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**APEC Laboratory Capacity Building Workshop**  
**25-26 August, Bangkok, Thailand**

# ***Importance of Laboratory Capacity: Public Health Implications***

**Dr. Lalith Goonatilake**  
Director  
Trade Capacity Building Branch  
United Nations Industrial Development Organization

[l.goonatilake@unido.org](mailto:l.goonatilake@unido.org)



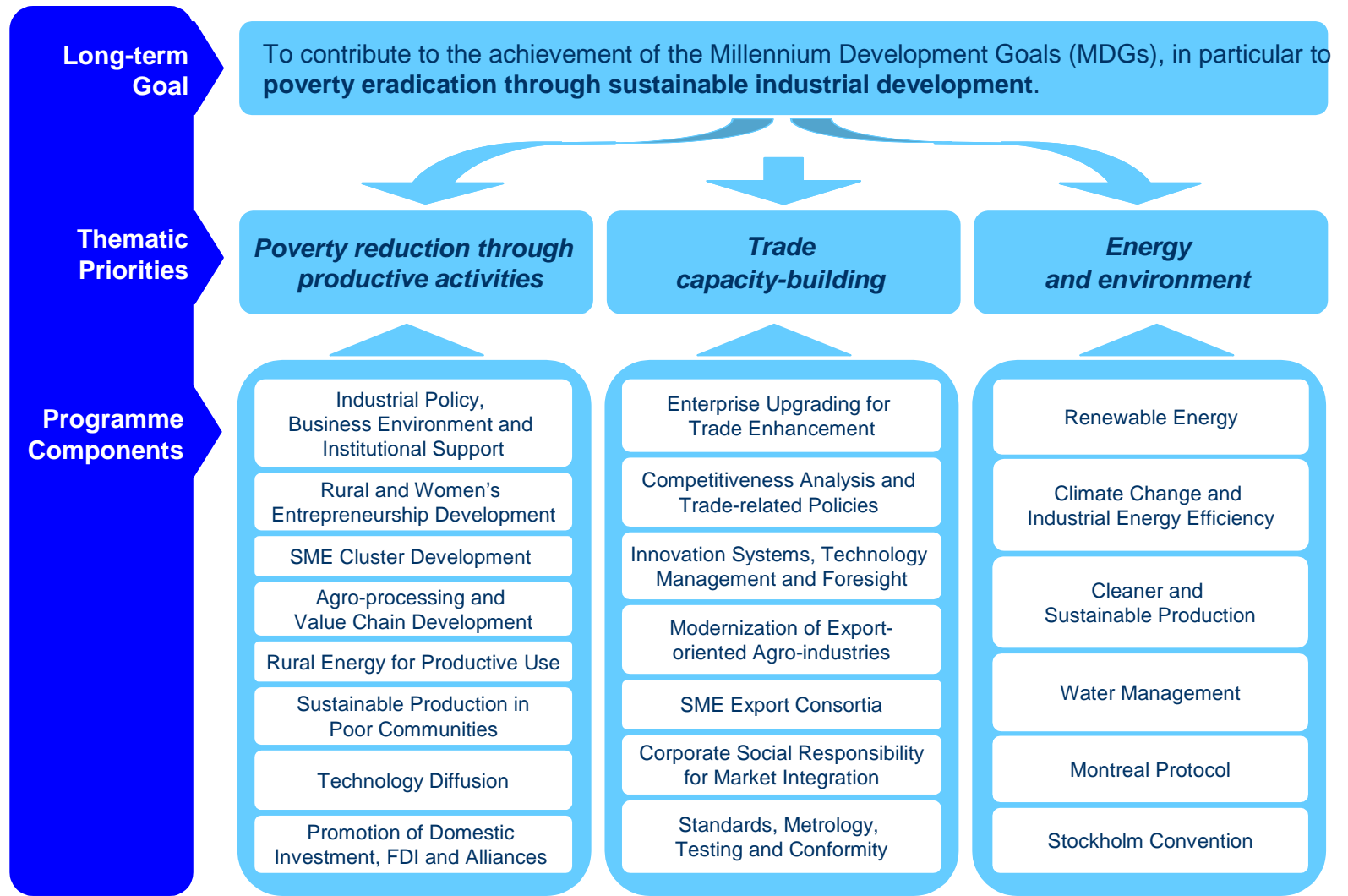
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# Presentation Overview

- Globalization of the Food Value Chain
- Importance of Laboratory Capacity
- Demonstrating Confidence- **ACCREDITATION**
- Path to Accreditation & Mutual Recognition
- Ensuring Laboratory Sustainability
- UNIDO Project Experiences
- UNIDO Tools



# UNIDO: UN Specialized Agency with three thematic areas:





# Food borne illnesses: United States

Table 1. Estimated annual number of domestically acquired, foodborne illnesses, hospitalizations, and deaths due to 31 pathogens and unspecified agents transmitted through food, United States

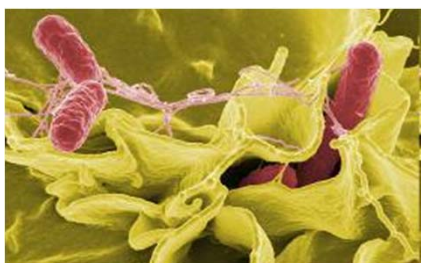
| Foodborne Agents   | Estimated annual number of illnesses (90% credible interval) | %   | Estimated annual number of hospitalizations (90% credible interval) | %   | Estimated annual number of deaths (90% credible interval) | %   |
|--------------------|--|-----|---|-----|---|-----|
| 31 known pathogens | 9.4 million (6.6–12.7 million)                               | 20  | 55,961 (39,534–75,741)  | 44  | 1,351 (712–2,268)   | 44  |
| Unspecified agents | 38.4 million (19.8–61.2 million)                             | 80  | 71,878 (9,924–157,340)  | 56  | 1,686 (369–3,338)   | 56  |
| Total              | 47.8 million (28.7–71.1 million)                             | 100 | 127,839 (62,529–215,562)  | 100 | 3,037 (1,492–4,983)                                       | 100 |

Source: Centers for Disease Control and Prevention, 2011



# Food borne illnesses - Costs: United States

| Pathogen  | CDC estimate of annual number of cases | ERS cost estimate (2010 dollars) |
|---|--|----------------------------------|
| ▶ <i>Campylobacter</i> (foodborne sources)                                    | 2,000,000                              |                                  |
| ▶ <i>Salmonella</i> (all sources)   | 1,397,187                              | \$2,708,292,046                  |
| ▶ Shiga toxin-producing <i>E. coli</i> O157 (STEC O157) (all sources)         | 73,480                                 | \$488,771,183                    |
| ▶ Non-O157 shiga toxin-producing <i>E. coli</i> (non-STEC O157) (all sources) | 31,229                                 |                                  |
| ▶ <i>Listeria</i> (all sources)   | 2,797                                  |                                  |



