

# Chain food information management for trade facilitation

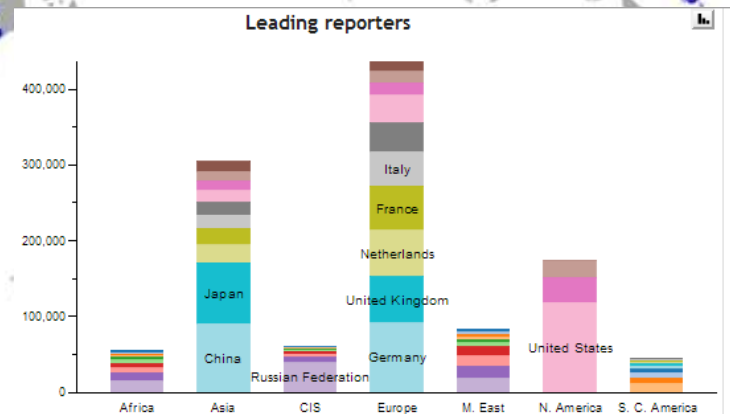
- Paperless food information management for trade facilitation
  - Introduction and scope
  - Types of paperless food information systems from a functional point of view
  - Types of paperless food information from a regulatory point of view
  - Types of paperless food information from a technical point of view
- Food safety, sustainability and trade: benefits of paperless food information management
  - Guaranteeing food security and safety
  - Increasing sustainability
  - Efficient Trade
- Developing Paperless Systems for Agro-trade Facilitation
  - Stakeholders and their role in the development process
  - The role of laws and regulations
  - Enabling efficient data gathering
  - Milestones towards large scale paperless food information system implementation
- Relevant international standards for paperless food information systems
  - Identification systems used world-wide for paperless food information systems
  - Data carrier standards
  - Data harmonisation standards
  - International data exchange standards and their penetration

- Practical Recommendations for Implementation of Agro-paperless Systems
  - Prioritizing adoption of paperless systems for agro-trade
  - Addressing legal implications for establishing paperless systems
  - Mobilizing Resources
  - Considerations for smallholders
  - Stakeholder motivation and coordination
  - Sustainability of the systems
  - Others
- Some examples of the implementation of paperless food information systems
  - Food safety: M-FIT
  - Sustainability: RSPO – trading of sustainable palm oil (Global)
  - Customs: eSPS systems
- Summary



# **Introduction and scope**

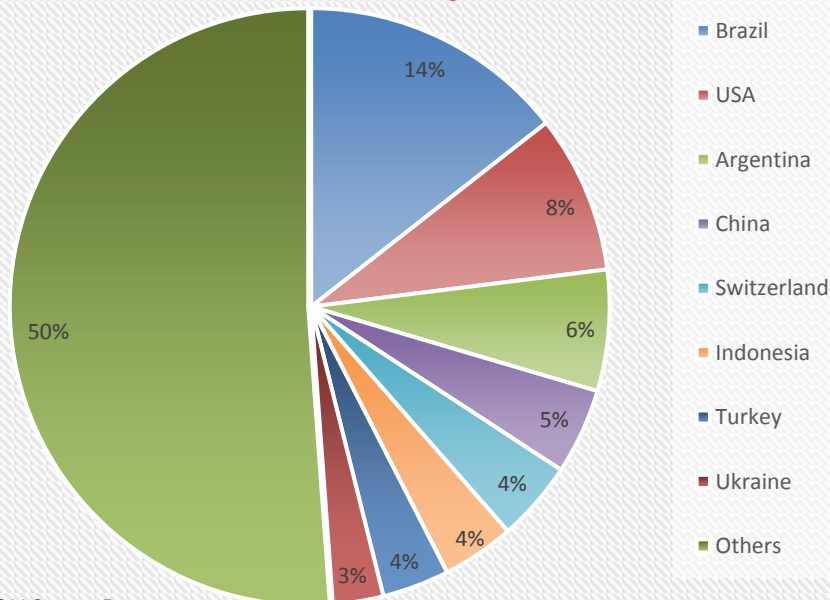
Src: Global Imports of Food, WTO



## One example: the European Union

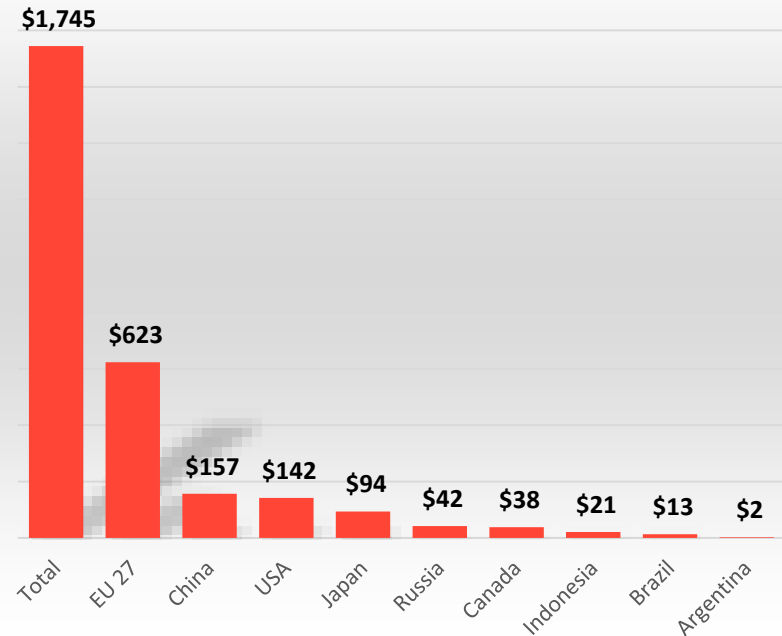
- The world's largest importer and exporter is the European Union
  - 36% of global imports
  - 38% of global exports

Source of EU food imports in %



2011 Source: Eurostat

Global food imports in billion USD



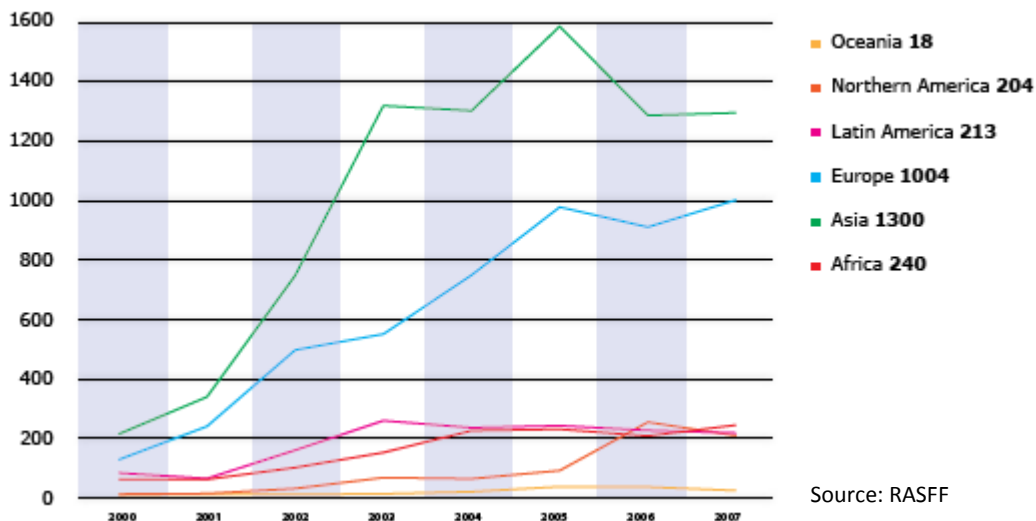
- The source is... the world



## The source of incidences

- Food is a sensitive commodity
  - directly related to human health
  - spoils quickly
- As a result, countries monitor food trade closely and reject what is not fit to eat
- The source of reported incidences in Europe is again... the world!

