plant health issues in public and policy-making spheres, including the risks, and what needs to be done to address these challenges.

Partnerships and collaboration

New partnerships also need to be developed and existing partnerships strengthened within the IPPC strategic framework to address common issues and make effective use of valuable resources. This applies to all areas of activities. In the area of capacity development for plant health, substantial progress has already been made to define the existing work programme more clearly and establish collaborative programmes. However, this programme is in need of substantial and sustainable resourcing.

6.4 International Organization for Standardization (ISO)[71]

International Standard Setting and Trade Compliance Issues

Introduction

International standards are an essential tool for facilitating trade. The WTO TBT Agreement recognizes the important contribution that international standards and conformity assessment systems can make to improving the efficiency of production. One of the annexes to the TBT Agreement is the *Code of Good Practice for the Preparation, Adoption and Application of Standards*. Known as the WTO Code of Good Practice, this indicates that, where international standards exist or their completion is imminent, standardizing bodies should use them, or the relevant parts of them, as a basis for the standards they themselves develop. The WTO Code also aims at the harmonization of standards on as wide a basis as possible, encouraging all standardizing bodies to play as full a part as their resources allow in the preparation of international standards by the relevant international body, including the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

The usefulness of ISO standards as practical tools for tackling many of today's global challenges is widely recognized. With 163 member countries as at July 2010, ISO is the world's leading developer of consensus-based international standards for business, government and society. Its current portfolio exceeds 18,000 standards, which provide benefits for almost every sector of activity and technology. ISO's work programme ranges from standards for traditional activities, such as agriculture and construction, through standards for mechanical engineering, manufacturing and distribution, transport, medical devices and the latest developments in information and communication technology to standards for services. They provide fully for all three dimensions of sustainable development – economic, environmental and social.

The *ISO Action Plan for developing countries 2005-2010*, which has been implemented by ISO since 2005, aims at increasing awareness in developing countries of the benefits of standardization, as well as of their participation in developing ISO standards. It should be noted that 75 per cent of the membership of ISO are developing countries. Over 6 million Swiss francs (CHF) was devoted to the execution of the *Action Plan* between 2005 and 2009, and more than 12,000 people from various sectors in developing countries have participated in ISO-organized training and awareness events. The *Action Plan* has also supported the participation of developing countries in the preparation of international standards.

[71] This contribution was prepared by Beer Budoo, Director Development & Training Services, ISO Central Secretariat

Emerging issues for developing countries

There are several issues which continue to hamper the improvement of developing country involvement in international standardization.

The first of these is their limited participation in the preparation of international standards. The Fifth Triennial Review of TBT in 2009 recognizes that advances have been made in developing country participation in this process but notes that challenges still remain, both financially and technically. Although the ISO Action Plan provides financial support for developing country members to participate in ISO technical committees, the need is much greater than the resources can cover. In addition, developing countries have difficulty in articulating technical inputs to the drafting of international standards generally. There may be several reasons for this, including a lack of understanding of the value of participation in standardization. As a consequence, the involvement of the standards-users themselves, i.e. industry and other stakeholders, remains low.

Another issue which is increasingly being highlighted as contrary to the good standardization practice aims of the WTO Code of Good Practice is the proliferation of private standards. Whilst national standards bodies (NSBs) in developing countries are being prompted to use best practices in both their national and their international standardization work, there is a fear that the advent of private standards, and their required use for access to major markets, may be undermining the efforts of developing countries, often at high cost, to participate in consensus standards formulation.

A further issue is that many NSBs in developing countries have not developed and tailored their range of services to meet the needs of their various clients and ensure their own long-term financial viability. The NSBs need guidance on the use of existing and proven models of business strategies, for example combining standards work with conformity assessment, training, etc. A standardization infrastructure should therefore be an integral part of quality infrastructure-building policies, and this should be the concern of governments and industry alike. A strong standards and conformity infrastructure should then be part of a national strategy to build competitive advantage for the country and its key industrial and service sectors. Such an infrastructure that is responsive to stakeholder needs has been proven to be vital for sustainable economic growth.

All the foregoing has to be placed in the context of other challenges facing developing countries, such as:

- Volatile financial markets and economies in recession;
- Their aspiration to sustainable development and interrelated issues of climate change, energy, food and water;
- Meeting the UN Millennium Development Goals;
- Converging technologies;
- The need for speed to market and market intelligence;
- Globalization of trade and supply chains;
- Stricter technical regulations for imports imposed by many markets as a means of risk minimization in the areas of safety, health and environment protection.

New standards areas

New standards areas that are of interest to developing countries include:

- Sustainability
- Water
- Energy
- Climate change
- Food safety
- Health services

Sustainability

International standards contribute to sustainable development by:

- Supporting the facilitation of global trade, the dissemination of new technologies, good business practice and good relations between economic actors;
- Supporting good environmental practice and information provision, adoption of energy efficiency policies and the dissemination of new, eco-friendly and energy-efficient technologies;
- Contributing to consumer protection, safety at work, healthcare, security and other social interests which may require technical or management standards for the related products and services.

Water

The goals of safe water and improved sanitation are embedded in the UN Millennium Development Goals. ISO is contributing to achieving these goals by developing a comprehensive toolbox of standards, built on a common understanding and cooperation between countries from all the regions of the world, that will help manage the shared heritage of the world's water resources equitably and durably. These include standards for assessing water quality and measurements, for managing drinking water and for wastewater services, including ensuring the delivery of water at times of crisis, and standards that address groundwater resources, "green" irrigation, water for industrial uses, etc.

Energy

International standards on energy efficiency and renewable energy play a vital role by:

- Reducing the costs of policy development;
- Ensuring policy consistency;
- Monitoring energy and CO_2 savings;
- Ensuring the quality, performance and reliability of energy products;
- Building consumer and government confidence in energy efficiency and renewable energy.

They also provide common metrics for defining and measuring energy performance so that investment decisions and incentives may be targeted to encourage energy efficiency, and they support scientific cooperation and the harmonization of public policies.

Climate change

Out of a current total of more than 18,000 ISO normative documents, about 600 are environment-related, including recent standards specifically developed to support greenhouse gas (GHG) emission accounting, claim verification and trading.

ISO standards offer practical tools for addressing climate change at four levels:

- Monitoring climate change;
- Quantifying GHG emissions and communication on environmental impacts;
- Promoting good practice in environmental management and product/process design;
- Opening world markets for energy efficient technologies.

International standards can also be a vehicle for the dissemination of innovative technologies, particularly for alternative and renewable sources of energy, by reducing time to market, creating global interest and developing a critical mass of support to ensure the economic success of such technologies. ISO standards are among the leading objective tools that assist policy-makers in decisions related to public incentives, regulations and the use of standards, thus encouraging the judicious and widespread use of such innovative technologies. ISO has already developed standards with an impact on climate change for areas such as nuclear energy, solar energy, hydrogen technologies, intelligent transport systems, building-environment design and improving sustainability in building construction.

Food safety

Of the hundreds of ISO food-related standards, the ISO 22000 series deals directly with food safety, covering a range of issues from the requirements for food processing units to certification, traceability and crop production.

The ISO 28000 series is also relevant; it specifies the requirements for a security management system to ensure safety in the supply chain. These standards can be applied by organizations of all sizes involved in manufacturing, service, storage or transportation by air, rail, road and sea at any stage of the production or supply process.

The ISO technical committee ISO/TC 234, Fisheries and aquaculture, is currently developing two standards on the traceability of fish products, ISO/CD 12875 and ISO/CD 12877, and another one, ISO/WD 12878, on environmental monitoring of the seabed impacts of marine finfish farms. Work in this area is of critical importance to developing countries exporting fish and other marine products.

ISO has a strong partnership with many UN agencies concerned with food issues, including FAO, the World Health Organization (WHO) and the Codex Alimentarius Commission (CAC). ISO's observer status to the CAC provides an opportunity for the coordination of issues related to a variety of ISO standards that are adopted and used by the CAC in its work.

Health care

ISO will develop a technical report, ISO/TR 14639, in partnership with the World Health Organization (WHO), to help emerging and developing countries implement a solid and internationally harmonized health informatics system. The report will present information in an accessible way to guide and facilitate the adoption of relevant international standards by countries with limited resources and infrastructure.

The design, deployment and maintenance of a national eHealth infrastructure can be a complex task, especially for newcomers. Scarce resources and IT expertise, together with limited access to best practices, can result in systems that are not scalable or robust enough to meet long-term needs.

International standards can help by providing globally harmonized specifications for establishing the architectural framework used to design eHealth systems, plan their implementation, make build-or-buy decisions, decide on acquisitions and undertake related activities.

Trade implications

All the above new standards areas have potentially serious trade implications for developing countries. The case of food safety is clear, and the earlier that one set of standards is agreed upon by all parties concerned, the better. For the time being, however, exporters in developing countries are forced to comply with different standards before they can gain access to markets.

Several trends are especially noteworthy:

- An increasing tendency in many markets to verify that products imported have been produced according to sustainable practices. Paper and timber as well as seafoods are notable examples.
- The probability that energy-efficient, low-carbon or carbon-neutral products will soon impact trade more strongly, since climate change policies top the agenda of many countries.
- In the healthcare industry, especially in the area of "medical tourism", the profound implications that the use of international standards can have for the delivery of reliable services.