Consequences of food borne illness cost **\$152 billion** annually – US only

Source: US Economic Research Service, 2011



## Food scares: EHEC

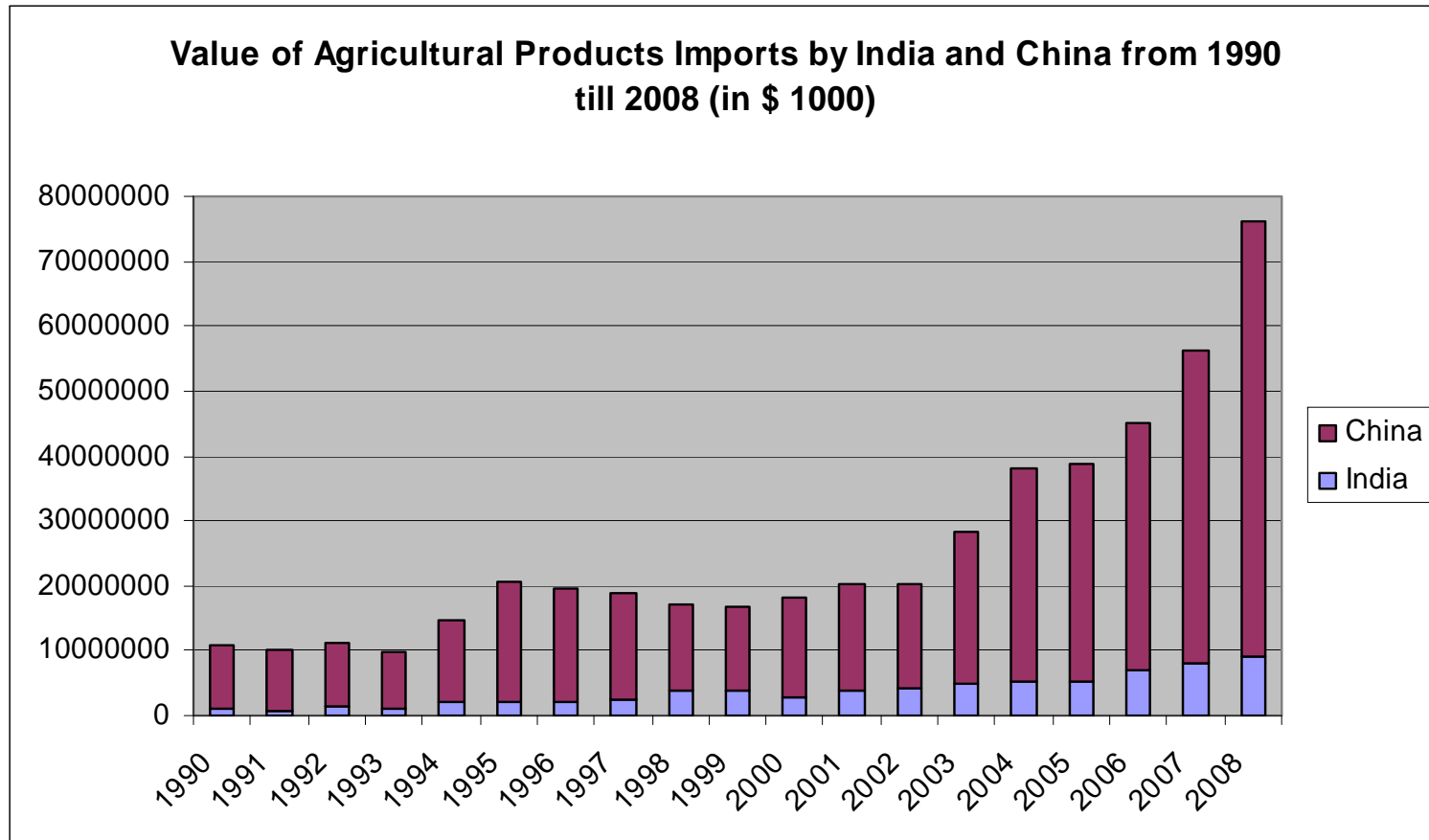
- **WHO:** EHEC (E. coli strain EHEC-0104) reported in 9 European countries: Austria, Denmark, Germany, the Netherlands, Norway, Spain, Sweden, Switzerland and UK
- Damages for the Agriculture sector in the whole of the EU have reached between **500 to 600 million Euros**
- Bacteria that has killed over 30 people in Germany



Source: [www.bz-berlin.de](http://www.bz-berlin.de)



# AGRO-Food Sector Growth- Chinese and Indian Agricultural Food Imports



Source: FAOSTAT



## Issues: Public Health

- **National food control strategy:** Quality and safety of food have to be ensured throughout the food production, processing, storage and distribution chain
- **Food Legislation:** Many countries existing food legislation is outdated
- **Compliance Policies:** Lack of compliance policies in most of the developing countries
- **Infrastructure Development:** Strengthening food control services requires considerable development in infrastructure

### Key Requirements for Demonstrating Food Safety

- **Food Safety Management Systems (ISO 22000, HACCP)**
- **Regular Surveillance mechanism**
- **Credible testing laboratories (ISO17025; ILAC-MRA)**





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## Laboratory Accreditation

### *Ensuring Credibility of Testing*

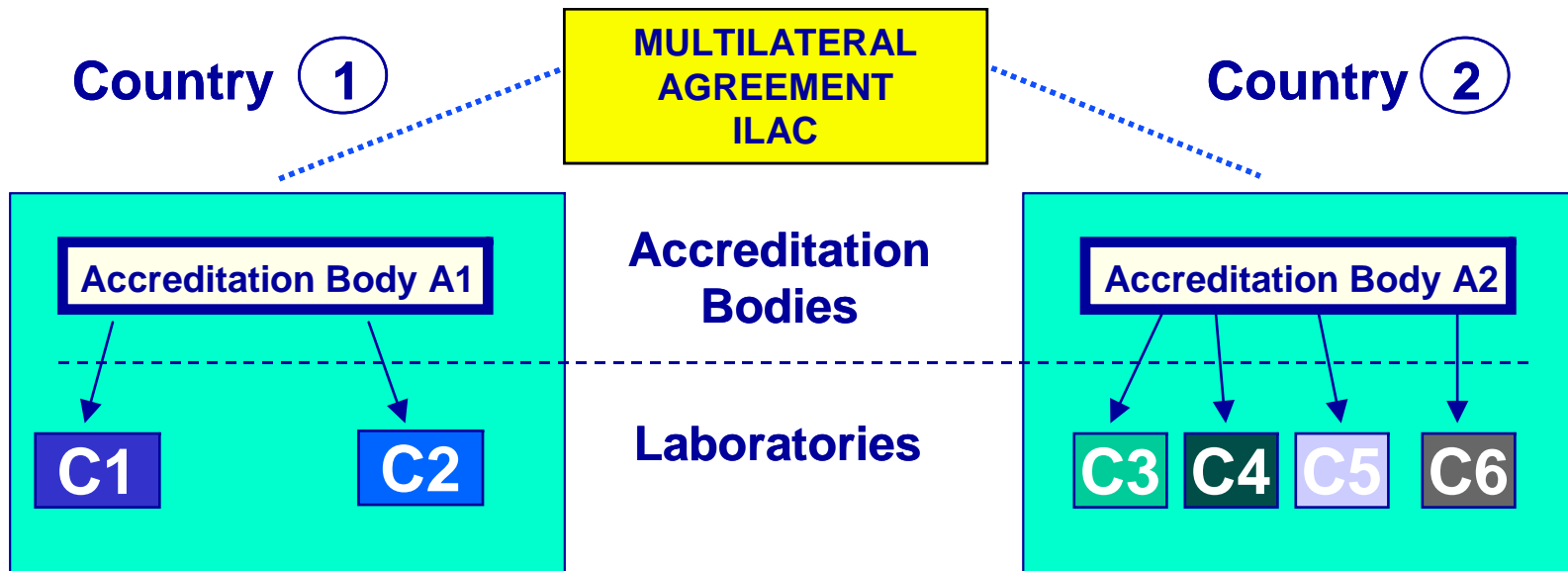
- **ISO/IEC 17025 Standard**
  - Physical facilities
  - Equipment
  - Human resources
  - Calibration
  - Test methods and test validation
  - Quality system
  - Independent accreditation
  - Recognition