Notifications by world regions 2000 - 2007



Source: RASFF

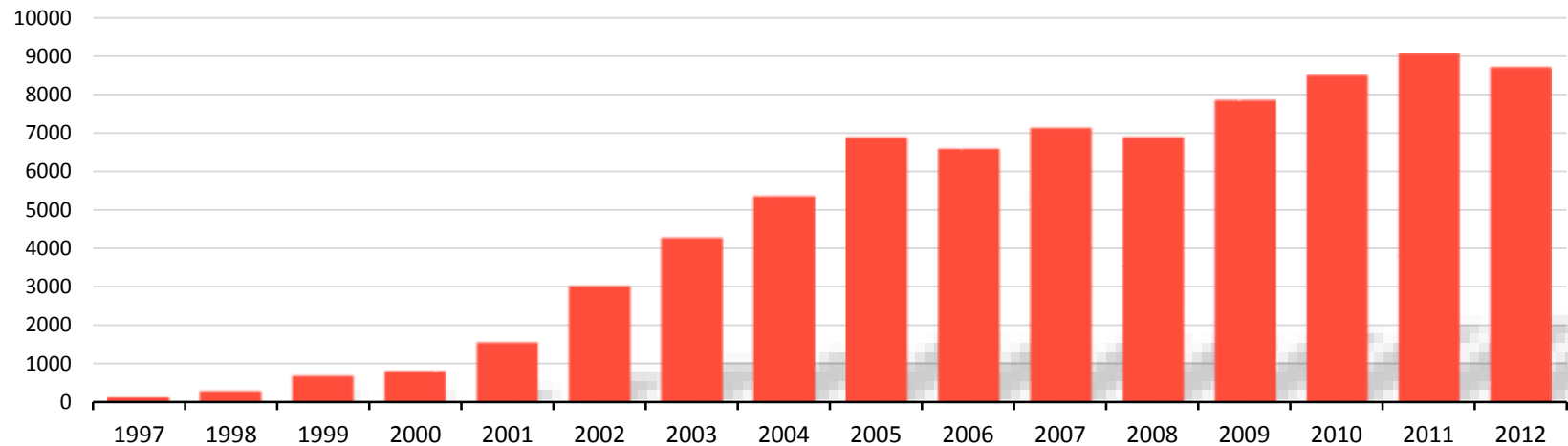
Notifications by country of origin of the product

COUNTRY	Number	COUNTRY	Number	COUNTRY	Number	COUNTRY	Number
CHINA	352 ↑	BANGLADESH	15 ↓	GAMBIA	4 ↑	GREENLAND	1 ↑
TURKEY	293 ↑	SENEGAL	15 ↑	F.Y.R.O.F MACEDONIA	4 ↓	GUINEA	1 =
THE UNITED STATES	191 ↓	RUSSIAN FEDERATION	15 ↓	MEXICO	4 ↓	HAITI	1 ↓
SPAIN	177 ↑	AUSTRALIA	14 ↓	SAUDI ARABIA	4 ↑	ICELAND	1 ↓
IRAN	133 ↓	LATVIA	14 ↓	SEYCHELLES	4 ↓	JORDAN	1 ↓
GERMANY	122 ↑	THE PHILIPPINES	13 ↓	GEORGIA	3 ↓	MACAO	1 ↓
INDIA	113 ↑	CANADA	12 ↓	KENYA	3 ↓	MONACO	1 ↓
FRANCE	109 ↓	CYPRUS	12 ↑	REPUBLIC OF KOREA	3 ↓	SAN MARINO	1 ↓
THAILAND	92 ↑	IRELAND	11 ↓	MALTA	3 ↑	YEMEN	1 ↓
POLAND	77 ↑	PANAMA	11 ↑	MAURITIUS	3 ↑	ZIMBABWE	1 =
ITALY	75 ↓	AUSTRIA	10 ↓	REPUBLIC OF MOLDOVA	3 ↓		
BRAZIL	58 ↓	IVORY COAST	10 ↓	MOZAMBIQUE	3 ↑		
THE NETHERLANDS	52 ↑	NICARAGUA	10 ↓	ROMANIA	3 ↓		
UNITED KINGDOM	52 ↓	PORTUGAL	10 ↓	SLOVENIA	3 ↓	AZERBAIJAN	
CHINA (HONG KONG)	50 ↑	SINGAPORE	10 ↑	ALGERIA	2 ↑	AFGHANISTAN	
NIGERIA	49 ↑	SWEDEN	10 ↑	BOLIVIA	2 ↑	BENIN	
ARGENTINA	48 ↓	SWITZERLAND	10 ↑	CAMBODIA	2 ↓	CAMBODIA	
VIETNAM	45 ↓	SYRIA	10 ↓	ETHIOPIA	2 =	COMOROS	
BELGIUM	40 ↑	JAPAN	9 ↑	FIJI	2 ↓	CONGO	
UKRAINE	40 ↑	SOUTH AFRICA	8 ↑	GABON	2 ↓	EL SALVADOR	
EGYPT	35 ↑	ECUADOR	7 ↓	JAMAICA	2 ↓	ERITREA	
DENMARK	34 ↑	NAHIBIA	7 ↑	MALAWI	2 ↓	GRENADA	
GREECE	32 ↑	ANGOLA	6 ↑	MYANMAR	2 ↑	HONDURAS	
CZECH REPUBLIC	31 ↓	BULGARIA	6 ↓	NEW ZEALAND	2 ↓	KOSOVO (UNSCR1244)	
GHANA	31 ↓	COLOMBIA	6 ↓	OMAN	2 ↓	KUWAIT	
PAKISTAN	27 ↑	COSTA RICA	6 ↑	PARAGUAY	2 ↓	LUXEMBOURG	
INDONESIA	26 ↓	LITHUANIA	6 ↓	SIERRA LEONE	2 =	MADAGASCAR	
SRI LANKA	24 ↑	SURINAME	6 ↑	SUDAN	2 ↓	THE MALDIVES	
UNKNOWN ORIGIN	23 ↑	URUGUAY	6 ↑	UGANDA	2 ↑	HONGKONG	
MALAYSIA	22 ↑	CROATIA	5 ↓	UZBEKISTAN	2 ↓	REUNION	
MOROCCO	22 ↓	ISRAEL	5 ↓	ALBANIA	1 =	SERBIA AND MONTENEGRO	
PERU	21 ↑	KAZAKHSTAN	5 ↑	ARMENIA	1 ↓	TOGO	
LEBANON	19 ↑	NORWAY	5 ↓	BOSNIA AND HERZEGOVINA	1 =	TONGA	
CHILE	18 ↑	SERBIA	5 ↑	CAPE VERDE	1 ↓	UNITED ARAB EMIRATES	
SLOVAKIA	17 ↑	TAIWAN	5 =	CUBA	1 =	VENEZUELA	
HUNGARY	16 ↑	TANZANIA	5 ↑	ESTONIA	1 ↓	YEMEN	
TUNISIA	16 ↑	DOMINICAN REPUBLIC	4 =	FINLAND	1 ↓	ZAMBIA	

## Has food safety improved over time?

### Total RASFF alerts 2004-2010

Source: RASFF



### Nagging questions:

- Has the General Food Law improved food safety?
- Has increased traceability resulted in safer food?
- Do consumers feel safe and capable of making well-informed decisions?

If not, why not?

(c) SYNTESA PARTNERS AND ASSOCIATES.

Number of cases and incidence rates of various foodborne and waterborne diseases, 2005 (1) Source: EUROSTAT

	EU-25		Member States	
	Confirmed cases (units)	Incidence rate (per 100 000 inhab.)	Highest incidence rate	Incidence rate (per 100 000 inhab.)
Botulism	147	0.0	LT	0.2
Brucellosis	1 428	0.3	PT	1.4
Campylobacteriosis	197 802	45.0	CZ	296.2
Cholera (Z)	34	0.0	BE	0.1
Cryptosporidiosis	7 960	2.8	IE	13.8
Echinococcosis	336	0.1	LT	0.4
Giardiasis	14 637	5.2	EE	24.3
Listeriosis	1 476	0.3	DK	0.9
Salmonellosis	180 303	39.1	CZ	322.2
Shigellosis	7 255	1.8	LT	13.4
Trichinellosis	153	0.0	LV	2.1
Tularaemia	489	0.1	SE	2.7
Variant Creutzfeldt-Jakob disease (vCJD)	14	0.0	SI	0.2
Verocytotoxinogenic Escherichia coli (VTEC)	5 199	1.2	CZ	16.7
Yersiniosis (non-pestis)	9 535	2.3	LT	14.6



## Paper-based systems

- Easy to implement
- Time resilient
- Not scalable; limited by capacity of personnel and physical transportation
- Cannot be re-used
- Usually not accessible; filed in physical location
- **Information chains impossible to construct**
- *Library of Congress*