Technical assistance needs

There is a need for proactive action to determine the needs of developing countries in light of their current or future export development policies and their product lines. ISO will be stepping up its technical assistance to NSBs, i.e. its members, to increase stakeholder awareness so that they may not only participate in the formulation of international standards but also enhance their uptake and application of these standards.

As from 2011, ISO will work with its members to implement activities related to infrastructure-building and/or strengthening. It should be noted that ISO and UNIDO have jointly published guidance documents on such issues and these may be used to define the contents of technical assistance.

Cooperation

ISO and UNIDO work closely together to meet developing country needs. ISO appreciates this close relationship and looks forward to increasing programmes of work to meet its stakeholders' needs in 2011 and beyond. It will be the long-term commitment to key programmes, such as those between UNIDO and ISO, that will make the difference to meeting critical needs in developing countries and achieving global objectives such as the UN Millennium Development Goals.

6.5 United Nations Environment Programme (UNEP)[72]

Environmental Requirements in the Food and Agriculture Sector: Creating Opportunities for Trade Promotion and Market Access for Developing Countries

Introduction

Agriculture is the most important sector for many countries in its potential to influence a wide range of issues that are critically related to their development, including the economy, employment, food security, trade flows, poverty, human health, climate change, the use of natural resources (especially land and water), and biodiversity. Efforts to quickly meet the challenges of increasing agricultural productivity and yield have produced short term gains but at a high social and environmental cost in the long term.

The adoption of intensive agricultural methods, generally characterized by a high use of off-farm inputs such as chemical/synthetic fertilizers and pesticides, and increased mechanization, has produced higher levels of productivity and yield in some regions. However, at the same time, most of the world's breadbaskets are being exploited to the point of exhaustion: these regions are suffering from increased soil infertility, water scarcity, biodiversity loss and other forms of ecosystem decay, which have an economic cost for individuals, especially the poor, and for the society as a whole. Currently, agriculture accounts for seventy per cent of global freshwater use and is responsible for most surface water pollution[73]. If current patterns of consumption continue, the world is expected to run out of fresh drinking water well before it runs out of oil. Agriculture also plays a role in global warming: it is responsible for over 13 per cent of total global greenhouse gas emissions[74].

This situation has generated a plethora of responses from farmers, consumers, governments and the private sector. One set of measures increasingly deployed is standards, certification and labelling schemes in the entire supply chain from farm to fork. These measures are intended to guarantee that production and trade in food and agriculture ensures environmental protection, poverty reduction and market access, the latter especially for developing countries. This article reviews recent emerging compliance issues of environment-related trade requirements in the food and agricultural sector as they affect trade flows between developing and developed countries.

In spite of the fact that the interface between environmental requirements and market access is quite complex and these requirements are quite stringent, especially in the agriculture and food sector, many developing countries have successfully met these requirements, and exports of environmentally friendly agricultural produce from developing countries have been constantly growing.

Emerging compliance-related challenges for the agricultural sector

Concerns over various forms of environmental damage due to intensive agricultural methods are one of the major driving forces behind environmental requirements in the food and agriculture sector. However, standards are not always put in place exclusively for environmental purposes. Here we discuss a few environment-related trade requirements that have a growing influence on trade in agriculture and food.

Environmental Trade Requirements in the Food and Agricultural Sector

Trade-related technical requirements can generally be broken down to three interrelated levels: (i) standards; (ii) the means of verification or establishing compliance (certification); and (iii) the means of communication (labelling). Standards provide the overarching framework for products to conform to particular criteria and are therefore the benchmarks against which commonality can be established among goods and services and the way in which they are produced (the processes). Certification provides the means of verification and evidence that the criteria established to conform to a particular standard have been met. A label is simply a symbol, phrase, picture or logo attached to the product as proof that it adheres to a particular standard. These requirements are developed by governmental bodies, non-state actors or intergovernmental authorities. Meeting the standards can be mandatory or voluntary. It is important to note that most of the environmental standards in food and agriculture trade are process standards as opposed to product standards. The later are mostly used for industrial products. Some environment-related trade standards are described below.

Organic Agriculture

Standards, certification and labelling schemes to distinguish organic agricultural products are the most ubiquitous and extensively developed instruments for product differentiation on environmental grounds. These are used, in general terms, to certify that the production of these products is based on active agro-ecosystem management rather than on external inputs (such as synthetics or chemical fertilizers, pesticides, and genetically modified organisms), and on the use of both traditional and scientific knowledge. There are two internationally significant standards to which numerous certification and labelling schemes adhere: the Codex Alimentarius Guidelines for the Production, Processing, Marketing and Labelling of Organically Produced Foods and the International Federation of Organic Agriculture Movements Basic Standards (IBS)[75]. In addition,

[72] This contribution was prepared by Asay Naqvi and Njogu Morgan

[73] UNEP, 2006, 'Challenges to International Waters; Regional Assessments in a Global Perspective,' Earth Print, p. 10, Available at http://www.unep.org/dewa/giwa/publications/fi nalreport/

[74] World Resources Institute (WRI), 2006, 'Climate Analysis Indicators Tool (CAIT) on-line database version 3.0,'WRI, Available at http://cait.wri.org

[75] In many cases these two are used as standards for developing organic standards.

there are various national standards (e.g. US National Organic Program (NOP), Japan's Agricultural Standards, and India's National Standards for Organic Production) and regional standards (e.g. the EU regulation for Organic Agriculture – EU Regulation 2092/91, the East African Organic Standard, and the Pacific Organic Standard). While some standards are very specific, most of these cover almost all crops and livestock, providing criteria for allowed and prohibited practices in the entire value chain.

One reason for the increasing use of organic labels and standards is the growing evidence that this offers opportunities for competitive economic returns, the supply of essential and life-supporting ecosystem services, the creation of decent jobs and livelihoods, smaller ecological footprints, increased resilience to climate change, and enhanced food security. Organic and biodynamic farming has been reported to use 20 to 56 per cent less energy per produced unit of crop dry matter[76], emit, on average, 64 per cent lower GHGs per hector[77], and sequester almost double the amount of carbon compared to conventional chemical-intensive farming methods[78]. Sustainably managed lands around the world maintain higher soil fertility than do other systems. They also produce yields that, depending on a range of factors, can be equivalent to, or higher than, conventional farming systems[79].

On the poverty reduction side, there are high price premiums, resulting in more income for farmers and others in the supply chain. For example, in Uganda farmers earn up to 180 per cent more for ginger that is produced organically, as compared with conventionally produced ginger[80]. In addition, international trade in organic agriculture has a strong poverty reduction element. While 80 per cent of organic producers (a significant proportion of them women) are in developing countries, about 97 per cent of sales revenue is generated in industrialized countries[81]. This offers the possibility for small farmers to become part of the US$50 billion global organic food market. Even for developed countries, an FAO study (Nemes, June 2009) that analysed 50 different long-term cases, mostly from the USA, reports that "the overwhelming majority of cases show that organic farms are more economically profitable."[82]

[76] Mäder, P., A. Fliessbach, D. Dubois, L. Gunst, F. Padruot and U. Niggli, 2002, 'Soil fertility and biodiversity in organic farming,' Science vol. 296, p. 1694 – 1697.

[77] Küstermann, B. and K.-J. Hülsbergen, 2008, 'Emission of Climate-Relevant Gases in Organic and Conventional Cropping Systems,' 16th IFOAM Organic World Congress, Modena, Italy, 16-20 June 2008, Available at http://orgprints.org/12813/1/12813.pdf

[78] ibid

[79] UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development (CBTF), 2008, 'Organic Agriculture and Food Security in Africa,' UNCTAD, Available at http://www.unep-unctad.org/cbtf/publications/UNCTAD_DITC_TED_2007_15.pdf

[80] Export Promotion of Organic Products from Africa (EPOPA), 2007, EPOPA newsletter, no. 5, May 2007.

[81] Willer, H., M. Rohwedder and E. Wynen, 2009, 'Organic Agriculture Worldwide: Current Statistics,' in H. Willer and L. Kilcher, (eds.), 2009, The World of Organic Agriculture: Statistics and Emerging Trends 2009, FIBL-IFOAM Report, Bonn: IFOAM; Frick: FiBL; Geneva: ITC.; and Sahota, A., 2009, 'The Global Market for Organic Food & Drink,' in H. Willer and L. Kilcher, (eds.), 2009, The World of Organic Agriculture: Statistics and Emerging Trends 2009, FIBL-IFOAM Report, Bonn: IFOAM; Frick: FiBL; Geneva: ITC.

[82] Nemes, N., 2009, 'Comparative Analysis of Organic and Non-Organic Farming Systems: A Critical Assessment of Farm Profitability,' FAO, p. 3, Available at ftp://ftp.fao.org/docrep/fao/011/ak355e/ak355e00.pdf

Global Good Agricultural Practices (GLOBALGAP)

GLOBALGAP, formerly known as Euro-Retailer Produce Association Good Agricultural Practise (EurepGAP), is a private voluntary standard owned and driven by various actors in European food retailing markets. It covers crop and livestock products, including feed, and is concerned with production processes until the products leave the farm. It therefore operates in business-to-business transactions, remaining invisible to consumers. It is multidimensional, covering aspects such as labour, health, and product quality management, and environmental issues such as pollution and conservation management. Though it is not an explicitly environmental standard and has less onerous environmental criteria than other standards, it exerts a growing influence in the trade of food and agricultural commodities in Europe.