***Tested Once – Accepted Everywhere***



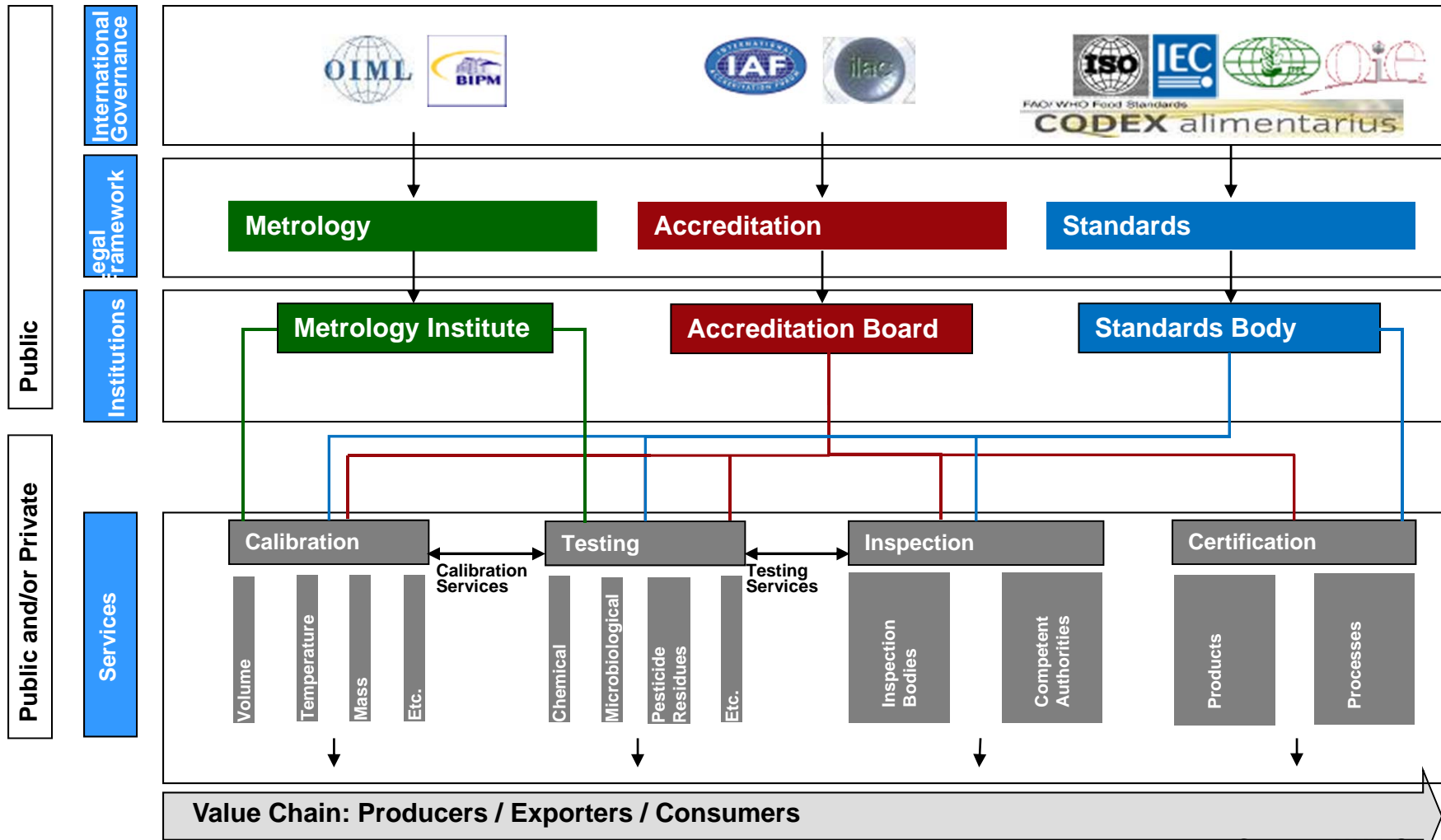
## Mutual Recognition of Certificates/Conformity



International Laboratory Accreditation Co-operation  
Multilateral Agreement will offer recognition  
among its members



### Quality Assurance Infrastructure



Source: UNIDO



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# TBT/SPS capacity-building demands linkages to International Standards & Conformity Organizations




**Andrew J. Wallard, Director BIPM,  
Kandeh K. Yumkella, DG, UNIDO  
Alan Johnston, President, CIML**

**MoU signed in Vienna, Austria on 03 December 2008**



**MEMORANDUM OF UNDERSTANDING ON COOPERATION**  
BETWEEN  
THE UNITED NATIONS DEVELOPMENT PROGRAMME (UNIDO),  
THE INTERNATIONAL BUREAU OF WEIGHTS AND MEASURES (BIPM) AND  
THE INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY (OIML)

**1. Object of Cooperation**

1.1. The United Nations Industrial Development Organization, hereinafter referred to as "UNIDO" is in the process of preparing the preparation and maintenance of technical standards in the developing countries with a view to assisting in the establishment of a joint international network with the Organization for Productive Technical Development and cooperation in public, regional, national, as well as on several levels, having in common the following aims:

- Assist Developing through Productive Activities (DPA) activities for Joint of parties and for the region and supporting private sector development in the region of priority and cooperation areas;
- Develop and strengthen technical capacity efficient, innovative, energy, water and managing resources performance;
- Trade Capacity Building which includes supply and resources management, information and technical skills training and supporting to produce the standards for accuracy without affecting the quality as a priority for technology, innovation, and knowledge (DPA) and the Confidence Instruments of the in the field of representation under the Technical Barriers to Trade (TBT) and Technical Regulations (TR) and Standards and Conformity Assessment (SCA) standards, and business activities and projects in the field of technical and technical trade items.



**ISO & UNIDO  
reinforce  
partnership  
for sustainable  
development**

**MoU signed  
on 23 June 2009  
in Vienna**

**Kandeh K. Yumkella, Director-General, UNIDO  
Rob Steele, Secretary-General of ISO**



**MOU signed at the Joint ILAC/IAF  
General Assembly in Cape Town on  
10 October 2004**



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## Cross Frontier Accreditations Completed via UNIDO Projects

**8 laboratories accredited in SRI LANKA** through SWEDAC (Sweden)

Microbiology (2); Chemical Testing (2); Garment/Textile (1);  
Metrology (1); Rubber testing (1); Food Testing (1)



**1 metrology laboratory accredited in TANZANIA** through SANAS

**19 public sector laboratories accredited in PAKISTAN** through NA

Microbiology (6); Chemical Testing (6); Leather/Textile (5); Metrology (1); Electrical (1)



**5 laboratories accredited in VIETNAM** through NA (Norway)

Microbiology (2); Chemical Testing (1); Metrology (2);



**5 laboratories accredited in LIBYA** through DAP (Germany)

Building Material testing Laboratory (1)



**2 laboratory accredited in CAMBODIA** through NATA and BOA (Vietnam)

Rubber testing Laboratory (1), Microbiology Lab (1) (NATA)



**Cambodia Product Certification Scheme accredited by NA**



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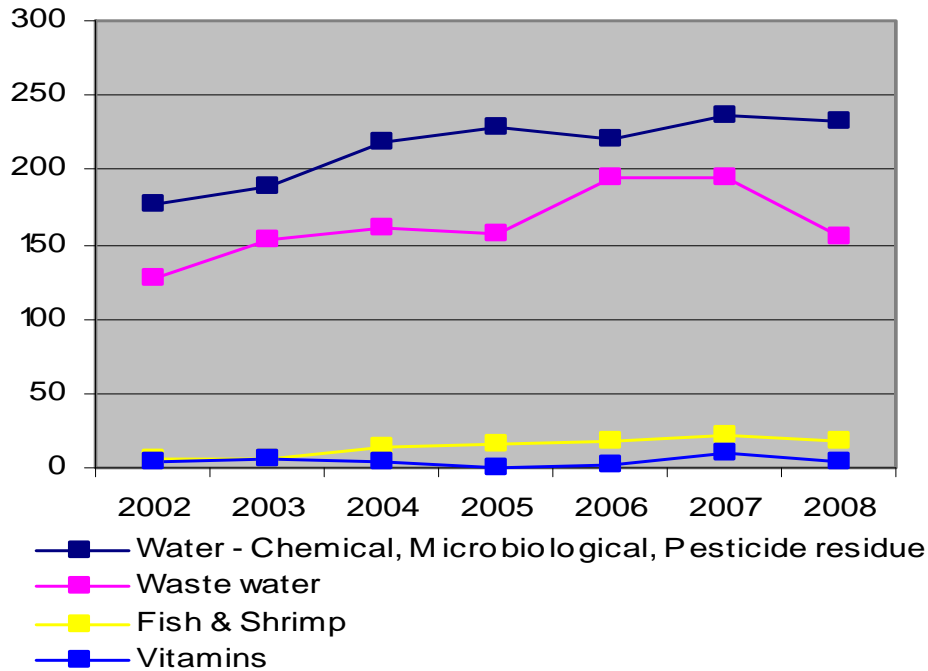
# Case Study - UNIDO in Sri Lanka