## Paperless systems

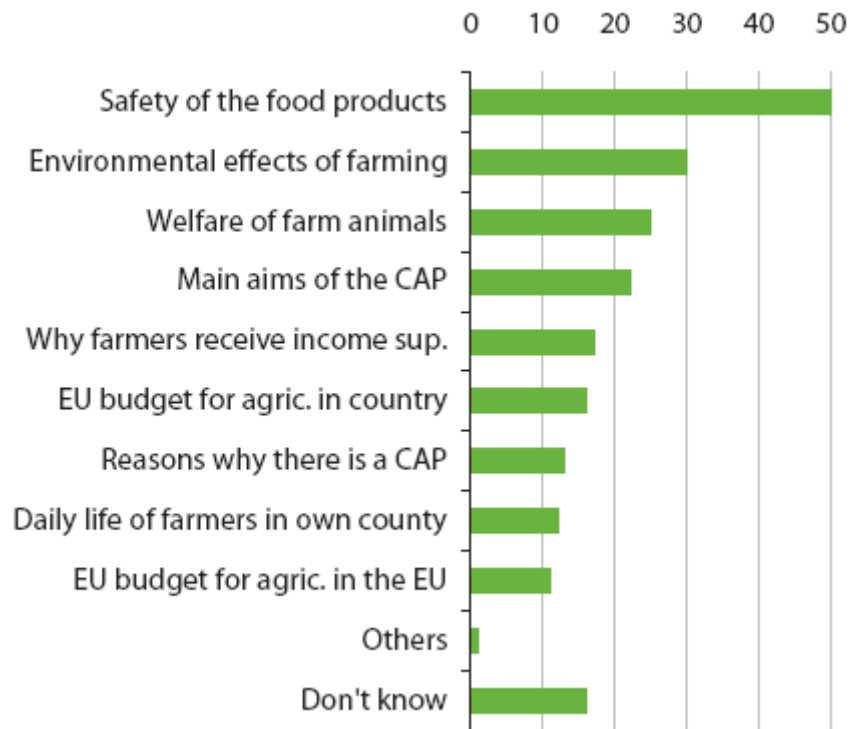
- Require technical capacity
- Subject to data format compatibility issues
- More scalable; can be (semi)automated
- Easy to copy and exchange; no transportation time
- Easily accessible
- **An information chain can be established**
- *Google*

## World-wide information needs for traded food

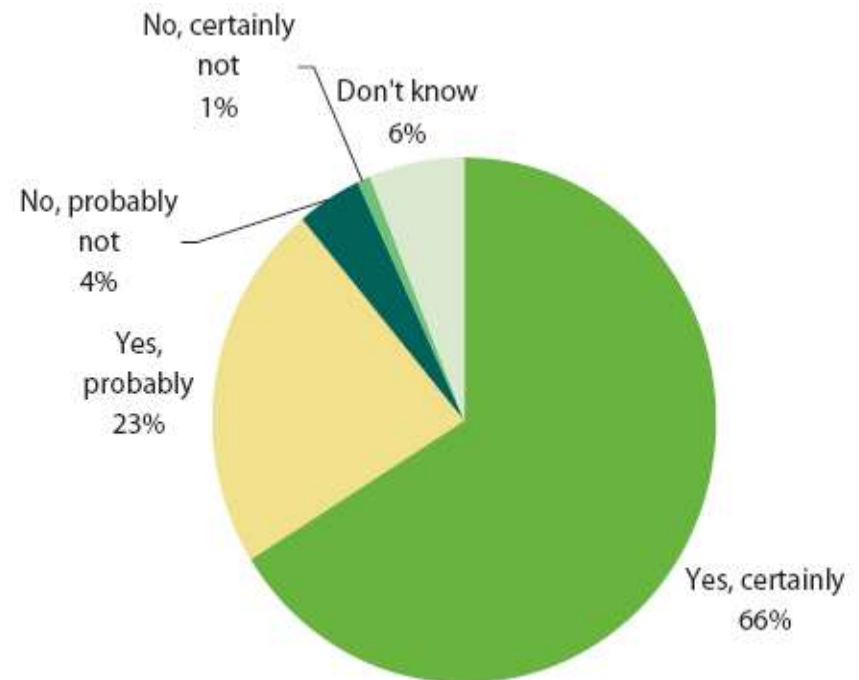
- Sanitary and phyto-sanitary information (SPS)
  - Internal hygiene, food safety and related export procedures
  - Disease control
- Food nature and history
  - Origin (linked to compliance, consumer health and choice, food safety)
  - Certification and Practices (e.g. Halal, fair trade, labour conditions etc)
  - Consumer information, in particular related to correct labelling
- Control of illegal activities
  - Import/export bans
  - Lack of trade permits
  - (Caught fish) Illegal, unreported and unregulated fishing (IUU)
- Customs
  - Trade information
  - Avoidance of illegal activities
  - Exporter blacklists
- Statistics
  - Continuous improvement
  - Mass balance
  - Avoidance of illegal activities
- Sustainability
  - Calculation of environmental, economic and social impact along supply chains
- Food security
  - Production prediction models based on history information

### Consumers (in the EU)

- 50% want more info on food safety
- 90% believe that food from outside should be subjected to the same rules
- (Environmental) sustainability is becoming ever more important
  - See e.g. [Cadbury's forced retreat](#) when announcing the use of palm oil



Agricultural topics on which the public would like more information, EU-25, 2006 (%)  
Source: EUROSTAT



Do you believe that imported foods from outside the European Union should respect the same conditions of animal welfare/protection as those applied in the European Union, EU-25, 2006 (%) Source: EUROSTAT

- To establish information chains, *chain food information management* is necessary
- ***Chain Food Information Management***
    - *refers to the distributed collection, storage and usage of information items, connected by traceability, that can be accessed via electronic systems*
- Simple steps:
    - Collect data as a food item moves through the chain
    - Make sure all processes connect inputs to outputs, i.e. are traceable
    - Transport or calculate relevant indicators and make them available to stages in the chain that are n-times removed