Fairtrade

Fairtrade standards are private voluntary requirements set and managed by non-governmental organizations. They are part of an initiative that aims to offer better trading conditions and improved market access for producers of agricultural products and related items, and to ensure that the economic benefits are also accompanied by social and environmental benefits to the communities.

There are three types of Fairtrade standards which must be complied with simultaneously: trade, labour and product. Trade standards govern the relationship between producers and companies buying the commodities. They are primarily aimed at protecting the long-term economic interests of producers as, for example, by maintaining a minimum price for products, providing advance payment to producers and providing an additional premium amount for reinvestment. The labour standards focus on the relationship between producers and workers, with the interests of the latter at heart; for example, they make provision for decent housing for workers when they need it. Product standards are designed according to the products themselves and consist mainly of environmental standards. These can require a reduced use of agro-chemicals, conserving water, maintaining soil fertility and protecting biodiversity.

Fairtrade standards have their own uniform certification scheme, run by a separate but related company, and a common label affixed to goods.

Impact of Environmental Standards on Trade in Food and Agriculture

Establishing the impact of environmental standards on trade is not a straightforward exercise, primarily due to the difficulty of disentangling causal factors. For example, environmental indicators are sometimes bundled with others, as is the case with GLOBALGAP and Fairtrade standards. Moreover, environmental standards are but one of the requirements that export products must fulfil. Nevertheless, the data can be used to show some of the following impacts.

One observation is of the growing volumes of environmentally friendly exports from developing countries to lucrative markets in developed countries, even in the face of stringent standards

and regulations. For example, the trade in certified organic food, drinks and fibre grew by 400 per cent between 1999, when it was only US$15.2 billion per year, and 2009 when it crossed the US$60 billion per year mark[83]. The major markets are still growing between 10 and 20 per cent per year. These figures do not include trade in cosmetics and body care products made from organic ingredients, demand for which is increasing exponentially.

Purchasing patterns of Fairtrade products have also surpassed expectations, holding strong even in the face of the global economic slowdown. In 2008 global sales for Fairtrade products exceeded US$3.5 billion, growing by 22 per cent from the previous financial period[84].

Under the GLOBALGAP standard, exports of fresh fruits and vegetables from sub-Saharan Africa to the European Union grew by 90 per cent from US$1.4 billion to US$2.7 billion between 1996 and 2006, and exports of fresh fruits and vegetables from Latin America and North Africa to the European Union have also been increasing. Research further shows that the export farms in Sub-Saharan Africa certified under the GLOBALGAP standard attained higher revenue flows.

Current and future challenges

Environment-related trade requirements in agriculture have helped create market opportunities for developing countries. However, there is much scope for expansion and growth of markets for organic products. In industrialized countries, for example, figures from 2000 show that sales of organic agricultural products were only 2 per cent of total food sales. While consumer demand is growing, the supply-side, mainly in developing countries, is facing the following challenges:

- Lack of policy support for the production and export of products to meet environmental requirements;
- Lack of institutional capacity to facilitate and guide a transition to farming methods that can meet environment-related trade standards;
- Lack of public and private investment in sustainable agriculture;
- Lack of micro credit and loan programmes to buy organic inputs and get certification;
- Lack of awareness about environmental requirements and how to meet them.

These national level challenges are further complicated by international challenges such as:

- High levels of farm subsidies to farmers, even for sustainable produce, in many developed countries, making it difficult for developing country farmers to compete with artificially reduced prices;
- Lack of harmonization in organic standards and certification schemes, preventing produce from being sold in multiple markets;
- Use of environmental standards in some countries as a means of protecting domestic markets.

In the very near future, environment-related trade compliance in the food and agricultural sector is likely to be affected by the impact of, and policy responses to, climate change. Some labels, such as 'food miles' and 'carbon content', have already started to emerge. There may also be new standards to limit greenhouse gas emissions in the agricultural sector.

Conclusions and recommendations

Environment-related trade requirements in agriculture offer opportunities for environmental protection, trade growth and development, with large benefits going to the developing countries. As the consumer and supply chains become more aware of the benefits of these requirements, the demand will continue to grow for such products. There is a need for developing countries to prepare themselves to fully exploit the economic development and market access opportunities offered by a growing demand for environmentally friendly food and agricultural products.

Complementary activities at international, regional and national levels to support market growth for products that meet environment-related trade standards and to build supply side capacities are also required.

At the national level:

- Reforms in fiscal and trade policies are needed to create a level playing field for sustainable and unsustainable farming practices; in most countries, policies and incentives favour chemical-intensive farming, hindering the farmer's ability to meet environmental requirements for market access;
- Provision of technical and advisory support to farmers for meeting environmental requirements during the production, processing and packaging stages;
- Improvements in storage and transport infrastructure, especially in developing countries, to reduce post-harvest losses; this is particularly important for organic products as no chemical preservatives can be used;
- Investment in industrialization to add value through the processing of raw harvested produce;
- Improvement in the infrastructure for production, marketing and trade in green inputs, such as organic fertilizers and biological and integrated pest control methods;
- The establishment of 'green banks' and/or micro-credit programmes for farmers and small- and medium-sized enterprises to offer, for example, small 'green' loans to buy organic inputs or pay for organic certification;
- Research and training for farmers, processors and exporters who want to specialize in accessing international markets by meeting environment-related trade requirements.

[83] Calculated by the authors based on data from The World of Organic Agriculture: Statistics and Emerging Trends from 2000 to 2010.
[84] Organic Monitor, 'Organic Monitor Gives 2009 Predictions,' Organic Monitor, Available at http://www.organicmonitor.com/r3001.htm

At the international level:

- Agricultural subsidies ought to be redirected towards supporting more sustainable agriculture.
- Special funds should be made available for organic and sustainable products under the Aid for Trade and other trade facilitation and export promotion programmes.
- Trade regimes should be re-aligned so that they support diversification of food and agricultural products.
- Efforts should be made to harmonize organic agricultural standards.
- Countries should also work towards a sustainable development oriented outcome of the Doha Development Round of the WTO, which, inter alia, addresses the issue of trade-distorting subsidies in the agriculture sector.

6.6 World Trade Organization (WTO)[85]

SPS and TBT Agreements and Emerging Compliance Issues in the Trade of Agricultural and Agro-Food Products

Introduction

All countries maintain, at the levels they consider appropriate, measures necessary to ensure the quality of their exports, to protect human, animal and plant life and health, to protect the environment, and to prevent deceptive practices in any of these areas. The WTO recognizes that no country should be prevented from doing this; however, it also recognizes that these measures, by their very nature, may result in restrictions on trade, and thus must be subject to the requirement that they are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or constitute a disguised restriction on international trade. This has been established in the various WTO agreements.

The WTO agreements are the legal foundation for the international trading system that is used by the bulk of the world's trading nations. They are the outcome of the 1986-1994 Uruguay Round of world trade negotiations held under the auspices of what was then the General Agreement on Tariffs and Trade (GATT).

The Agreement on Agriculture, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement on Technical Barriers to Trade (TBT) are of special importance for developing countries as they cover the basic rules applied to activities in the primary sectors (agriculture, fishing and forestry) and agribusiness. The economies of most developing countries rely upon these sectors. As the Agreement on Agriculture does not address regulatory matters, it is not addressed in this report.

Agreement on the application of Sanitary and Phytosanitary Measures (SPS)

The basic aim of the SPS Agreement is to maintain the sovereign right of any WTO member to provide the level of health protection it deems appropriate, but also to ensure that these rights are not misused to create unnecessary barriers to international trade. The SPS Agreement reduces the possible arbitrariness of decisions and encourages consistent decision-making. It requires that sanitary and phytosanitary measures be applied for no other purpose than that of ensuring animal and plant health, food safety, or protection of the territory from pests. Measures for these purposes should be based on the analysis and assessment of objective and accurate scientific data.

SPS-Related Trade and Compliance Issues

Transparency

Under the SPS Agreement, WTO members are required to publish all their SPS requirements and to set up enquiry points to respond to requests for more information on new, modified or existing measures. All members are obliged to provide an advance notification of any new or changed sanitary requirements which might affect trade, except for measures taken in response to emergency situations, in which case a notification is to be provided immediately upon taking the measure. Other members have the opportunity to comment on these notified measures, both directly to the notifying member and/or by raising the issue at a regular meeting of the SPS Committee.

As of May 2010, members have submitted 7,804 regular notifications, 1,211 emergency notifications, and 2,596 addenda and corrigenda to regular and emergency notifications. Food safety was identified as the objective of the measure in 2,381 notifications; protecting humans from animals/plant pest or disease in 1,939 notifications; plant health in 1,286 notifications; animal health in 914 notifications; and protecting the territory from other damage by pests in 383 notifications.[86] It should be noted that a measure will often have several objectives.

As of May 2010, 102 members out of 153 (66 per cent) have submitted at least one notification to the WTO. Members who have not submitted any notification so far include 20 developing countries and 23 Least Developed Countries (LDCs).