- Laboratory Accreditation Impact
  - Food Safety Training Model
- “Crowns” Domestic Food Safety Scheme



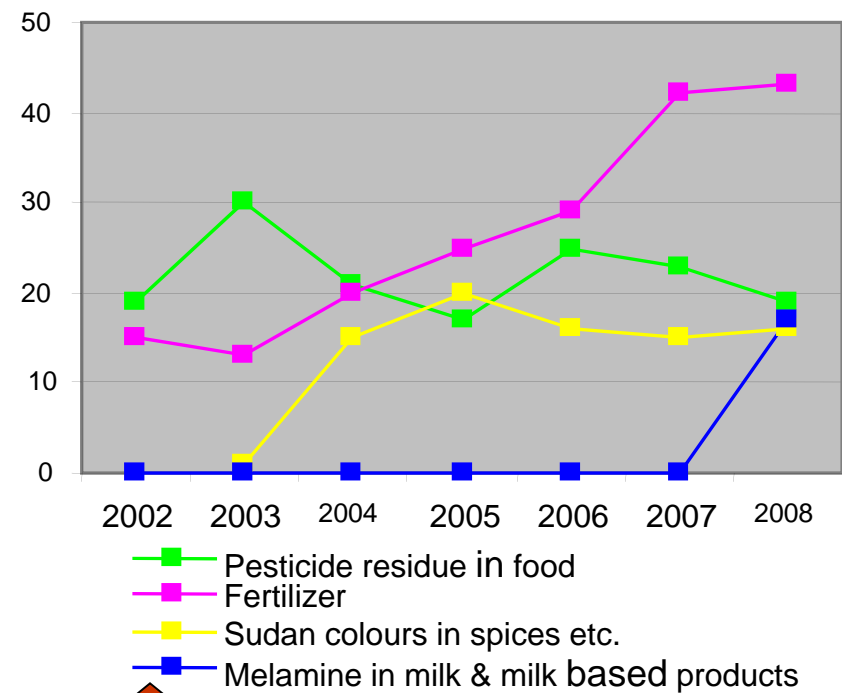
# Sri Lanka-Impact of Accreditation - Growth in Service Demand

Chemical & microbiological labs of ITI  
Number of clients – (Accredited services)



↑  
**Accreditation**

Chemical & microbiological labs of ITI  
Number of clients (non-accredited but related)



↑  
**Accreditation**



# Accreditation Impact- Sri Lanka

| Institute | Laboratory                 | Number of clients |      |          |     | Revenue (LKR Mn) (values discounted to 2002) |      |          |     |
|-----------|----------------------------|-------------------|------|----------|-----|--|------|----------|-----|
|           |                            | 2002              | 2008 | Increase |     | 2002   | 2008 | Increase |     |
|           |                            |                   |      | No.      | %   |  |      | No.      | %   |
| SLSI      | Chemical                   | 73                | 181  | 108      | 148 | 3.6  | 5.3  | 1.7      | 47  |
|           | Microbiological            | 15                | 42   | 27       | 180 | 1.1  | 4.0  | 2.9      | 264 |
| ITI       | Chemical & Microbiological | 366               | 556  | 190      | 52  | 8.9  | 21.9 | 13.0     | 146 |
|           |                            |                   |      |          |     |  |      |          |     |
|           | Calibration                | 174               | 344  | 170      | 98  | 8.3  | 18.1 | 9.8      | 118 |





# Comparison Of Test Costs

Sri Lanka Labs Vs Region- (Accredited labs)

| Test   | Lab 1 ITI<br>Sri Lanka                   | Lab 2<br>Sri Lanka | Lab 3<br>India | Lab 4<br>India | Lab 5<br>Malaysia | Lab 6<br>S'pore | Lab 7<br>S'pore |
|--|--|--------------------|----------------|----------------|-------------------|-----------------|-----------------|
|  | USD<br>(LKR)                             | USD<br>(LKR)       | USD            | USD            | USD<br>(MYR)      | USD             | USD<br>(SGD)    |
| Melamine in milk powder/milk based products  | 174<br>(20,000)                          | 130<br>(15,000)    | 130            | 250            | 241<br>(850)      | 300             | 205<br>(300)    |
| Sudan colours in spices and related products | 35<br>(4,000)                            | 48<br>(5,500)      | 50             | -              | 170<br>(600)      | 200             | 164<br>(240)    |
| Histamine in Fish                            | 30<br>(3,500)                            | 36<br>(4,140)      | 30             | -              | 71<br>(250)       | 65              | 55<br>(80)      |
| E.coli and Coliform count in Drinking water  | 20<br>(2,300)                            | 17<br>(1,900)      | 24             | -              | 28<br>(100)       | 40              | 27<br>(40)      |
| Vitamin A in Food                            | 35<br>(4,000)                            |                    |                | -              | 51<br>(180)       | 135             | 123<br>(180)    |
| Vitamin E in Food                            | 35<br>(4,000)<br>(both)<br>61<br>(7,000) |                    |                | -              | 51<br>(180)       | 200             | 164<br>(240)    |
|  |  | 53<br>(6,050)      | 60             |                |                   |                 |                 |



# ENSURING SUSTAINABILITY

| SUSTAINABILITY CRITERIA                       | SLSI | ITI | TTSC |
|---|------|-----|------|
| Skilled staff                                 | +    | +   | +    |
| Appropriate remuneration package              | -    | +   | -    |
| Promotional schemes to encourage performers   | -    | -   | -    |
| Performance based incentive scheme            | -    | +   | -    |
| Sustainable succession plan                   | -    | -   | -    |
| Quality concept leveraged across organization | -    | +   | -    |
| Laboratories operating as profit centres      | -    | +   | -    |
| Costing methods and pricing strategy          | -    | +   | -    |
| Laboratories able to meet changing demand     | -    | +   | -    |
| Strategic orientation towards clients needs   | -    | +   | -    |
| Scope of accreditation related to needs       | +    | +   | -    |
| Budget for annual renewal of accreditation    | +    | +   | +    |
| Budget for staff training for scope expansion | +    | -   | -    |



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# Food Safety Training - UNIDO Sri Lanka Model



Chartered Institute of Environmental Health

Accredited training center to provide food safety, environmental management and occupational safety qualifications. (Trainers, support materials, accreditation)

Partner with international certification body to provide certification and training services (Auditors, Pilot certification, accreditation support)



National GHP conformity mark with Colombo Municipal Council. (design of scheme, pilot scheme, training and capacity building, benchmarking)

Support in implementing GAP scheme for Cargills network of growers. (under design)



MOU with NCPC to jointly deliver CIEH qualifications in Environmental management. (Trainers, support materials, accreditation)