- National single window systems and ePermit systems

Customs management



- Food safety oriented systems
- Animal and carcass tracking

e-traceability systems



- Fair trade
- Religious
- No child labour

Ethical compliance



- Sustainability tracking
- Compliance to specific food standards

Standard compliance



- IUU fishing
- Export/import licenses
- Shipment registration

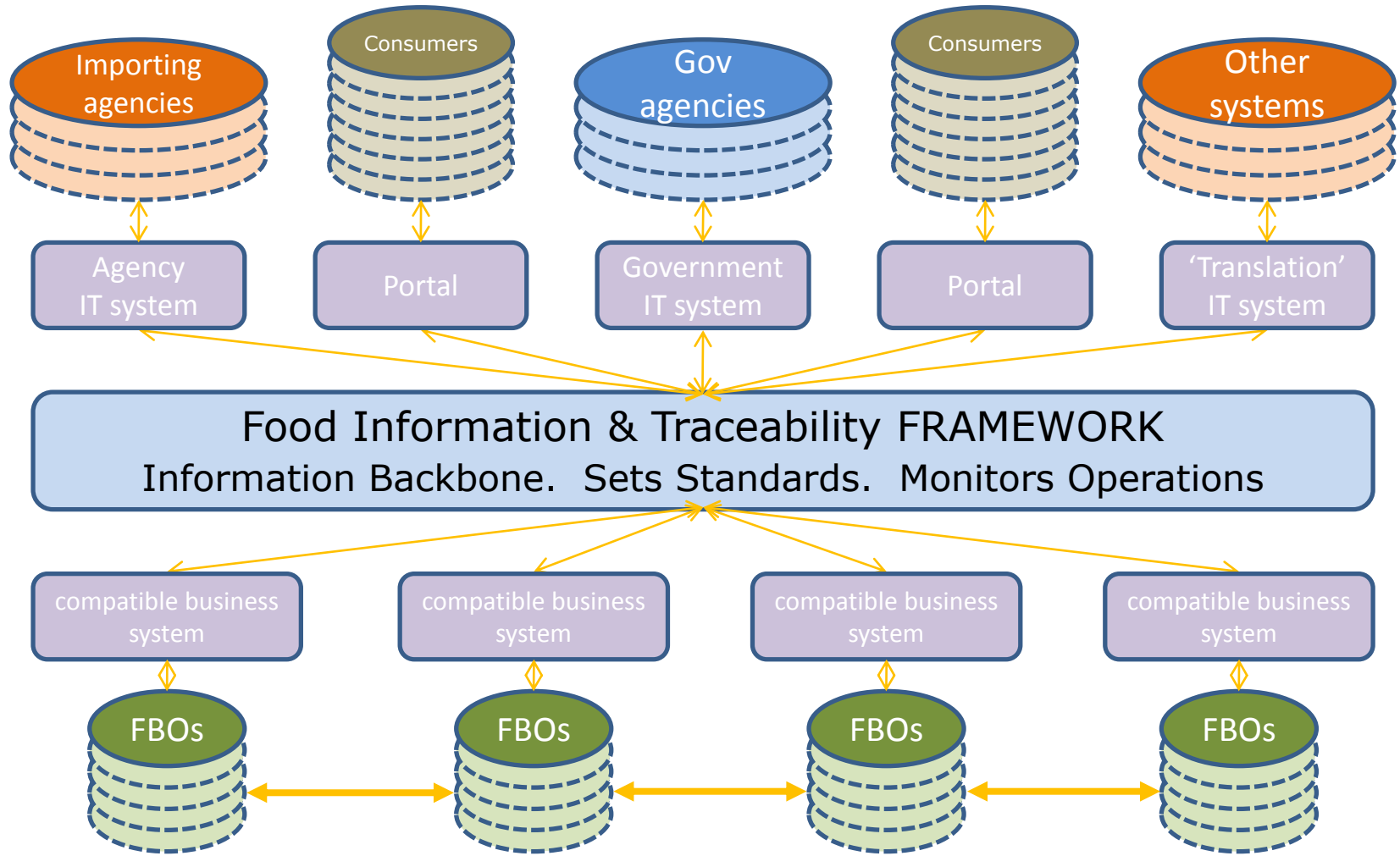
Legal compliance



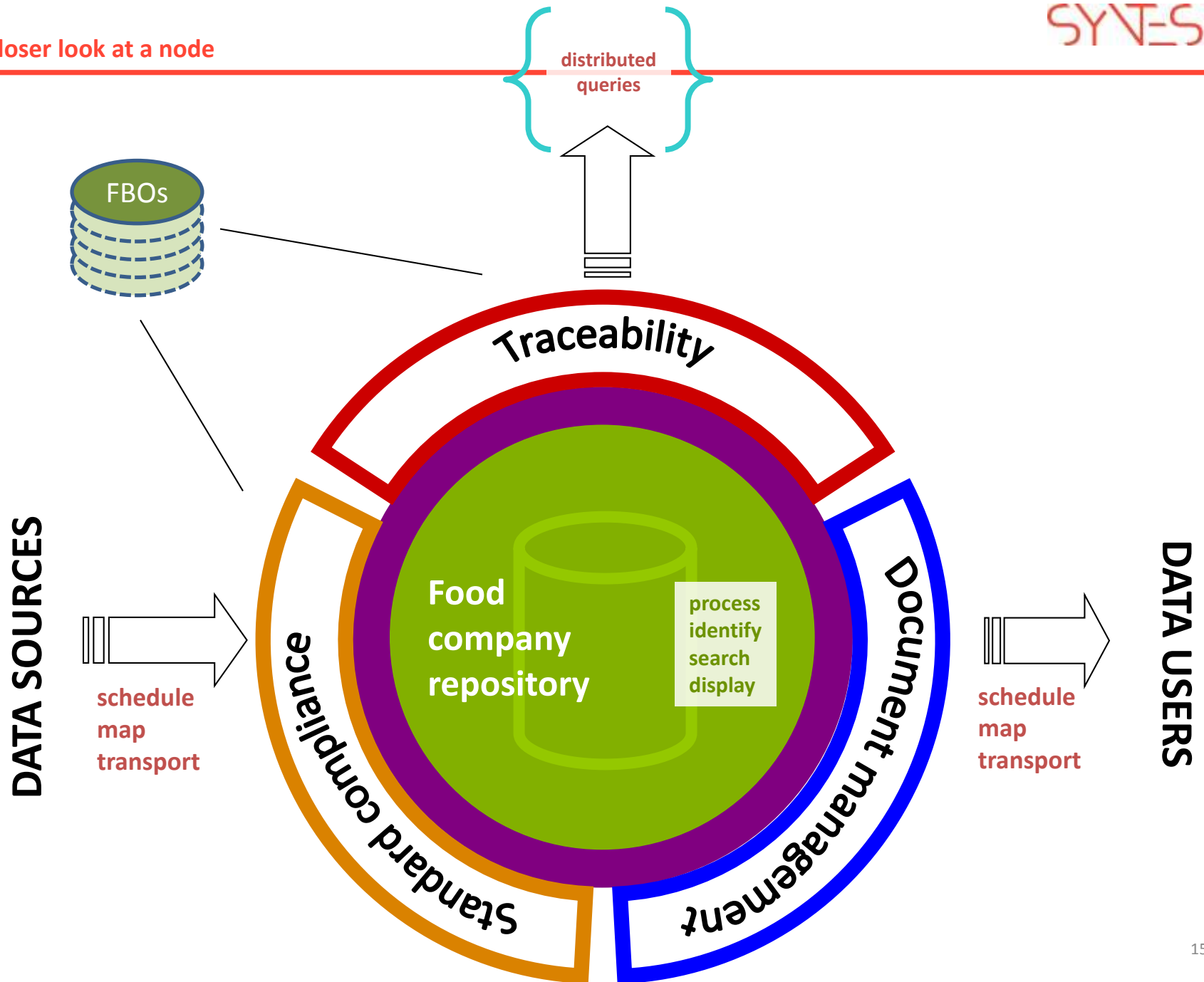
- Transparency systems

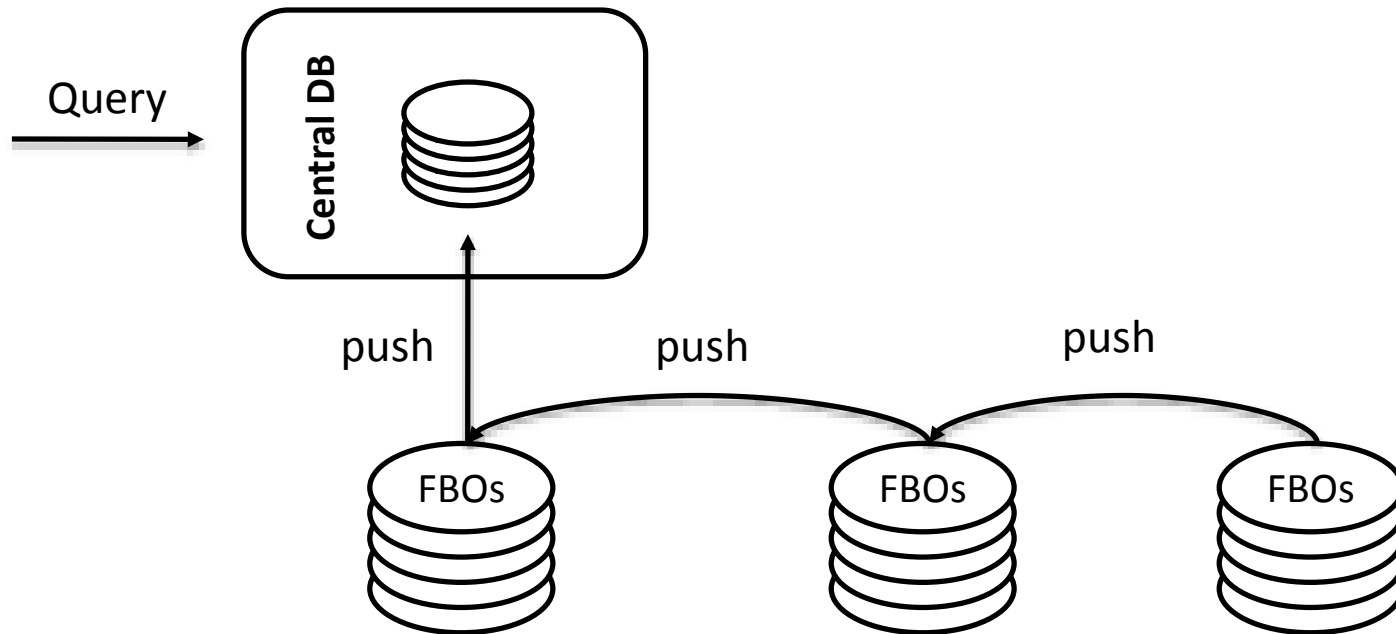
Marketing-oriented systems