Over the years, the submission of notifications by developing countries has been growing and, as of May 2010, their share of all notifications submitted had reached 48 per cent; LDCs, on the other hand, had a very small participation, with 0.43 per cent of all notifications.[87]

In light of the steadily increasing volumes of notifications, managing their flow, coordinating at the national level and benefiting from a transparent system has become a challenge for members. The replies to a questionnaire in 2007 on the operation of enquiry points and national notification authorities indicated that this is one of the areas where members are looking for technical assistance and guidance on best practices.[88]

There have been some recent efforts to address this issue. The WTO Secretariat has developed an SPS Information Management System (SPS IMS), the public version of which was launched in October 2007. Its trilingual interface allows access to the most recent information on notifications as well as on

[85] This contribution has been prepared under the Secretariat's own responsibility and without prejudice to the positions of Members and to their rights and obligations under the WTO.

[86] Data obtained from the SPS IMS.

[87] Idem.

[88] See the Analysis of Replies to the Questionnaire on the Operation of Enquiry Points and National Notification Authorities (G/SPS/GEN/751/Rev.1) for further elaboration on this issue.

enquiry points and national notification authorities. It also includes information on specific trade concerns (STCs) and other SPS documents. The SPS IMS facilitates the conduct of searches according to specific needs/interests, and the preparation of reports/summaries which can be shared with interested stakeholders. The WTO Secretariat has provided training on the SPS IMS during SPS Committee meetings and during its technical assistance programmes, and has responded to ad hoc requests from members and other interested parties for assistance. A practical manual on the operation of enquiry points and national notification authorities has been developed, as well as an informal mentoring mechanism to assist officials responsible for transparency in developing country members.

Specific Trade Concerns

One important role of the SPS Committee is to provide a multilateral forum where countries can discuss and try to resolve specific SPS-related trade problems. Any WTO country can raise particular problems with the animal or plant health or food safety requirements imposed by another WTO member. The problems may be in relation to the notification of a new or changed measure, or based on the experience of exporters. Often, other WTO countries will have similar concerns. At the meeting, the countries usually commit themselves to exchange information and hold bilateral consultations.

Altogether, 290 specific trade concerns have been raised since the entry into force of the SPS Agreement in 1995 through December 2009. Overall, 28 per cent of these relate to food safety issues, 26 per cent to plant health, 6 per cent to other issues such as certification requirements or translation, and 40 per cent to animal health and zoonoses. The animal health and zoonoses category is further divided into foot-and-mouth disease (FMD), transmissible spongiform encephalopathies (TSEs), avian influenza and other animal health concerns, including issues related to avian influenza. TSEs account for 36 per cent of animal health concerns, foot-and-mouth disease for 24 per cent, and the remaining 40 per cent relate to other animal health issues and avian influenza. A summary of the specific trade concerns raised in meetings of the SPS Committee is compiled on an annual basis by the WTO Secretariat.[89]

The main measures mentioned as affecting trade include: (i) food safety: the costs of foreign on-site audits and inspections, the acceptance of health certificates, and the operation of national food inspection systems; (ii) animal health: quarantine, import bans, vaccination, disease surveillance systems, disease-free status, and the introduction of traceability systems; and (iii) plant health: quarantine, pest risk analysis, surveillance, pest-free status, issuance of phytosanitary certificates, and the use of irradiation and other technologies as a phytosanitary measure.

From January 2008 through October 2010, 29 new specific trade concerns were raised: nine related to animal health, nine to food safety, four to plant health and seven to other concerns. Thirteen of these 29 have been subsequently raised in the Committee on one or more additional occasions. One concern, raised by Pakistan regarding Mexico's import restrictions on rice, has been reported as resolved.

Developing country members are participating actively under this agenda item in SPS Committee meetings. Since 1995, they have raised 146 trade concerns compared to 190 raised by developed country members and three by Least Developed Country members.[90] A developing country member has supported another member raising an issue in 188 cases, compared to 136 for developed country members and one for Least Developed Country members. In 178 cases, the measure at issue was maintained by a developed country member, and in 149 cases by a developing country member. A complaint by Brazil against Senegal in June 2010 marked the first time that SPS measures of a Least Developed Country have been challenged in the Committee.

Equivalence

The level of protection which a country decides to apply can often be achieved by different types of measures. The concept of equivalence of different measures is recognized by the SPS Agreement. If an exporting country can demonstrate to the importing country that its measure achieves the level of protection required by the latter, its measure should be accepted as equivalent. This is particularly important to developing countries, because the regulations applied by importing countries are usually based on the technologies and practices of their own industries, and in the developed countries these have become increasingly more sophisticated over time. Many developing countries do not have the infrastructure or resources to use these sophisticated production, processing or testing techniques, yet can produce equally safe products using more traditional methods.

At the WTO, developing countries requested that clearer guidance be given to facilitate the implementation of this provision, particularly in the context of the SPS Agreement. The SPS Committee reached a decision on the implementation of the equivalence provision in October 2001, which was further elaborated on in the following years (G/SPS/19/Rev.2). The decision emphasizes that equivalence may be recognized for a specific treatment and/or specific product, or on a systems-wide basis.

To date, two recognitions of equivalence have been reported. On 9 August 2007, Panama submitted the first notification on a recognition of equivalence of SPS measures to the Committee,[91] and, in 2008, the Dominican Republic submitted a second notification.[92]

[89] The latest version of this summary can be found in document G/SPS/GEN/204/Rev.10 and addenda. This document is a public document available from http://docsonline.wto.org. Specific searches are also possible on the SPS Information Management System (SPS IMS) (http://spsims.wto.org).

[90] The European Communities was counted as one Member. Similarly, when one Member spoke on behalf of ASEAN, it was counted as one Member only.

[91] G/SPS/N/EQV/PAN/1.

[92] G/SPS/N/EQV/DOM/1.

Emerging SPS-Related Trade and Compliance Issues

Trade Concerns

The most common complaints concern an importing country's failure to base its measures on the relevant international standard; other common complaints are about delays in getting decisions, approvals and replies. Below are some selected specific trade concerns which were of interest to a large number of members:

- Import restrictions on pork products due to avian influenza maintained by Armenia, Bahrain, China, Gabon, Indonesia, Jordan and Suriname: The concern about these restrictions was raised by Mexico and supported by Australia, Brazil, Canada, Dominican Republic and the United States (2009).
- A NAPPO (North American Plant Protection Organization) draft standard for ships and cargoes from areas infested with Asian gypsy moth maintained by Canada, Mexico and the United States: The concern was raised by China, Indonesia, Japan and the Republic of Korea (2008).
- Application and modification of the EC regulation on novel foods maintained by the EU: The concern was raised by Colombia, Ecuador and Peru and supported by Argentina, Benin, Bolivarian Republic of Venezuela, Bolivia, Brazil, Chile, Costa Rica, Cuba, El Salvador, Honduras, India, Mexico, Paraguay, Philippines and Uruguay (2006).

Disputes

Article 11 of the SPS Agreement indicates that the Dispute Settlement Understanding will apply to SPS disputes and provides for the consultation of experts when a dispute involves scientific or technical issues. As of 31 May 2010, more than 400 disputes had formally been raised under the WTO's dispute settlement system. Of these, 40 alleged that there were violations of the SPS Agreement, although in seven cases this was not the main focus of the dispute. Panels have been established to examine fifteen SPS-related complaints, twelve of which were first raised as specific trade concerns in the SPS Committee:

- The United States' and Canada's complaints about the EU ban on meat treated with growth-promoting hormones;
- Complaints by Canada and the United States against Australia's restrictions on imports of fresh, chilled or frozen salmon;
- One complaint at the request of the United States to examine Japan's requirement that each variety of certain fruits be tested with regard to the efficacy of fumigation treatment;
- Japan's restrictions on apples due to fire blight; complaint requested by the United States;
- The Philippines' complaints against Australia's quarantine procedures;
- Complaints by the European Communities against Australia's quarantine procedures;
- Complaints by the United States, Canada and Argentina against EC measures affecting the approval and marketing of biotech products;
- Complaints by the European Communities against the United States and Canada on their continued suspension of obligations relating to the EC-Hormones dispute;
- New Zealand's complaint against Australia's restrictions on apples;
- Canada's and Mexico's complaints against the United States on the Certain Country Labelling (Cool) Requirements;
- China's complaint against certain United States measures affecting imports of poultry;
- Canada's complaint against Korea's measures affecting the importation of bovine meat and meat products from Canada.

Private Standards

Since June 2005, the SPS Committee has discussed the issue of private and commercial standards on a number of occasions. The issue was initially raised by St. Vincent and the Grenadines with regard to EurepGAP (now GLOBALGAP) requirements on pesticides used on bananas destined for sale in European markets.

There is much interest on the part of developing country members for the SPS Committee to address this issue in a practical manner. The main concerns that they have raised in the WTO about private standards include the proliferation of such schemes, their deviation from international standards, their costly certification requirements, and the lack of a transparent and science-based approach.