## The INDEXPO model

- **INDEXPO**: Private Sector driven **Certification** and **Training** body
  - Legally registered as **non-for-profit company** owned by the 2 chambers
  - Internationally recognized as **CIEH Accredited** Training center
- **Achievements**: Since January 2009, INDEXPO organised and delivered **40** different training programme of which **30** have been independent of any UNIDO support at all, the total fees generated by INDEXPO for the 40 programmes where **3,080,448.- LKR**
- **INDEXPO Partners**
  - Chartered Institute of Environmental Health (CIEH)
  - Colombo Municipal Council (CMC)
  - Kotte Municipal Council
  - Registrar of Standards (Holdings) Limited (ROS)
  - United Registrar of Systems (URS)
  - National Cleaner Production Centre (NCPC)
  - Scores on the Doors scheme (UK)
  - **Ministry of Health – Potential shareholder**
- **GHP scheme** Crowns for Food Hygiene (CfFH) in place





## Crowns For Food Hygiene

- Scheme design based on the highly-successful “**UK Scores on the Doors**” scheme
- Scheme Ownership: INDEXPO (Chambers)
- Status: voluntary scheme (possibility of mandatory – discussion with Sri Lanka Tourism Authority)
- Target group: all food handling establishments – private & public
- Scheme officially piloted: 17 food establishments participated in CMC area – Kotte Municipal council area will be the target region





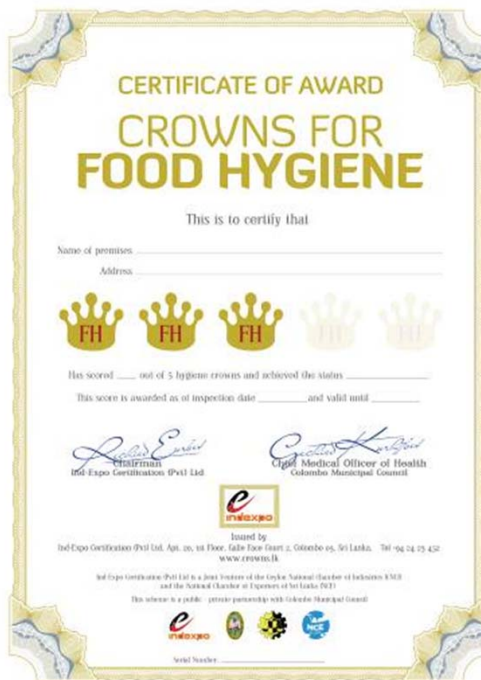
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# Crowns For Food Hygiene

Crowns Website: [www.crowns.lk](http://www.crowns.lk) officially launched by NORAD & Norway Embassy representatives

Crowns Certificate

INDEXPO website: <http://indexpocertification.lk>





# UNIDO Support to Laboratory Accreditation

| Action  | Regions    |
|---|------------|
| 1. Laboratory design/ modification            | VIETNAM    |
| 2. Provision of Equipment/ Reference material | SAARC      |
| 3. Training in house and Overseas             | MEKONG     |
| 4. Supporting quality manual development      | PAKISTAN   |
| 5. Supporting PT participation                | BANGLADESH |
| 6. International accreditation                | NEPAL      |
| 7. Business planning/marketing                | SRI LANKA  |



**No. Countries: 25**  
**Budget: EUR 10 mn**



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## UNIDO Support to Accreditation Bodies/ Arrangements

- Legal framework setting the body
- Training of Assessors
- Support to running PT schemes
- Joint accreditation with MRA holder
- Examples:
  - Vietnam BOA
  - PNAC- Pakistan
  - SLAB- Sri Lanka
  - BAB- Bangladesh
  - MNAS - Mongolia



BANGLADESH



NEPAL



PAKISTAN



VIETNAM



SRI  
LANKA





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# UNIDO's Assistance to Metrology

## Building National Measurement Capabilities



Asia Pacific Metrology Programme

Sri Lanka

Nepal

Maldives

Viet Nam

Pakistan

Bhutan

Lao PDR

Afghanistan

Cambodia

Bangladesh



### UNIDO and APMP-DEC PARTNERSHIP

- Regional Metrology Organisations Valuable
- RMO involvement – requirement for CIPM MRA
- Joint support to CIPM – MRA
- Joint Inter comparison/ PT schemes
- Joint Training activities



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# UNIDO TOOLS & PUBLICATIONS



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# LABNETWORK WEB PORTAL

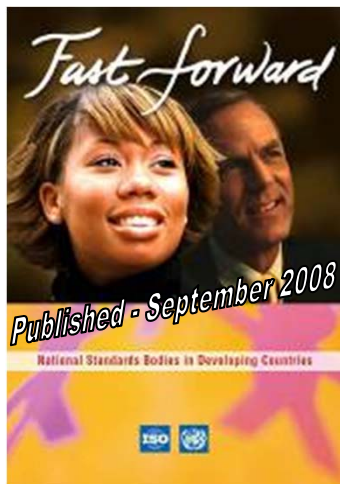
In Partnership With :



[www.labnetwork.org](http://www.labnetwork.org)

- **Laboratories** (environmental, metrology, testing, chemical, microbiology, textile, etc.)
- **Professional laboratory staff** in developing countries
- **Exporters** from developing countries
- **Industry**, in particular **small and medium-sized enterprises**, seeking metrology and calibration laboratories in developing countries
- **Emerging accreditation/certification bodies**
- Laboratories with the potential to obtain accreditation
- **Academia and researchers**

Translated to Arabic and Spanish in progress.



**Fast Forward - National Standards Bodies in Developing Countries**

**Contents:**

- Metrology, standardization and conformity assessment
- The WTO and its influence on standardization
- International, regional and national standards bodies
- Activities and structure of an NSB
- Standards development



**FUNDED BY UNIDO**



**Building trust – The Conformity Assessment Toolbox**

**Contents:**

- Basic concepts of conformity assessment
- Conformity assessment techniques
- Conformity assessment schemes and systems
- Conformity assessment bodies
- How UNIDO can help with setting up a quality infrastructure
- Case studies

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**Translated into Spanish (by COPANT)**



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

www.unido.org



# Trade Standards Compliance Report 2010

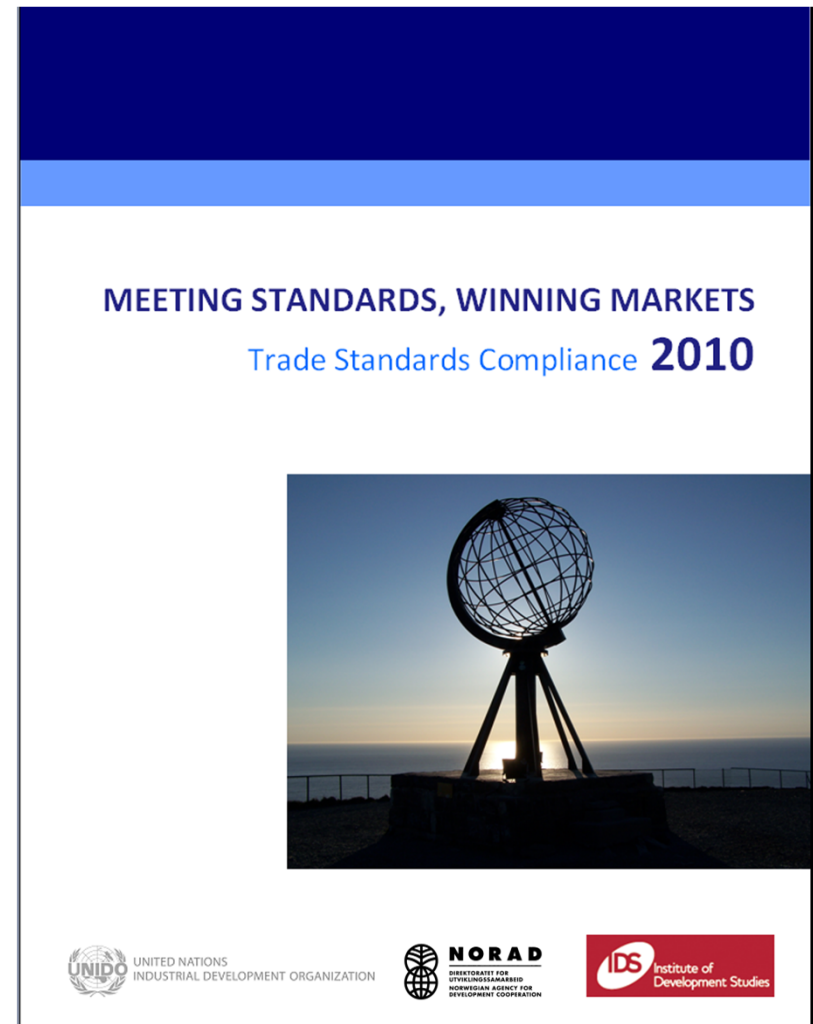
## Project Objective:

- Design and establish an innovative annual publication on compliance challenges

- Advocating TCB related technical assistance

## Publication date:

December 2010



Funded by NORAD



# TRADE STANDARDS COMPLIANCE REPORT

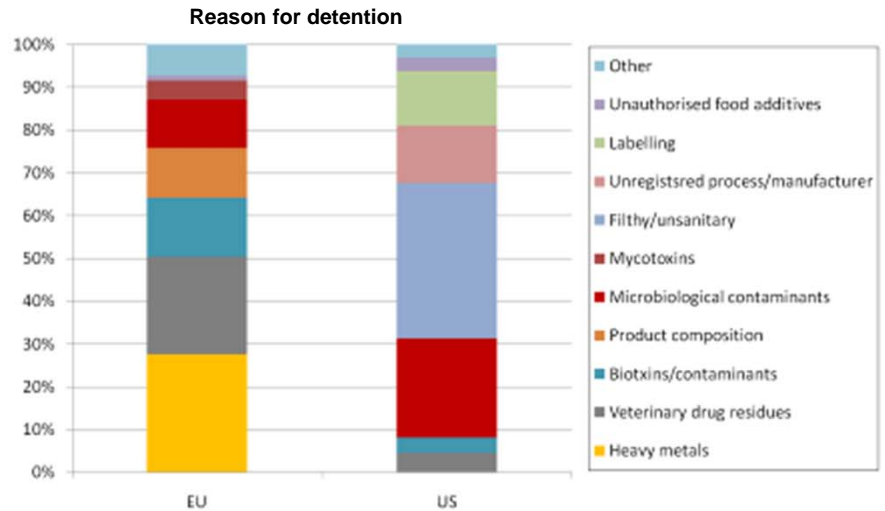
## Overview of contents

| <b>Chapter</b>   | <b>Content</b>   |
|--|--|
| <b>Rationale</b>   |  |
| <b>I – Perspectives and emerging priorities on compliance issues</b>                             | <b>Contributions from WTO, UNEP, FAO, ISO, ILO</b>   |
| <b>II – What do border rejections tell us about compliance capacity?</b>                         | <b>Analysis of border rejection data (US-FDA and EU-RASFF data)</b>  |
| <b>III – Big or small money – how significant are border rejections for developing countries</b> | <b>Quantification of export losses</b>   |
| <b>IV – Can developing countries detect non-compliance?</b>                                      | <ul style="list-style-type: none"><li>• <b>Standards Compliance Capacity Index</b></li><li>• <b>FVO Inspection Report analysis</b></li></ul> |
| <b>V – How can technical assistance stimulate the integration into global value chains?</b>      | <ul style="list-style-type: none"><li>• <b>Value chain analysis</b></li><li>• <b>Case study</b></li></ul>                                    |
| <b>VI – Towards measuring the impact of Trade Capacity-Building</b>                              | <b>Case study</b>  |
| <b>Synthesis</b>   | <b>Cost/Benefit Model – Outline</b>  |



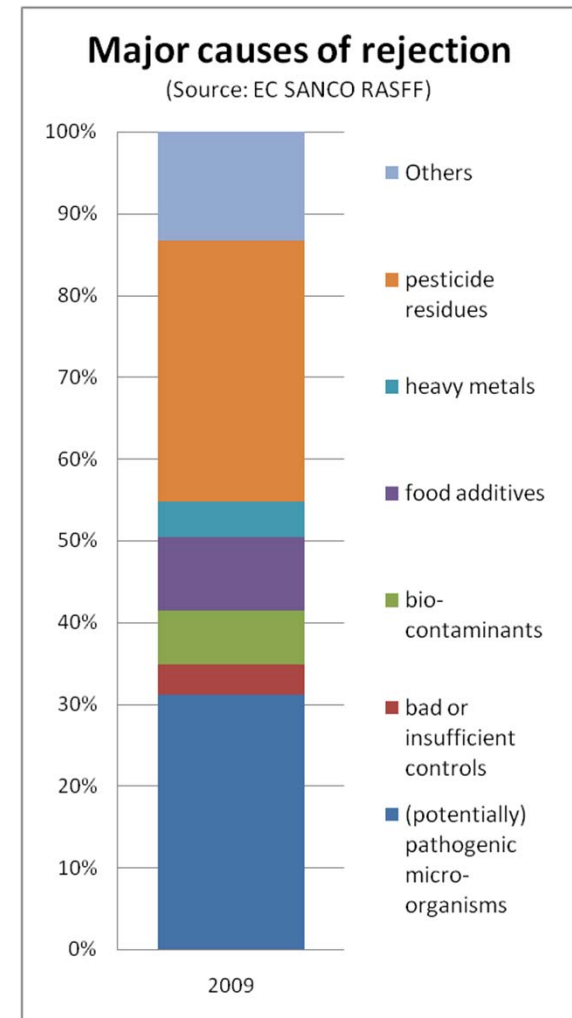
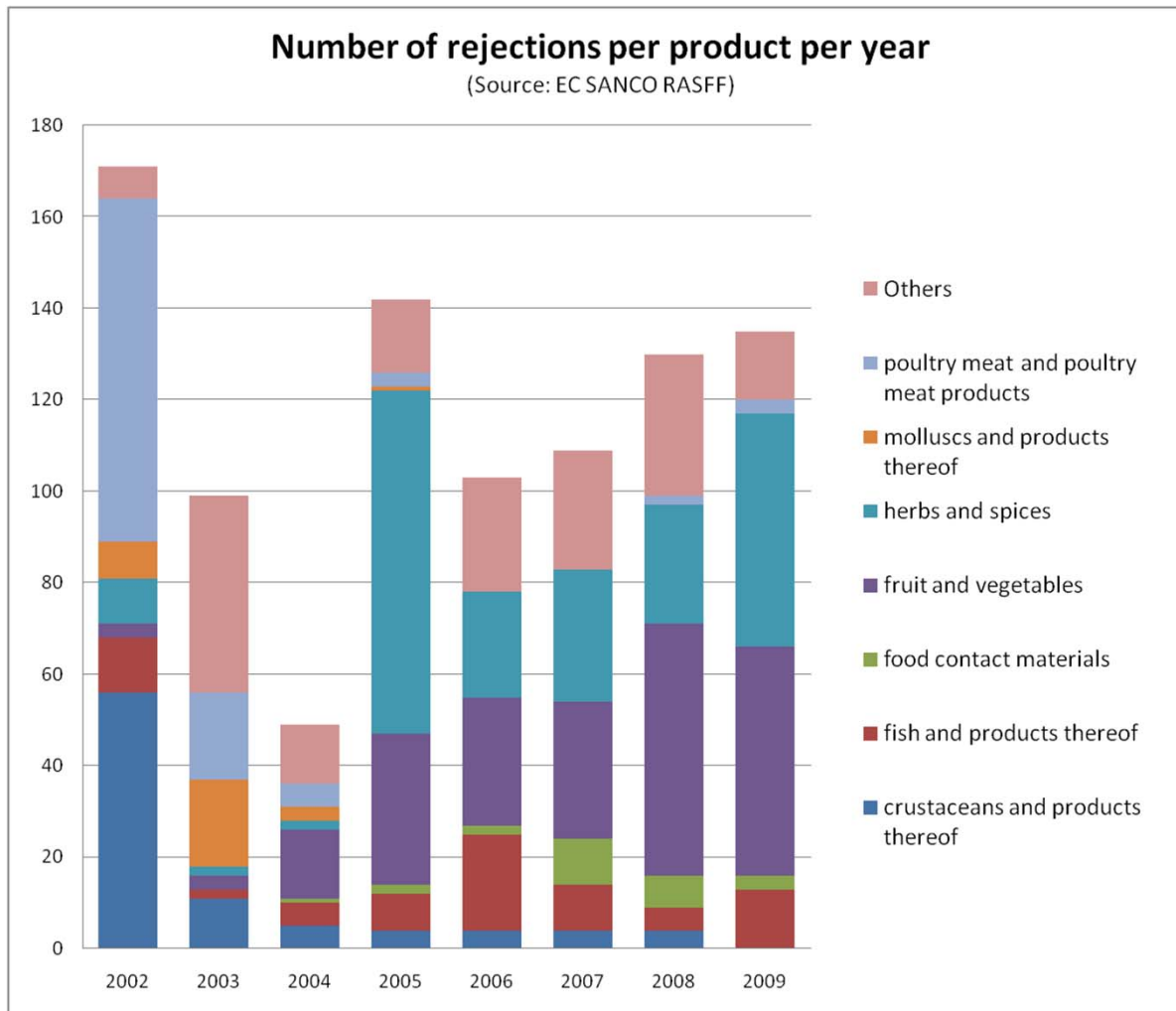
# Detention Analysis- US-FDA; EU-RAFFS