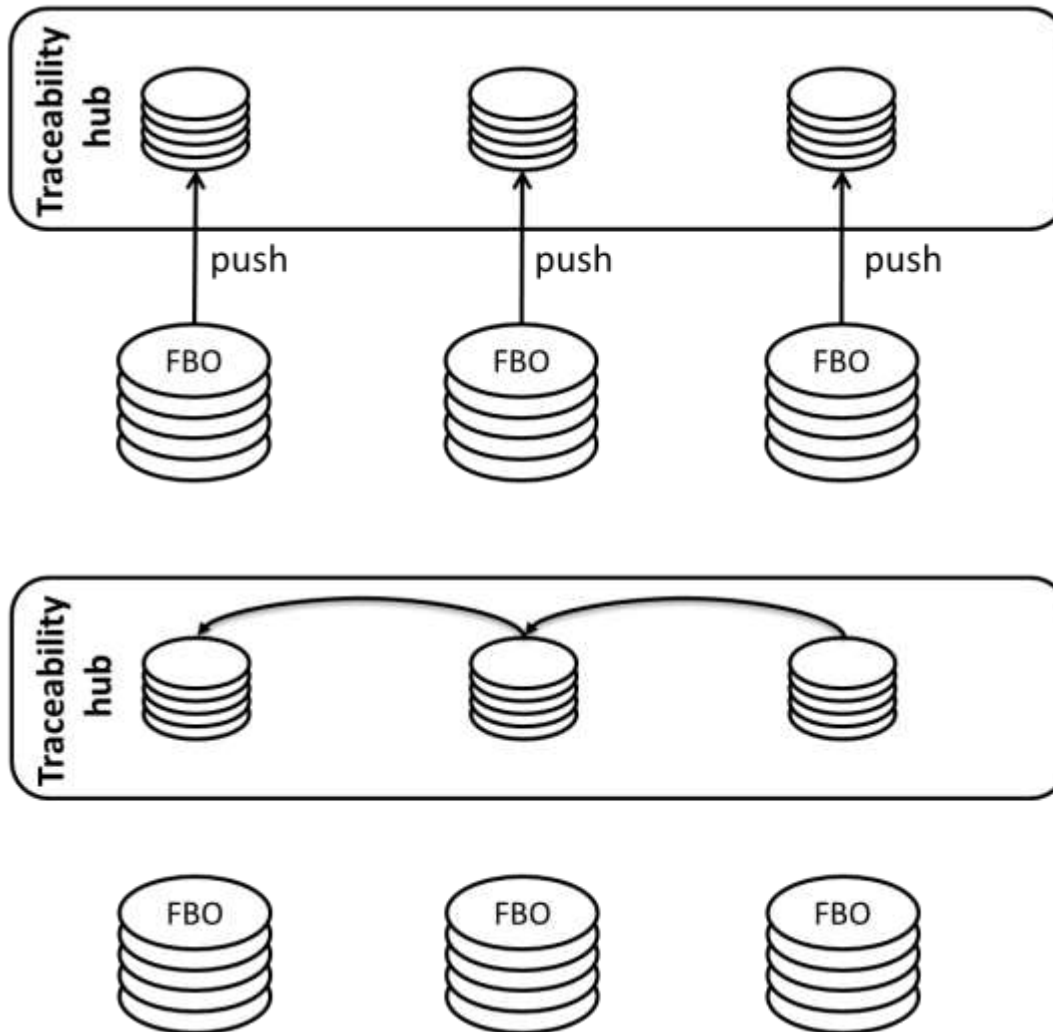






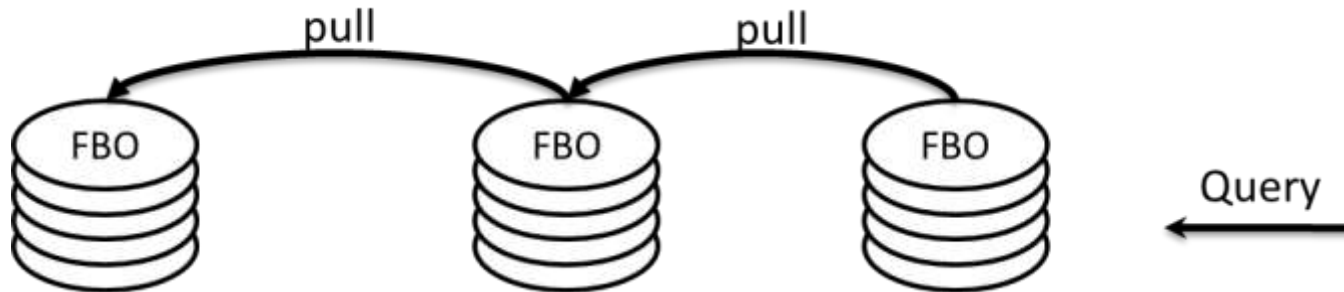


- Data is submitted to a central database
- FBOs deliver data on behalf of their own supply chain
- Advantages
  - Simple to implement

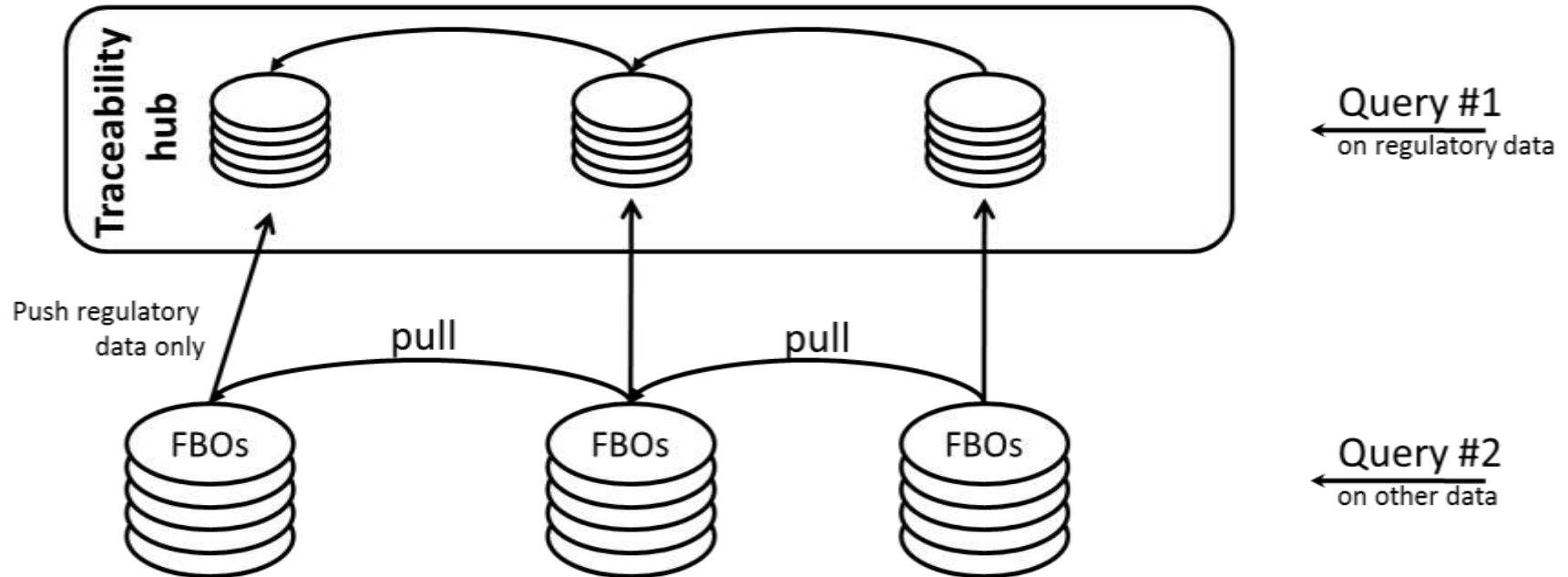


- FBOs submit a well-defined data set to a “hub”
- The data set is designed in a way that allows connection with other data sets
- (In some systems, the data set is replaced by data pointers)
- Queries are executed solely on the hub level

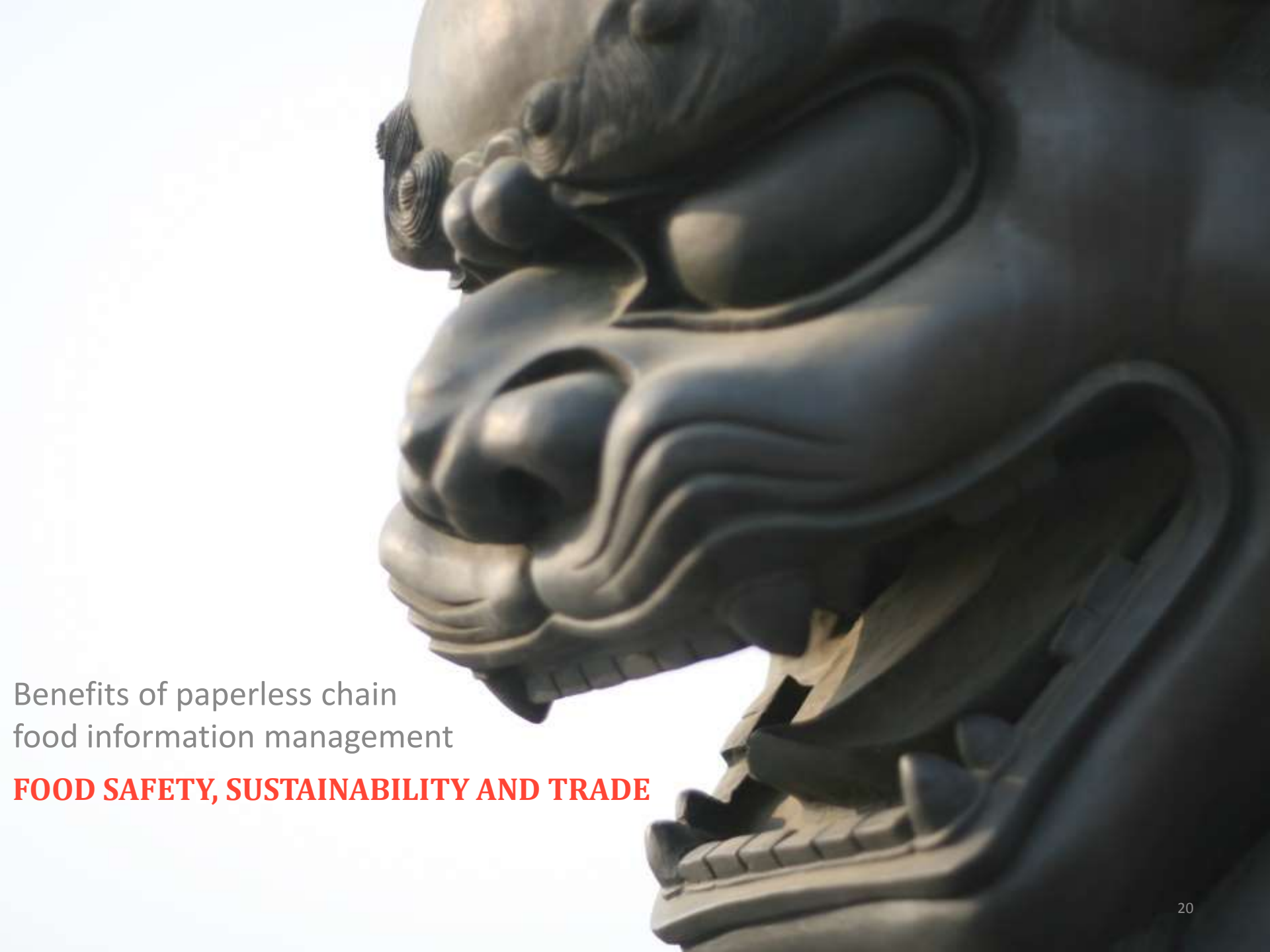
- Advantages
  - Robust and fast, if chain partners can be convinced