On the basis of proposals from members about what the SPS Committee can and should do to: (i) reduce the negative effects that private SPS standards can have on international trade, especially for developing countries; and (ii) enhance the potential benefits of private SPS standards for developing countries, the Committee agreed to a three-step procedure to be led by an ad hoc working group on private standards. As the first step, the Secretariat circulated a questionnaire on SPS-related private standards in December 2008[93] which sought information from members about products and markets of concern, the relevant private and international standards, trade effects, costs of compliance, and a number of related elements. As the second step, a compilation of replies summarizing the information contained in the 40 responses received from 22 members was circulated in June 2009 and revised in December 2009[94], in light of members' comments. As the third step, the ad hoc working group is currently in the process of identifying a number of possible actions on private standards for the SPS Committee's consideration.

Implications for Technical Assistance on SPS

Technical Assistance

The SPS Agreement calls for technical assistance among members, in particular to developing and Least Developed Countries, to enable them to strengthen their food safety and animal and plant health protection systems. The assistance can take different forms, including advice, training, equipment or

[93] G/SPS/W/232.
[94] G/SPS/GEN/932/Rev.1.

financial assistance in areas such as processing technologies, research and infrastructure. A number of developing countries have identified their lack of effective participation in standard-setting as one of the difficulties they face with the implementation of the SPS Agreement. The SPS Agreement encourages WTO members to actively participate in the development of international standards, but effective participation extends well beyond physical presence in meetings: it requires the scientific expertise to evaluate the potential effect of proposed standards on national production, and the capacity of the country to actually implement the standards. Many developing countries who have shortfalls in these resources are concerned that the standards being developed do not adequately take into account the needs and difficulties faced by their producers.

The WTO also provides technical assistance and training to help its members, in particular developing and Least Developed Countries, implement their obligations and exercise their rights under the WTO agreements. The overall objective of the SPS technical assistance activities is to enhance the knowledge and expertise of government officials from WTO developing country members and observers, so that they can better understand and implement the SPS Agreement, benefit from its provisions, and strengthen their capacities to engage in the work of the SPS Committee.[95] SPS technical assistance and training activities typically include presentations on the basic provisions of the SPS Agreement, the transparency provisions, specific trade concerns raised at the SPS Committee, the WTO dispute settlement and SPS-related cases, and specific issues such as risk analysis, regionalization and equivalence. Altogether, 198 SPS training activities have been undertaken by the WTO Secretariat from 1 September 1994 to 31 December 2009. In 2009, 21 SPS training activities were undertaken: five regional or sub-regional workshops, 13 national seminars, two other activities and one SPS specialized trade policy course.[96]

The Standards and Trade Development Facility

The Standards and Trade Development Facility (STDF) is a global programme in capacity building and technical co-operation established by the FAO, the World Organization for Animal Health (OIE), the World Bank, the WHO and the WTO to assist developing countries to comply with food safety, animal and plant health measures in international trade. Other international organizations, donors and developing countries also participate. The WTO administers the STDF and provides the secretariat.

The STDF aims to: (i) act as a vehicle for co-ordination among technical cooperation providers, the mobilization of funds, the exchange of experience and the dissemination of best practice; and (ii) assist developing countries in enhancing their capacity to analyze and implement international SPS standards with the ultimate objective of improving human, animal and plant health, and thus gaining and maintaining market access. More information can be found on the STDF website.

The STDF operating plan for 2010-2011, the fourth and fifth year of the five-year STDF Medium Term Strategy (STDF 154), is set according to three thematic areas: coordination and information dissemination, project development, and project implementation.[97] The operating plan also includes provision for the development of a new STDF strategy and work plan for 2012 and beyond.

Apart from projects and project preparation grants (PPGs), the main planned STDF activities currently focus on economic analysis, public-private partnerships and SPS indicators.

Agreement on Technical Barriers to Trade (TBT)

The TBT Agreement's basic objective is to ensure that technical regulations, standards and conformity assessment procedures do not constitute unnecessary barriers to international trade. It seeks to achieve a balance between allowing WTO members to take regulatory measures to protect legitimate interests and assuring that technical regulations, standards and conformity assessment procedures do not become unnecessary obstacles to international trade. It also promotes the use of international standards, guides and recommendations as a basis for standards, technical regulations and conformity assessment procedures.

Two aspects of the TBT Committee's work are relevant to the surveillance and monitoring of regulatory measures that have an effect on international trade: members' notifications of draft regulations and the discussion of potential or actual trade effects of such measures in the Committee.

TBT-Related Implementation Issues

Transparency

The TBT Agreement requires that whenever a relevant international standard, guideline or recommendation does not exist or when the technical content of a proposed technical regulation and/or conformity assessment procedure is not in accordance with the content of a relevant international standard or guideline, and if the technical regulation and/or conformity assessment procedure may have a significant effect on trade, they shall be notified to WTO members through the secretariat, indicating the products covered. This shall be done at an appropriate early stage, when amendments can still be introduced and comments taken into account.

From the entry into force of the Agreement in January 1995 up to 31 December 2009, about 12,000 notifications have been made by 110 members.

In 2009, members submitted 1,490 new notifications (including revisions) of technical regulations and conformity assessment procedures along with 401 addenda/corrigenda to notifications.[98] The following objectives were mentioned in the notifications: protection of human health or safety; prevention of

[95] For a list of the SPS Technical Assistance activities for 2010, please see document G/SPS/GEN/997.
[96] G/SPS/GEN/521/Rev.5 and addenda.
[97] Additional information per thematic area can be found in document G/SPS/GEN/1029 and at: http://www.standardsfacility.org/files/various/STDF_314%20Operating%20Plan%202010-11%20FINAL.pdf
[98] Monthly summaries of TBT notifications for 2009 are contained in documents G/TBT/GEN/N/95-106.

deceptive practices; quality requirements; protection of the environment; adoption of new technology; protection of animal or plant life or health; harmonization; consumer information and labeling; cost saving and increasing productivity; trade facilitation; and national security requirements.[99]

The most recurrent objectives of the notifications are the protection of human health or safety, with a 46 per cent share, followed by prevention of deceptive practices and consumer protection, with 18.2 per cent, and quality requirements, with ten per cent; various other objectives account for the remaining 26 per cent of the total number of notifications.[100]

The number of notifications from developing country members is rising steadily, mainly driven by Asian economies (e.g. China, Korea, Indonesia) and Saudi Arabia. In particular, the growth in the number of Chinese notifications is part of a long-term trend which has been on-going for about five years.

Specific Trade Concerns

Members also use the TBT Committee as a forum to discuss trade concerns that arise between members and that relate to technical regulations, standards or conformity assessment procedures. These specific trade concerns normally relate to proposed draft measures (notified to the TBT Committee as described above) or to the implementation of existing regulations. Members have underlined the value of the Committee's discussions on specific trade concerns; these discussions provide an opportunity for a multilateral review that enhances transparency and predictability in the application of standards, technical regulations and conformity assessment procedures.

The number of concerns raised and discussed in the TBT Committee has grown significantly over the last four years, reaching a record 75 in 2009 (compared to 59 in 2008). This significant increase in specific trade concerns raised in the TBT Committee over the last few years may, to a certain extent, be an indication of the increasingly active participation of members in the work of the TBT Committee; it may also indicate an enhanced awareness and implementation of the requirements in the TBT Agreement.

The review of specific trade concerns in the Committee is an important monitoring mechanism. From the period from 1995 to March 2010, 264 specific trade concerns were raised by members. About 70 per cent of these related to measures notified to the TBT Committee. Most of these measures were notified as technical regulations (81 per cent), while a smaller proportion (17 per cent) were related to conformity assessment procedures. The most frequently invoked concerns are those relating to the need for more information on, or clarification of, the measure at issue. Concerns related to the avoidance of unnecessary barriers to trade and transparency are also frequent. The most commonly cited objectives of the measures discussed relate to health and safety and the protection of the environment. Other concerns relate to a wide range of objectives, including consumer protection, consumer information, nutritional concerns, fair trade and trade facilitation.[101]

By and large, the regional distribution of members maintaining the measures raised for discussion in the Committee is spread evenly across the WTO membership, with the exception of African and Caribbean countries. No concerns about measures maintained by LDCs have been raised, while measures maintained by the European Union, China and the United States have been most frequently raised.[102]

From January 2009 through March 2010, 110 specific trade concerns were raised, of which 53 were new concerns and 57 were concerns that had been previously raised and for which new information was available. Approximately 50 per cent of the 53 new concerns raised in 2009 related to measures involving the primary sector (agriculture, fishing and forestry) and agribusiness.

Emerging TBT-Related Trade Issues

Illustrative examples: Alcohol and tobacco

At the TBT Committee meeting on 24-25 March 2010, several members raised concerns about Brazil's and Thailand's new labelling measures, taken for public health reasons, related to alcohol beverages, which, they argued, created unnecessary barriers to trade. Members also reiterated concerns about a Canadian measure on tobacco products aimed at preventing young people from addiction.

Thailand's proposed health warnings for alcoholic beverages, notified to the TBT Committee under G/TBT/N/THA/332, raised concerns from several countries.[103] While these countries did not contest the legitimacy of Thailand's objectives of addressing public health concerns, they argued that the labelling requirements created unnecessary obstacles to trade and that Thailand could instead use less restrictive methods, such as public information campaigns, to achieve the same objective. Members also argued that the labelling requirements could mislead the consumer by informing them that drinking any level of alcohol, even moderately, could lead to health problems. Drawing experience from tobacco control, Thailand has noted, among other things, that pictorial warning labelling has a stronger impact than text-only messages – particularly in the case of population groups with a relatively low literacy rate.