## Example: Country Analysis Indonesia





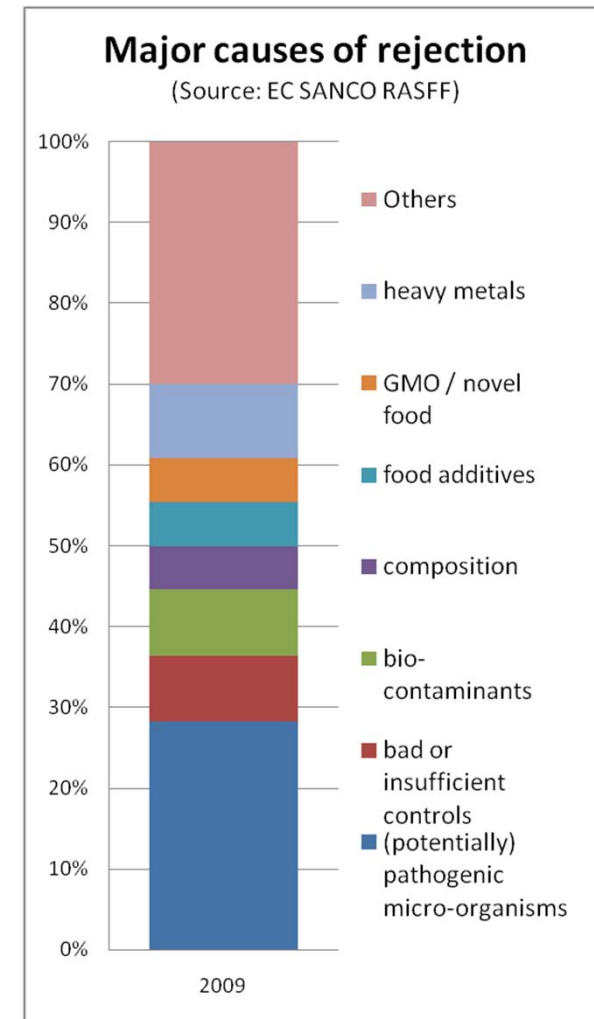
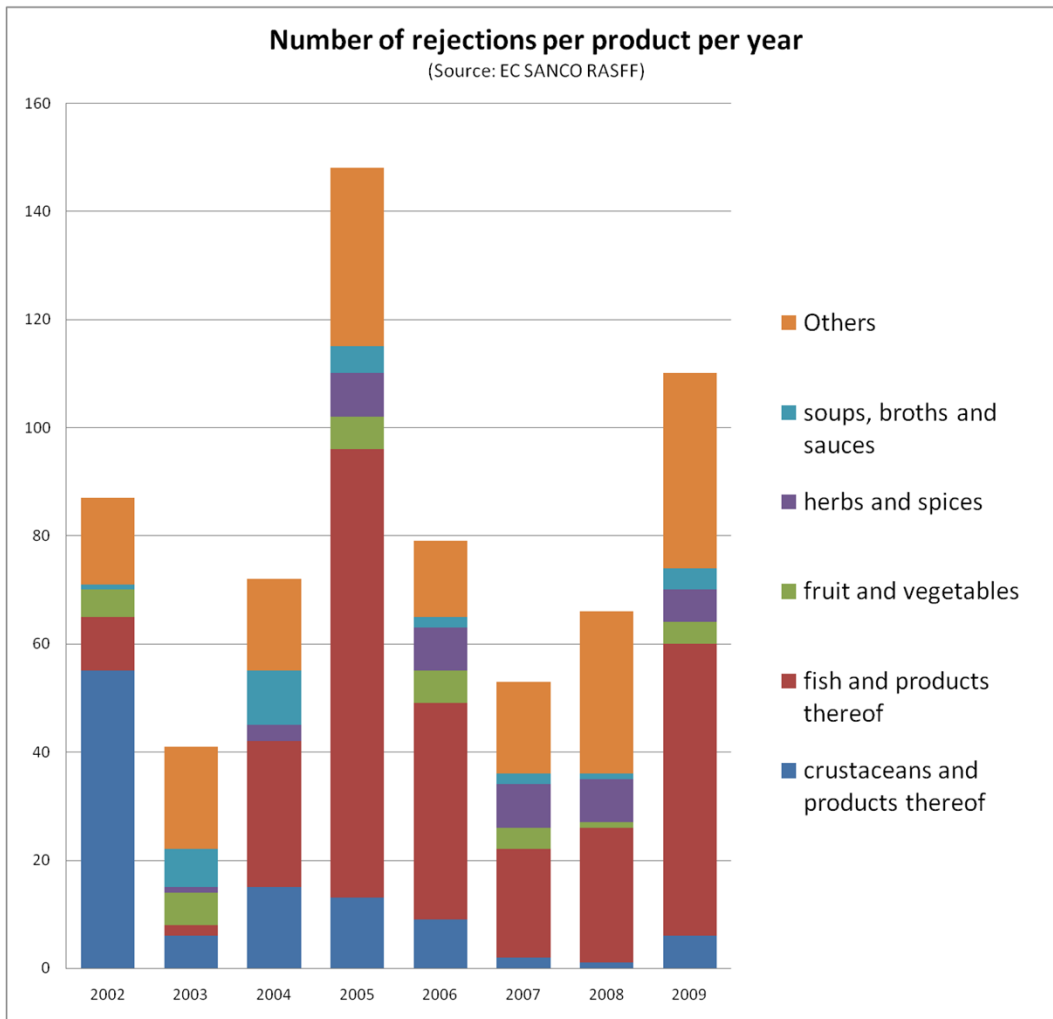
# RAFFS Detention Analysis - Thailand