- FBOs store and manage their own data without pushing it towards a centralized system
- Queries are resolved in hopping from one FBO to another following the queries trace.
  - “One up-one down” systems.
- Typically, this is accompanied by some form of search service to obtain the initial entry point for a query.
- Advantages:
  - Scalability
  - Increased control over data access
- If a commonly accepted standard for electronic exchange of information existed, this could be a good, if fragile model.



- FBOs submit a well-defined, minimal data set to a hub. Other data remains on-site, but connected through well-defined interfaces
- Specific queries, e.g. related to regulations, can be executed within the hub
- Other queries, e.g. in case of a food crisis, can be executed through the network
- Advantages
  - Probably the best realistic implementation model
  - Based on the Public-Private Partnership thinking model

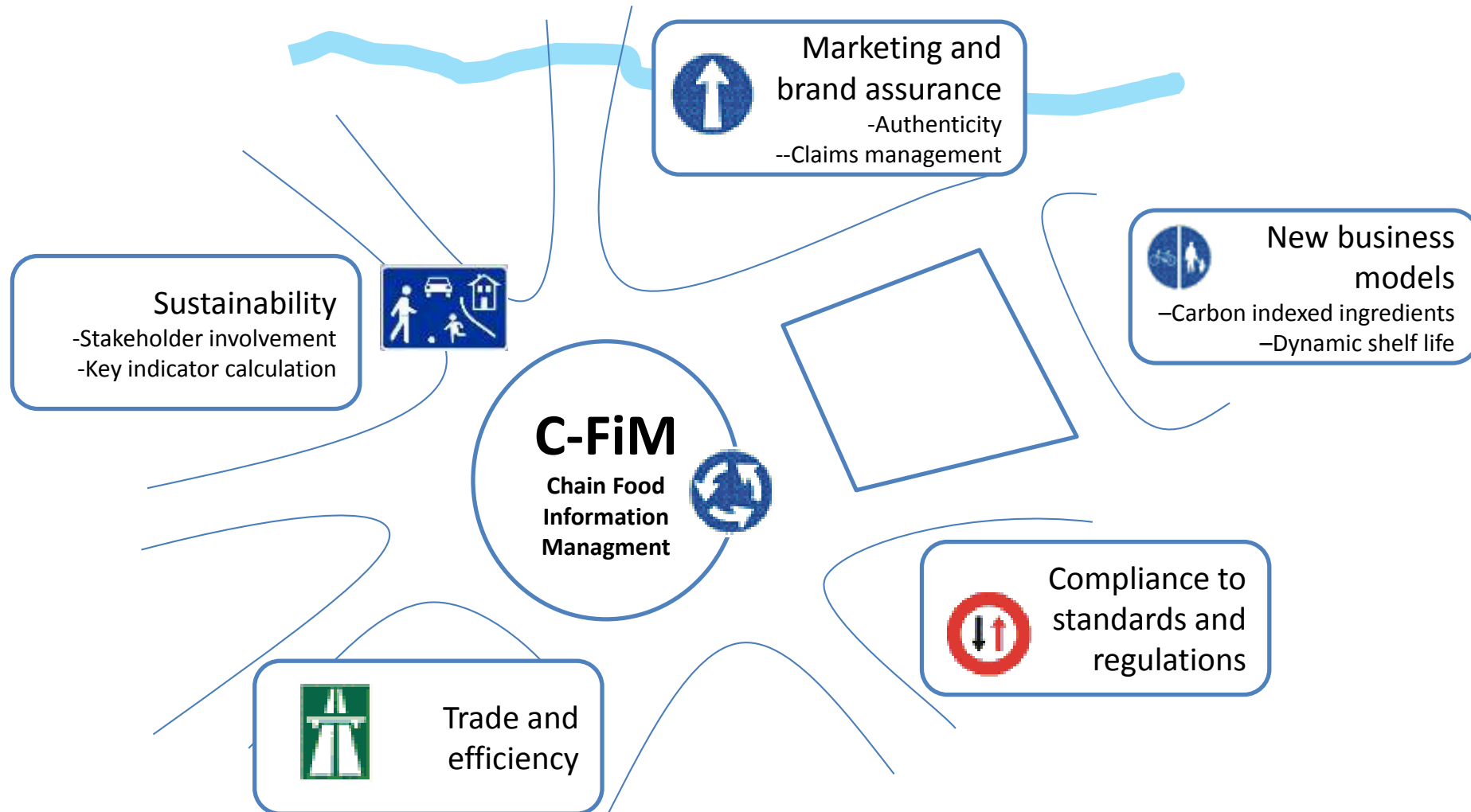


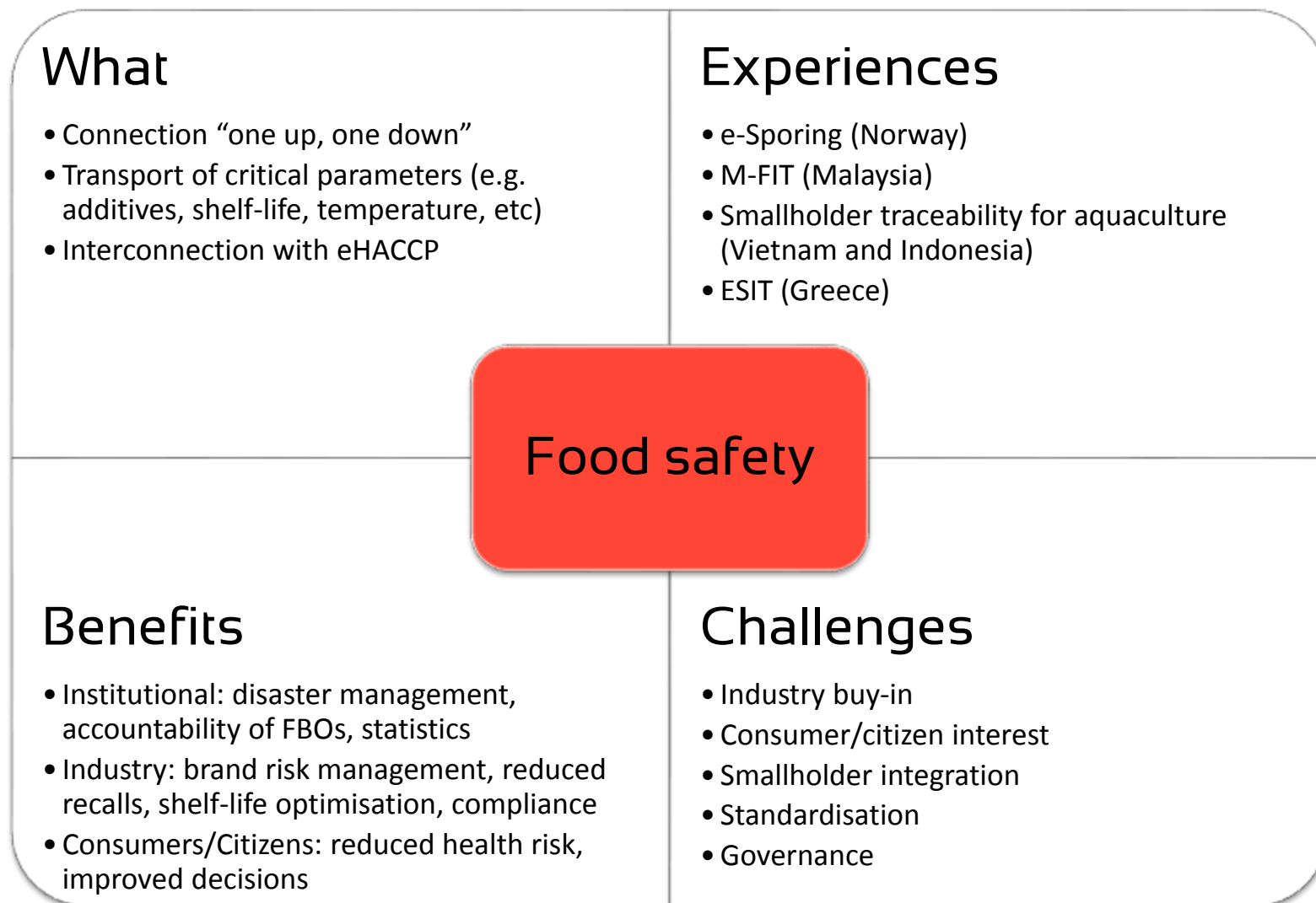
Benefits of paperless chain  
food information management