Canada's "Cracking Down on Tobacco Marketing Aimed at Youth Act" (Bill C-32 amendment to the Tobacco Act), adopted by the Canadian Parliament in October 2009, raised considerable concern among several delegations in the TBT Committee, including several African countries. This measure prohibits the use of certain additives in cigarettes and other tobacco products and is aimed at preventing young people from smoking. Members argued that the Tobacco Act would effectively ban "blended cigarettes" (cigarettes made with several types of tobacco), which contain a number of additives prohibited by Canada. They stated that these additives are an essential component of blended cigarettes, reducing the strong flavour of Burley tobacco, and do not add a characteristic flavour. Banning these additives could have the effect of a "de facto" prohibition of blended cigarettes. Canada has stressed that the measure is

99 G/TBT/28.
100 Idem.
101 G/TBT/GEN/74/Rev.5.
102 Idem.
103 G/TBT/M/50.

designed to address public health concerns – to reduce incentives for young people to smoke in order to prevent addiction to tobacco. It was stressed that there is scientific evidence to show that certain additives do increase the attractiveness of tobacco products. Moreover, it was noted that the Act prohibits the use of certain additives in little cigars, cigarettes and blunt wraps sold in Canada, regardless of their origin. It does not ban any type of tobacco product or types of tobacco.

Disputes

Currently, three of the specific trade concerns discussed in the TBT Committee have led to formal proceedings under the WTO Dispute Settlement Understanding:

- European Union: Measures Prohibiting the Importation and Marketing of Seal Products (complaint by Canada and Norway). Consultations have been requested but no panel has been established and no settlement has been notified.
- United States: Certain Country of Origin Labelling Requirements (complaints by Mexico and Canada). A single panel was established on 19 November 2009.
- United States: Measures Affecting The Production And Sale Of Clove Cigarettes (complaint by Indonesia). Consultations have been requested but no panel has been established and no settlement has been notified.

Implications for Technical Assistance on TBT

Since the establishment of the TBT Committee, technical assistance has been considered a priority area, and it figures permanently on the agenda of the Committee. Just as in the SPS Agreement, the TBT Agreement calls for technical assistance among members, in particular to developing countries, on the preparation of technical regulations. The TBT Agreement encourages members to grant technical assistance for the establishment of national standardizing bodies and participation in the international standardizing bodies. Members are also encouraged to grant technical assistance for the establishment of regulatory bodies, or bodies for the assessment of conformity with technical regulations, and the methods by which their technical regulations can best be met.

In its Fifth Triennial Review of the Operation and Implementation of the Agreement on Technical Barriers to Trade[104], the TBT Committee encourages its members to review their capacity building needs and priorities in the following areas in particular:

- Good regulatory practice: technical assistance in the area of good regulatory practice should be considered an integral element of capacity building activities to strengthen the implementation of the TBT Agreement and draw on the expertise of both members and other relevant organizations.
- Conformity assessment: members are encouraged to participate in technical cooperation activities in the area of conformity assessment, consistent with sector-specific national priorities. Capacity building activities – at the national or regional level as appropriate – aimed at improving the technical infrastructure as well as the capacity to implement the TBT agreement should be consistent with national priorities and take into account the existing level of technical infrastructure development.
- Standards development: members should undertake efforts to build understanding of the strategic importance of standardization activities through increased outreach in sectors of priority interest. It may be beneficial to explore incentives to increase support for and promotion of such activities, particularly in developing country members.
- Transparency: reinforcing the operation of enquiry points.

For 2010, TBT has planned three Geneva-based events; three regional workshops; thirteen member workshops; one Geneva-based and four regional trade policy courses covering, inter alia, the TBT Agreement; and one e-training course.[105]

[104] G/TBT/26.
[105] G/TBT/GEN/102.

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Annexes

1.

Annex 1. *List of abbreviations* [106]

Name	Abbreviation
Afghanistan	AF
Albania	AL
Argentinia	AR
Armenia	AM
Australia	AU
Austria	AT
Azerbaijan	AZ
Bahamas	BS
Bangladesh	BD
Barbardos	BB
Belgium	BE
Belize	BZ
Bermuda	BM
Bolivia, Plurinational State of	BO
Bosnia and Herzegovina	BA
Brazil	BR
Brunei Darussalam	BN
Bulgaria	BG
Britihs Virgin Islands	VG
Cambodia	KH
Cameroon	CM
Canada	CA
Chile	CL
China	CN
Colombia	CO
Costa Rica	CR
Côte d'Ivoire	CI
Croatia	HR
Cyprus	CY
Czech Republic	CZ
Denmark	DK
Dominican Republic	DO
Ecuador	EC
Egypt	EG
El Salvador	SV
Ethiopia	ET
Fiji	FJ
Finland	FI
France	FR
French Polynesia	PF
Georgia	GE
Germany	DE
Ghana	GH
Greece	GR
Greenland	GL
Guatemala	GT
Guyana	GY
Haiti	HT
Honduras	HN
Hong Kong	HK
Hungary	HU
Iceland	IS
India	IN
Indonesia	ID
Iran, Republic of	IR
Ireland	IE
Israel	IL
Italy	IT
Jamaica	JM
Japan	JP
Jordan	JO
Kenya	KE
Korea, Republic of	KR
Latvia	LV
Lebanon	LB
Lithuania	LT
Macau	MO
Macedonia, the former Yugoslav Republic of	MK
Madagascar	MG
Malaysia	MY
Malawi	MW
Maldives	MV
Malta	MT
Marshall Islands	MH
Mauritius	MU
Mexico	MX
Micronesia, Federated States of	FM
Moldova, Republic of	MD
Morocco	MA
Mozambique	MZ
Myanmar	MM
Namibia	NA
Netherlands	NL
New Zealand	NZ
Nicaragua	NI
Nigeria	NG
Norway	NO
Oman	OM
Pakistan	PK
Panama	PA
Papua New Guinea	PG
Paraguay	PY
Peru	PE
Philippines	PH
Poland	PL
Portugal	PT
Romania	RO
Russian Federation	RU
Rwanda	RW
Samoa	WS
Saudi Arabia	SA
Senegal	SN
Serbia	RS
Montenegro	ME
Seychelles	SC
Singapore	SG
Slovakia	SK
Slovenia	SI
South Africa	ZA
Spain	ES
Sri Lanka	LK
Saint Pierre and Miquelon	PM
Saint Vincent and the Grenadines	VC
Sudan	SD
Suriname	SR
Sweden	SE
Switzerland	CH
Syrian Arab Republic	SY
Taiwan	TW
Tanzania, United Republic of	TZ
Turks and Caicos Islands	TC
Thailand	TH
Togo	TG
Tonga	TO
Trinidad and Tobago	TT
Tunisia	TN
Turke	TR
United Arab Emirates	AE
Uganda	UG
United Kingdom	GB
Ukraine	UA
Urugay	UY
Uzbekistan	UZ
Venezuela, Bolivarian Republic of	VE
Vietnam	VN
Yemen	YE
Zimbabwe	ZW

[106] Available from: www.iso.org/iso/english_country_names_and_code_elements.

Annex 2. ***Relative Rejection Rate Indicator (RRRI)***

Country	European Union					United States				
	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices
Afghanistan	High	None	High	Low	None	High		High	None	None
Albania	High	Medium	High	None	Low	Low		None		Low
Algeria	Medium	Medium	Medium	None	None	High		High		
Angola	High	High	None	None	None					
Antigua and Barbuda	None	None	None	None	None	None	None	None		
Argentina	Low	Low	Low	Low	None	Low	Low	Low	Low	Medium
Armenia	High	None	None	None	None	High	None	Medium	Medium	None
Aruba	Medium			None		High	High			None
Australia	Low	High	Medium	Low	None	Low	Low	Low	None	None
Austria	n/a	n/a	n/a	n/a	n/a	Low	None	None	None	None
Azerbaijan	High	None	None	Low	None	Low	Medium	Low	None	None
Bahamas	None	None	None		None	Low	Low	None		None
Bahrain	None	None	None	None	None	Medium	None			
Bangladesh	High	High	High	High	High	Medium	Medium	High	High	High
Barbados	None	None	None		None	Medium	Medium	High		
Belarus	Medium	None	Medium	None	None	High	High	High	None	
Belgium	n/a	n/a	n/a	n/a	n/a	Low	Low	Low	None	None
Belize	None	None	None			Low	Low	None		None
Benin	Medium	High	None	None	None	High		High	High	
Bermuda	None	None	None		None	Low	None			
Bhutan	None	None	None		None	None		None	None	None
Bolivia	Medium	None	None	Low	None	Medium		Medium	Low	None
Bosnia and Herzegovina	Medium	None	Medium	None	Medium	High	None	Medium	None	None
Botswana	High	None	None		None	None		None		
Brazil	Low	High	Low	Medium	Low	Low	Medium	Low	Low	Low
Brunei Darussalam	None	None	None	None		Medium	Medium			
Bulgaria	n/a	n/a	n/a	n/a	n/a	High	None	Medium	Medium	Medium
Burkina Faso	Medium	None	None	High	None	High	None	High	None	None
Burundi	None	None	None	None	None	None				
Cambodia	High	None	None	None	High	Low	Low	None	Medium	None
Cameroon	Low	None	Low	None	Low	Medium	None	High	None	High
Canada	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium
Cape Verde	Medium	Medium		None		High	High			
Cayman Islands	None	None	None		None	None	None	None	None	
Central African Republic	None		None		None	None				
Chad	None	None	None			None				
Chile	Low	Medium	Low	Low	Low	Low	Low	Low	None	Low
Hong Kong	High	None	High	High	None	High	High	High	Medium	Low
China	High	Medium	Medium	Medium	Medium	Medium	Low	Low	Low	Low
Colombia	Low	Medium	Low	None	None	Low	Low	Low	High	Low
Comoros	Medium		None	None	Low	None				None
Congo Brazzaville	Medium	High	High	None	None	None	None			None
Democratic Republic of the Congo	Low	None	None	None	None	None	None			
Cook Islands	None	None	None			High	High	None		
Costa Rica	Low	Medium	Low	None	None	Low	Low	Low	None	Low