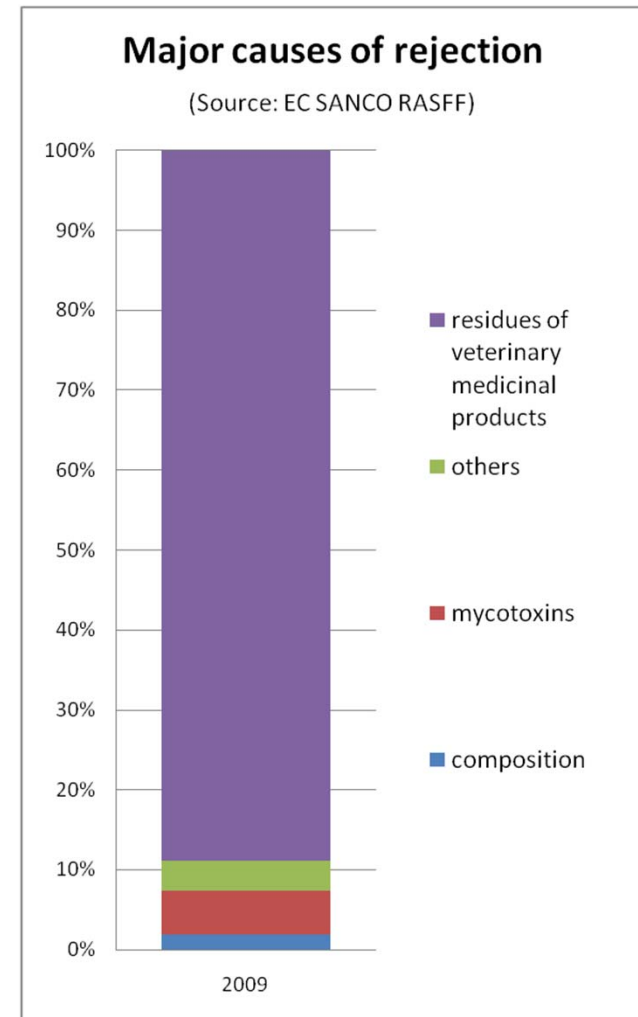
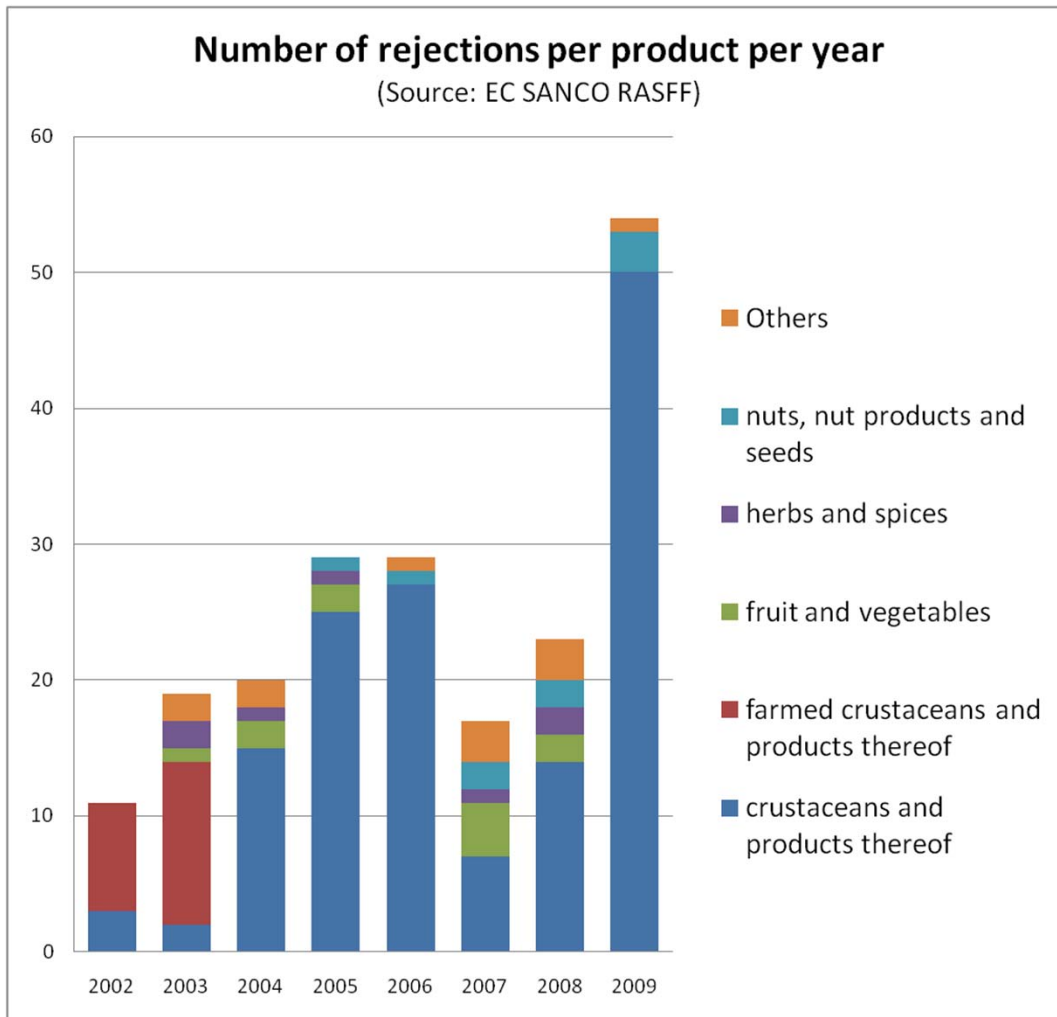


# RAFFS Detention Analysis - Vietnam





# RAFFS Detention Analysis - Bangladesh





# Standards Compliance Capacity Index - Overview

## Country coverage:

28 countries  
ECOWAS and ASEAN  
plus reference countries

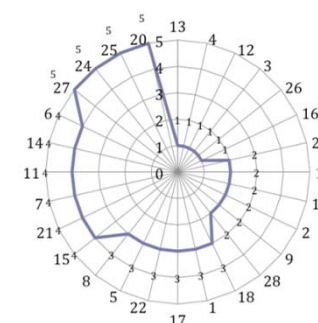
## Next edition:

- Expansion of country coverage
- Expansion of variables
  - along the value chain
  - creation of a Trade Performance Index

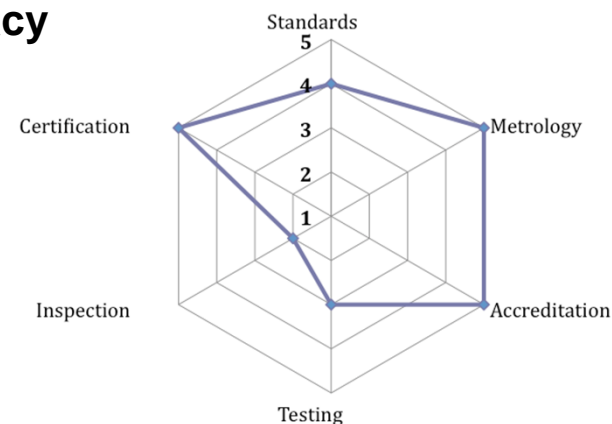
## Variables in 8 domains:

- Standards
- Metrology
- Accreditation
- Testing
- Inspection
- Certification
- Private Standards
- Compliance Diplomacy

Array of compliance capacity, standard-setting



Array of compliance capacity in country 15





## **Conclusion**

- **Agro-food sector significant growth potential**
  - Opportunities for poverty reduction
- **Globalisation of Value Chains- a challenge**
- **Increasing global food scares**
  - Need for Surveillance & Confidence
- **Laboratories- Key to Food Safety**
  - Accreditation & Sustainability– A requirement
- **UNIDO- partner for Capacity Building**