**FOOD SAFETY, SUSTAINABILITY AND TRADE**



## Some drivers for chain food information management





## What

- Calculation of key environmental sustainability parameters along the supply chain, such as CO<sub>2</sub>eq, water usage,
- Transport of key social sustainability parameters, such as legal compliance, worker/aboriginal rights, child labour

## Experiences

- (social only) UTZ Certified
- (legal compliance) IUU fishing
- (in preparation) Roundtable for Sustainable Palm Oil and some retailers/manufacturers
- (for biofuels) ISCC

## Sustainability

## Benefits

- Institutional: Enforcement aid, accountability of FBOs, monitoring of management goals
- Industry: brand risk management, legality of supply chain, monitoring of mngmt goals
- Consumers/Citizens: informed decisions, peace of mind

## Challenges

- Technical complexity; in some case unclear science
- Industry commitment
- Consumer/citizen push
- Standardisation, in particular of calculation methods

## What

- Exchange of electronic information for trade relevant purposes (trade permissions, customs, goods shipped notices)
- Single window for traders
- Legality, security, safety of shipments
- Electronic handling of incidences
- Electronic handling of fees

## Experiences

- ASYCUDA (World)
- eCustoms (Europe)
- Animal passports (Europe)
- ePermit and ePermit1 (Malaysia)

## Trade

## Benefits

- Institutional: More robust trade processes, accountability of institutions, increased visibility of trade bottlenecks; statistics
- Industry: reduction of trade-related bureaucracy; streamlined processes
- Consumers/Citizens: fresher products

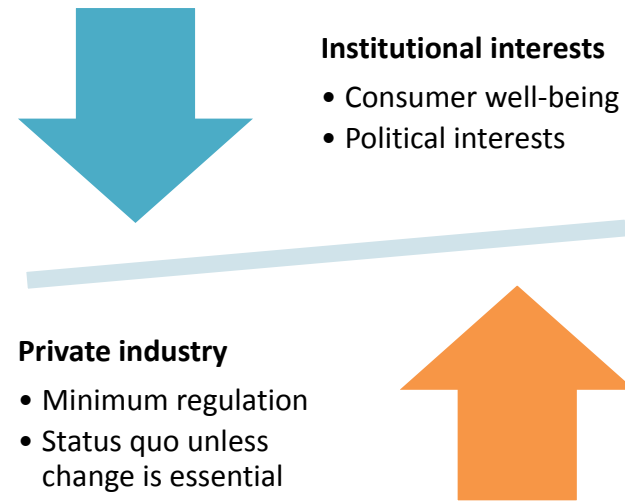
## Challenges

- International standardisation
- Interdepartmental collaboration
- Economic sustainability of systems

The role of governments

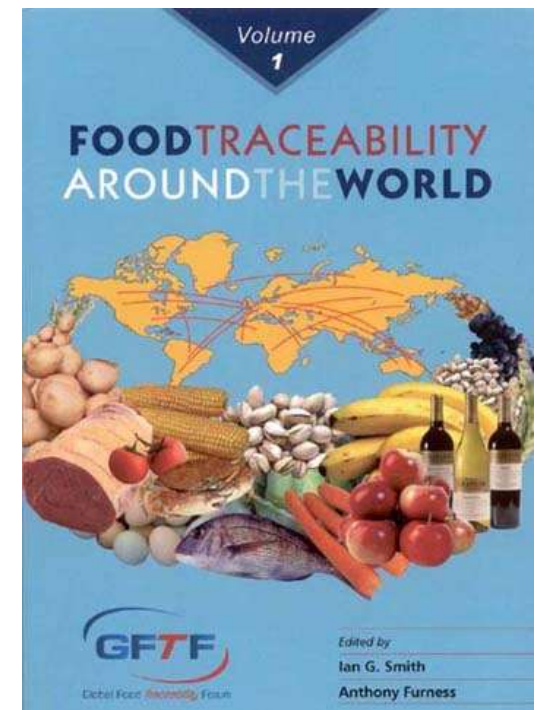
# **DEVELOPING PAPERLESS SYSTEMS FOR AGRO-TRADE FACILITATION**

- The establishment of chain food information systems is a major challenge
  - Buy-in is necessary from
    - Governmental institutions
    - Supply chain players
    - Trade partners
    - Consumers
- In the food chain, the main power lies within distribution and retail
  - However, without buy-in from upstream, there is little they can do to implement e-systems
- In international trade, public administrations hold a key position
  - However, only with buy-in from stakeholders can chain food information management systems be successful





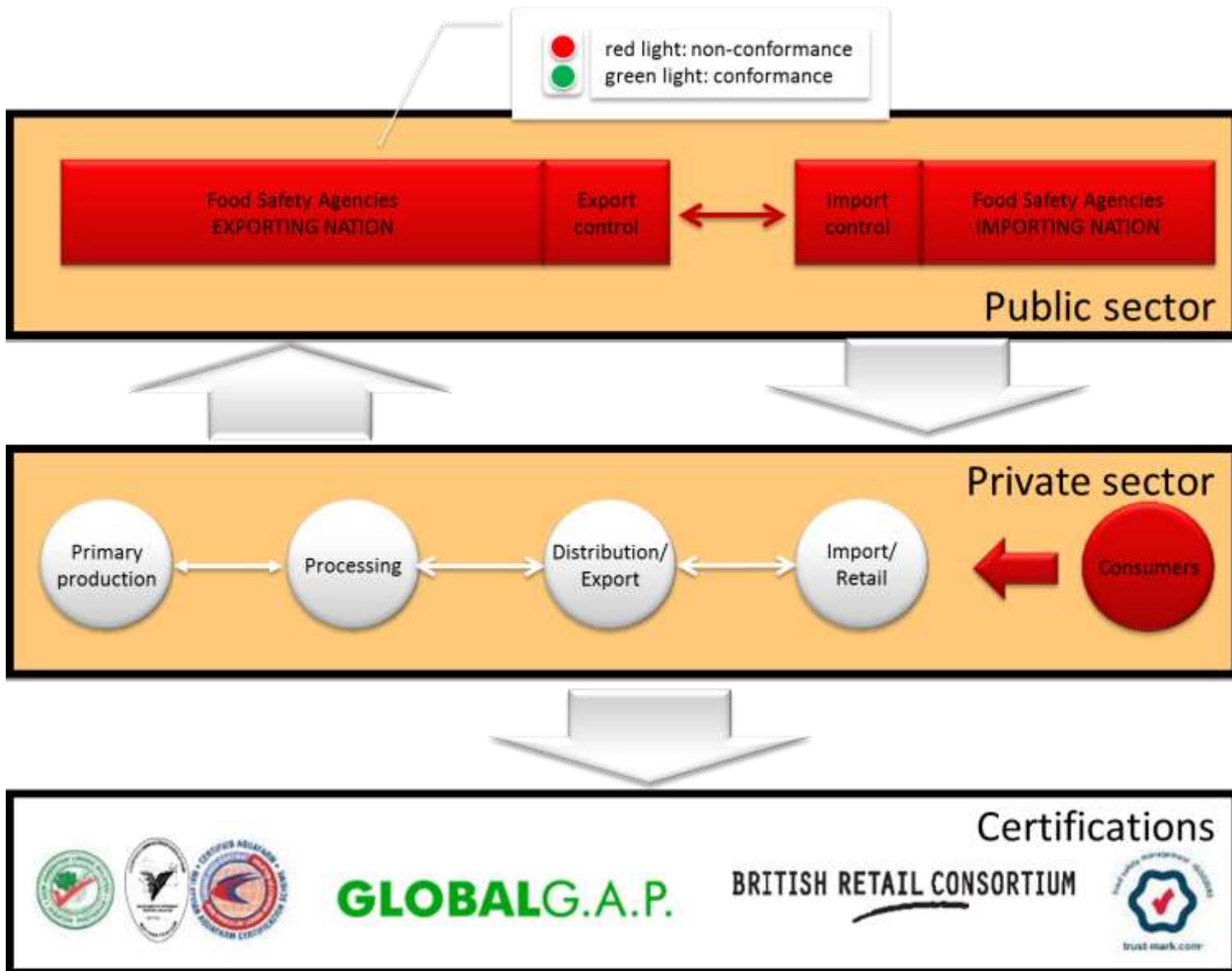
- Top down
  - Government-sponsored implementations of chain food information management systems
  - Typical project size: 500k-2m USD
  - Accompanied by promotional programmes
  - Examples: Malaysia, Vietnam
  - Main challenges
    - Sustainability after end of funds
    - Ownership of systems and data
- Bottom up
  - Industry or industry-association driven, perhaps in form of a Public Private Partnership (PPP)
  - Typical project size: very diverse
  - Requires strong industry motivation
  - Examples: Norway, Denmark
  - Main challenges
    - Understanding the value of transparency
    - International standards
    - Smallholders