Country	European Union					United States				
	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices
Côte d'Ivoire	Low	Medium	Low	Low	None	Low	High	High	None	None
Croatia	Medium	High	Medium	Medium	None	Medium	High	Medium	None	None
Cuba	Low	Low	None	None	None					
Cyprus	n/a	n/a	n/a	n/a	n/a	High	Low	High	None	None
Czech Republic	n/a	n/a	n/a	n/a	n/a	Medium	None	High		Low
Denmark	n/a	n/a	n/a	n/a	n/a	Low	Medium	Medium	None	None
Djibouti	None	None	None		None	Medium	High	None		
Dominica	None	None	None	None	None	High	High	Medium		None
Dominican Republic	Medium	None	Medium	None	None	High	Medium	High	Low	High
Ecuador	Low	Low	Low	Medium	None	Low	Low	Low	None	Medium
Egypt	High	Medium	Medium	High	Medium	High	High	Medium	High	Medium
El Salvador	Low	None	None	None	None	Medium	Medium	Low	High	High
Equatorial Guinea	None		None		None	High				
Eritrea	High	None	None	None	High	None	None	None		
Estonia	n/a	n/a	n/a	n/a	n/a	None	None	None		None
Ethiopia	Low	None	None	High	High	Low		Medium	None	High
Fiji	Medium	High	High	None	None	Medium	Low	Medium	None	Medium
Finland	n/a	n/a	n/a	n/a	n/a	Low	None	None		None
France	n/a	n/a	n/a	n/a	n/a	Low	Medium	Medium	Medium	Low
Gabon	Medium	Medium	None	None	None	None	None			None
The Gambia	High	High	None	Medium	None	High	High	High	High	
Georgia	High	None	None	Low	None	High	None	Medium	None	High
Germany	n/a	n/a	n/a	n/a	n/a	Low	Medium	Low	None	Low
Ghana	Medium	Medium	Medium	High	High	High	High	Medium	High	High
Greece	n/a	n/a	n/a	n/a	n/a	Medium	Medium	Low	Medium	Low
Greenland	Low	Low	None		None	Medium	None	None		
Grenada	Medium	High	None		Low	None	Medium	High		Low
Guadeloupe	n/a	n/a	n/a	n/a	n/a	Medium		High		
Guatemala	Low	Low	Low	None	None	Medium	Medium	Low	Low	Medium
Guinea	Medium	Low	None	Medium	None	High	High	None	None	High
Guinea-Bissau	None	None	None	None		None			None	
Guyana	Low	None	None	None		Medium	Medium	Medium	None	High
Haiti	Medium	None	None	None	None	High	High	Low		High
Honduras	Low	Low	Medium	None	None	Medium	Low	Low	Medium	Medium
Hungary	n/a	n/a	n/a	n/a	n/a	Medium	None	Low	None	Low
Iceland	Low	Low	None	None	None	Low	Low	High		None
India	High	High	Medium	Low	Medium	High	Medium	Medium	Low	Medium
Indonesia	Medium	High	Low	Low	Low	Medium	Medium	Low	Medium	Low
Iran	High	None	High	High	Low	High	Medium	Medium	Medium	Low
Iraq	None	None	None	None		None		None	None	
Ireland	n/a	n/a	n/a	n/a	n/a	Low	High	Medium	None	None
Israel	Low	None	Low	Medium	Low	Medium	High	Low	Low	Low
Italy	n/a	n/a	n/a	n/a	n/a	Low	High	Medium	Low	Medium
Jamaica	Low	Medium	Low	None	Low	Medium	Medium	Medium	None	Medium
Japan	Medium	Medium	High	Low	None	High	Medium	Medium	High	High
Jordan	High	None	Medium	None	High	High	High	High	High	High
Kazakhstan	Medium	Medium	High	None	None	None	None			

Country	European Union					United States				
	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices
Kenya	Low	Medium	Low	None	Low	Low	None	Medium	None	Medium
Kiribati	None	None	None	None	None	None	None			
North Korea	High	High	High							
South Korea	High	None	None	None	None	High	High	Medium	Medium	Low
Kosovo	High		None	None	None					
Kuwait	High	None	None	High		High		High		High
Kyrgyzstan	Medium		None	Medium	None	None	None	None	None	None
Lao	None	None	None	None	None	None	None	None	None	None
Latvia	n/a	n/a	n/a	n/a	n/a	High	High	High		None
Lebanon	High	None	High	High	High	High		High	Medium	High
Lesotho	None	None	None	None						
Liberia	None	None	None			High	High		High	
Libya	None	None	None	None		None		None		
Liechtenstein	None	None	None		None	None				
Lithuania	n/a	n/a	n/a	n/a	n/a	Medium	High	High		None
Luxembourg	n/a	n/a	n/a	n/a	n/a	None				
Macao	High	None	None	None	None	Medium	Medium	High	None	High
Macedonia	Medium	None	None	None	Medium	High		Medium	High	Medium
Madagascar	Low	Low	Medium	None	None	Low	Medium	None	None	None
Malawi	Medium	None	None	Medium	Medium	Low	None	Low	None	None
Malaysia	Medium	High	Medium	Medium	Medium	Low	Medium	Low	Medium	Low
Maldives	Medium	Medium		None	None	Medium	High			
Mali	Medium	None	None	High	None	High		None		
Malta	n/a	n/a	n/a	n/a	n/a	Medium	Low	None		
Martinique	n/a	n/a	n/a	n/a	n/a	High	None			
Mauritania	Low	Low	None	None	None	High	None	High		
Mauritius	Low	Low	None	None	High	Low	Low	None	None	None
Mexico	Low	Medium	Low	None	Low	Medium	Medium	Low	Low	Medium
Moldova	Medium	None	High	Low	None	High		High	None	
Monaco	High					High	None	High	High	
Mongolia	High	None	None	None	None	None				
Montenegro	None	None	None		None	None		None		
Morocco	Medium	Medium	Low	Low	Medium	Low	Low	Low		Medium
Mozambique	Low	Low	None	Low	None	Low	Medium	High	None	
Myanmar	High	High	None	None	None	High	Medium	High		
Namibia	Medium	Low	None	None	None	Low	Low			None
Nepal	Medium	None	None		None	High		None		None
Netherlands	n/a	n/a	n/a	n/a	n/a	Low	Low	Low	Medium	Medium
New Zealand	Low	Low	None	None	None	Low	Low	Low	None	High
Nicaragua	Medium	Low	None	Medium	None	Medium	Low	Low	Low	Medium
Niger	None	None	None	None	None	High	High			
Nigeria	High	Medium	High	High	Medium	Medium	High	High	Medium	Medium
Niue	None		None			None	None			
Norway	Low	Low	None	Low	Medium	Low	Low	High	None	None
Oman	High	High	None	None		Medium	None	Medium	None	
Pakistan	High	Medium	High	Medium	High	High	Medium	High	High	High
Palestinian Territory	Medium		None	None	None					

Country	European Union					United States				
	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices
Panama	Medium	High	Low	None	None	Low	Low	Low	None	Medium
Papua New Guinea	Low	Low	None	None	None	Low	Medium	None	None	None
Paraguay	Medium	None	None	Medium	Medium	Low	None	None		None
Peru	Low	Low	Low	None	Low	Low	Medium	Low	Low	Low
Philippines	Medium	None	Medium	Low	None	Medium	Medium	Low	Low	High
Poland	n/a	n/a	n/a	n/a	n/a	Medium	High	Medium	None	High
Portugal	n/a	n/a	n/a	n/a	n/a	Medium	High	Medium	None	None
Puerto Rico	High					n/a	n/a	n/a	n/a	n/a
Qatar	None	None	None	None		None				
Romania	n/a	n/a	n/a	n/a	n/a	Medium	None	Medium	None	None
Russia	Medium	Low	Medium	Medium	High	Low	Low	Medium	High	Medium
Rwanda	Low		None	High	None	Low				
Samoa	None		None		None	Medium	High	Low		None
San Marino	High	None	None	High						
São Tomé and Príncipe	None	None	None			High	None			
Saudi Arabia	High	None	None	High	None	Medium	None	High	High	None
Senegal	Medium	Medium	Medium	Medium	None	High	High	High	High	High
Serbia	Low	High	Low	High	Medium	Medium	None	Low		None
Serbia and Montenegro	Low	High	Low	None	Low	High	None	Medium	None	High
Seychelles	Low	None	None		None	Medium	Low			
Sierra Leone	High	None	None	High	High	High	High	Medium		None
Singapore	High	High	High	Medium	Medium	Medium	Medium	Low	None	None
Slovakia	n/a	n/a	n/a	n/a	n/a	Medium		High		None
Slovenia	n/a	n/a	n/a	n/a	n/a	Medium	High	Medium	None	None
Somalia	None	None	None		None	High	None	None		None
South Africa	Low	Low	Low	Medium	Low	Medium	Low	Low	None	Low
Spain	n/a	n/a	n/a	n/a	n/a	Low	Medium	Low	Low	Low
Sri Lanka	High	High	High	Low	Medium	High	High	High	Medium	Medium
St Kitts and Nevis	None	None	None	None	None	High	High			
St Lucia	None	None	None	None	None	High	None	Medium		None
St Vincent and the Grenadines	None	None	None	None	None	High	Low	Medium		
Sudan	Medium	None	None	High	None	Low				None
Suriname	Medium	Medium	High	None	None	Medium	Medium	None		None
Swaziland	Low	None	Medium			None		None		None
Sweden	n/a	n/a	n/a	n/a	n/a	Low	High	Low	None	None
Switzerland	Low	None	None	None	None	Low	High	Low	Medium	None
Syria	High	None	High	Medium	Medium	High	None	High	High	Medium
Taiwan	High	High	None	None	None	High	Medium	Medium	High	Medium
Tajikistan	None		None	None	None	None		None		
Tanzania	Medium	Low	None	None	Medium	Low	None	Medium	None	None
Thailand	High	Medium	High	Medium	High	Medium	Low	Low	Low	Medium
Togo	Medium	None	None	High	None	Medium	High	High		None
Tonga	High	None	None	None	High	Low	Low	None		None
Trinidad and Tobago	None	None	None	None	None	Medium	Low	High	None	Medium
Tunisia	Medium	High	Medium	None	Low	Medium	Medium	Medium	High	None
Turkey	High	Medium	High	Low	High	Medium	High	Low	Low	

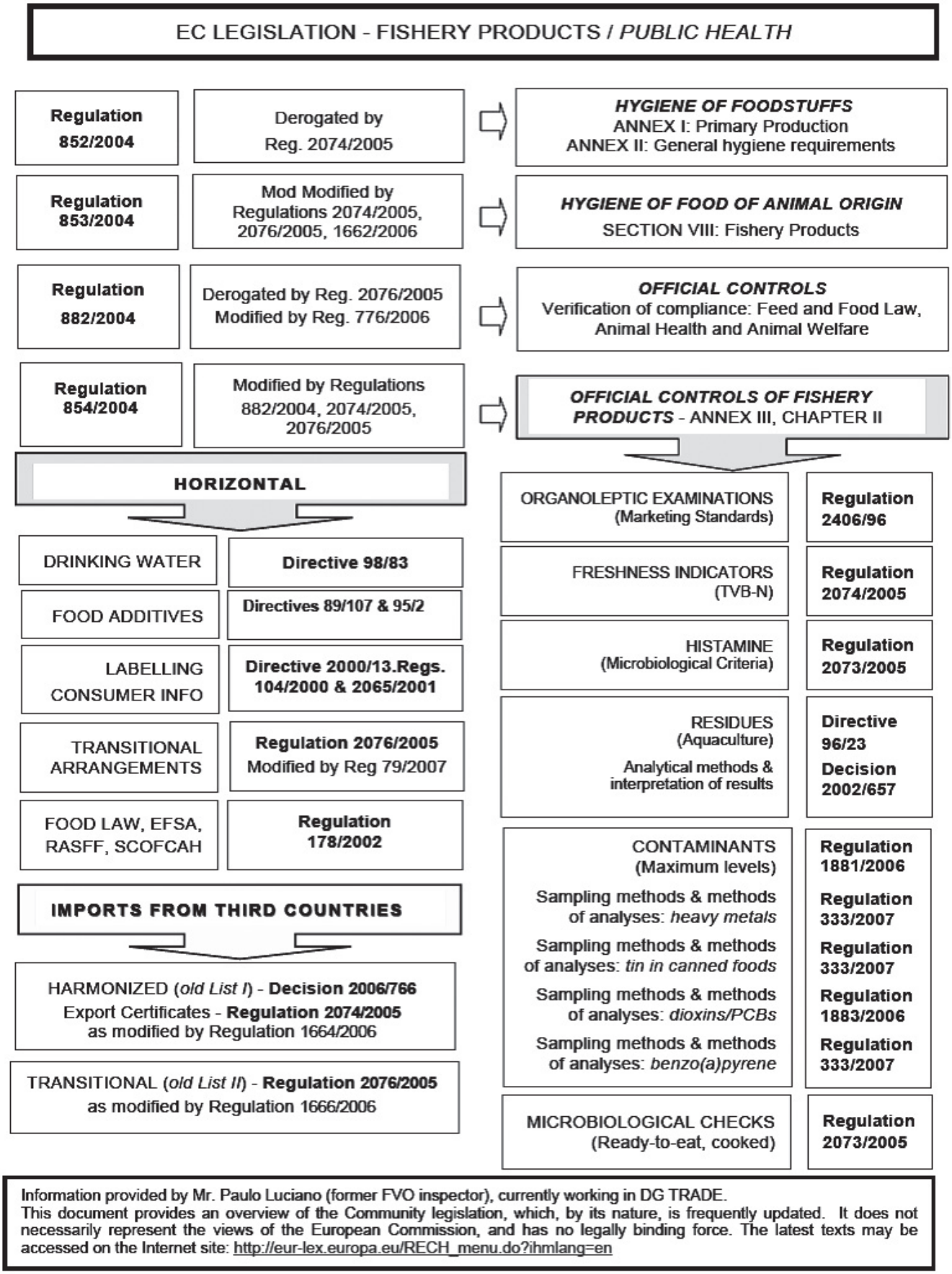
Country	European Union					United States				
	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices	Total	Fish and Fishery Products	Fruits and Vegetables	Nuts and Seeds	Herbs and Spices
Turkmenistan	None	None	None		None	None				
Uganda	Low	Low	None	High	None	Low	Low	High		None
Ukraine	Medium	None	Medium	Low	High	High	Medium	High	Medium	Low
United Arab Emirates	Low	High	None	Medium	High	Medium	Low	Medium	None	High
United Kingdom	n/a	n/a	n/a	n/a	n/a	Medium	Medium	High	Medium	
United States	Medium	Low	Low	Low	Low	n/a	n/a	n/a	n/a	n/a
Uruguay	Low	Medium	Medium	None	None	Low	Low	Medium	None	None
Uzbekistan	High		High	Medium	None	Medium		Medium	None	None
Vanuatu	None	None	None		High	None	None	None		None
Venezuela	Low	Low	None	None	Medium	Medium	Medium	Low	None	None
Vietnam	High	High	High	Low	Medium	Medium	Medium	Medium	Low	Low
Yemen	High	Medium	None	None	None	Medium	High			
Zambia	Low	None	None	High	None	None	None	None	None	None
Zimbabwe	Low	None	Medium	High	None	Low		None		None

3.2

Annex 1. ***FVO Inspection Headings***

No.	Heading
1.	**Legislation** Information about the legislation structure is an important requirement for the checklist. The responsibilities of the government in maintaining good health conditions, providing good refrigeration and maintaining proper standards of fishery products are essential.
2.	**Competent Authority** The country of inspection has a Competent Authority (CA) at central, regional and national level for fishery products; implements legislation for unfit fishery products; and provides allocation, training, qualification and experience for the staff members.
3.	**Laboratories** Legal and nationally approved laboratories which are aiming for accreditation; monitoring and sampling pollution control, and good water quality in the laboratories for inspection of fishery products.
4.	**General statistics** The annual production of fisheries are listed, sorted, identified and approved by the EU for exporting. The country of inspection has standard vessels, which are to be registered and approved.
5.	**Requirements for the approval of establishments, factory and freezer vessels** Registration for the approved establishment of vessels is a requirement; must issue a registration number, factory code and status of requirements.
6.	**Official Supervision** Information on the inspection of fishery products is important for maintaining the ongoing high standards of the CA.
7.	**Controls on important fishery products** Legal and approved importation of seafood products is carried out.
8.	**Procedure for approval/suspension/withdrawal** Official approvals system is robust, with the ability to facilitate removal following non-compliance.
9.	**Export health certificate** Upon export, a system is in place with the CA to issue an export health certificate.
10.	**Residuals** The laboratory has the ability to undertake the appropriate analyses to detect residuals in seafood product.

Annex 2. EC Legislation – Fishery products/public health



Information provided by Mr. Paulo Luciano (former FVO inspector), currently working in DG TRADE.
This document provides an overview of the Community legislation, which, by its nature, is frequently updated. It does not necessarily represent the views of the European Commission, and has no legally binding force. The latest texts may be accessed on the Internet site: http://eur-lex.europa.eu/RECH_menu.do?ihmlang=en

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