Ian G Smith and Anthony Furness, eds.  
Vicarage Publications, 2008  
ISBN 978-0-9553707-17

- Regulations play a vital role in the adoption of paperless trade systems
  - Legal framework of all-electronic transactions (incl. validity of e-signatures)
    - Place electronic transactions at the same level as paper transactions
    - Specifically incentivise the submission and management of electronic information
    - Regulate data confidentiality and security and make offenses liable
  - Definition of data sets for specific purposes
    - Such as food safety, disease control, legality of trade, origin determination etc
  - Support for globally unique identification
    - Mostly by fomenting the use of globally unique identifiers and avoiding the creation of country-wide (or even ministry-specific) identification schemes
  - Support for international standards for data exchange
    - Recognising the need to exchange information in an automated fashion
    - Support for international schemes and push for standardisation by e.g. ISO

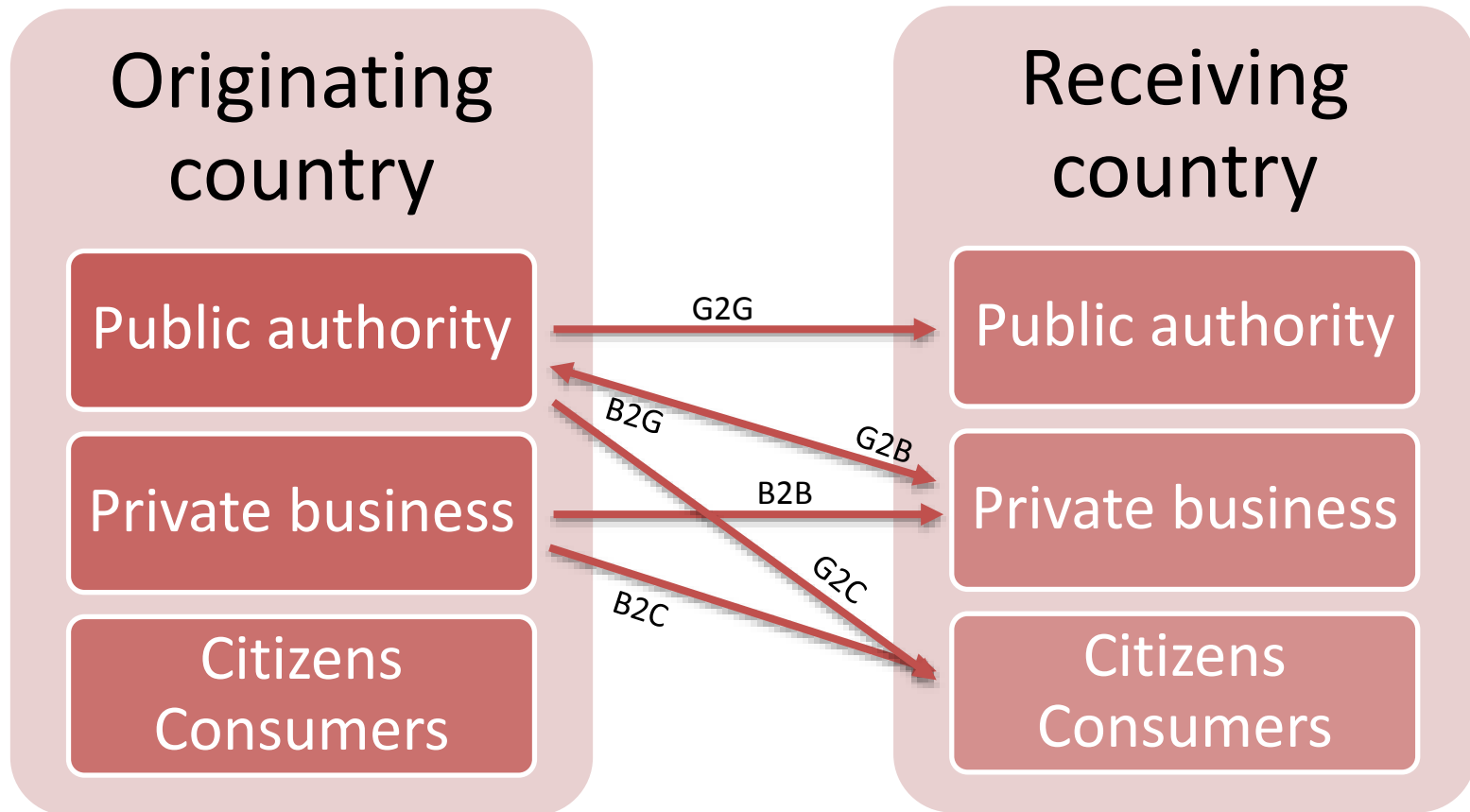
## The layered model of chain food information management





Chain food information management systems  
**RELEVANT INTERNATIONAL STANDARDS**

## Complex relationships warrant huge standard ecosystem



### Standard level/type

#### Procedural standards

- What information is important to store/transport

#### Information exchange standards

- How to transport information

#### Semantic standards

- How to name information elements

#### Syntactic standards

- How store information

### Application in chain food information management

#### Food standards

- E.g. on food safety (ISO22000) or sustainability (RSPO)

#### IT standards for exchanging information

- E.g. EPCIS, UML and parts of ebXML

#### Semantic standards

- For fish e.g. ISO 12875:2011

#### Syntactic standards

- TraceCore, UNeDocs, EDIFACT and derivatives

**NB:** General trade-off between ease of application and specificity of a standard set. Generic standards have a tendency to be too abstract and more specific standard sets create interface problems between different subsectors (e.g. fish standards not applicable to dairy production).



- Codex Alimentarius
  - International reference standards for consumer protection and food safety, used as the legal basis of international trade
  - Joint effort of the FAO and WHO
- ISO 22000 family
  - Family of voluntary industry standards on food safety
  - Main building block HACCP (includes traceability)
  - Recognised by GSFI
- GlobalGAP (and similar efforts BRC, IFS etc)
  - Buyer-driven private standards
  - Based on general principles and ideas of international food standards
  - Application-oriented with the aim to be practical
  - Often include a general traceability requirement



- No specific generic standards for sustainable food production; efforts are sector based
  - ISO14000 series on environmental management
  - ISO26000 series on social responsibility (non-certifiable)
- Some sector-specific examples



- Palm oil: Roundtable for sustainable palm oil (RSPO) – [www.rspo.org](http://www.rspo.org)  
*Very complex standard attempting a holistic approach to sustainable palm oil production. Takes into account environment, social aspects as well as business profitability. Has supply chain certification and runs a traceability system.*



- Aquaculture: Aquaculture Stewardship Council (ASC) - [www.asc-aqua.org](http://www.asc-aqua.org)  
*A relatively new player in aquaculture sustainability. Created in a stakeholder-driven approach. Looks primarily at environmental sustainability, but also animal welfare. Uses a weaker chain of custody approach.*



- Fair trade: Fairtrade International (FLO) – [www.fairtrade.net](http://www.fairtrade.net)  
*Internationally used standard for fair trade. Has generic rules for different organisations related mostly to fair distribution of gains along the value chain. Has specific standards for food subsectors. Requires membership.*



- eCert

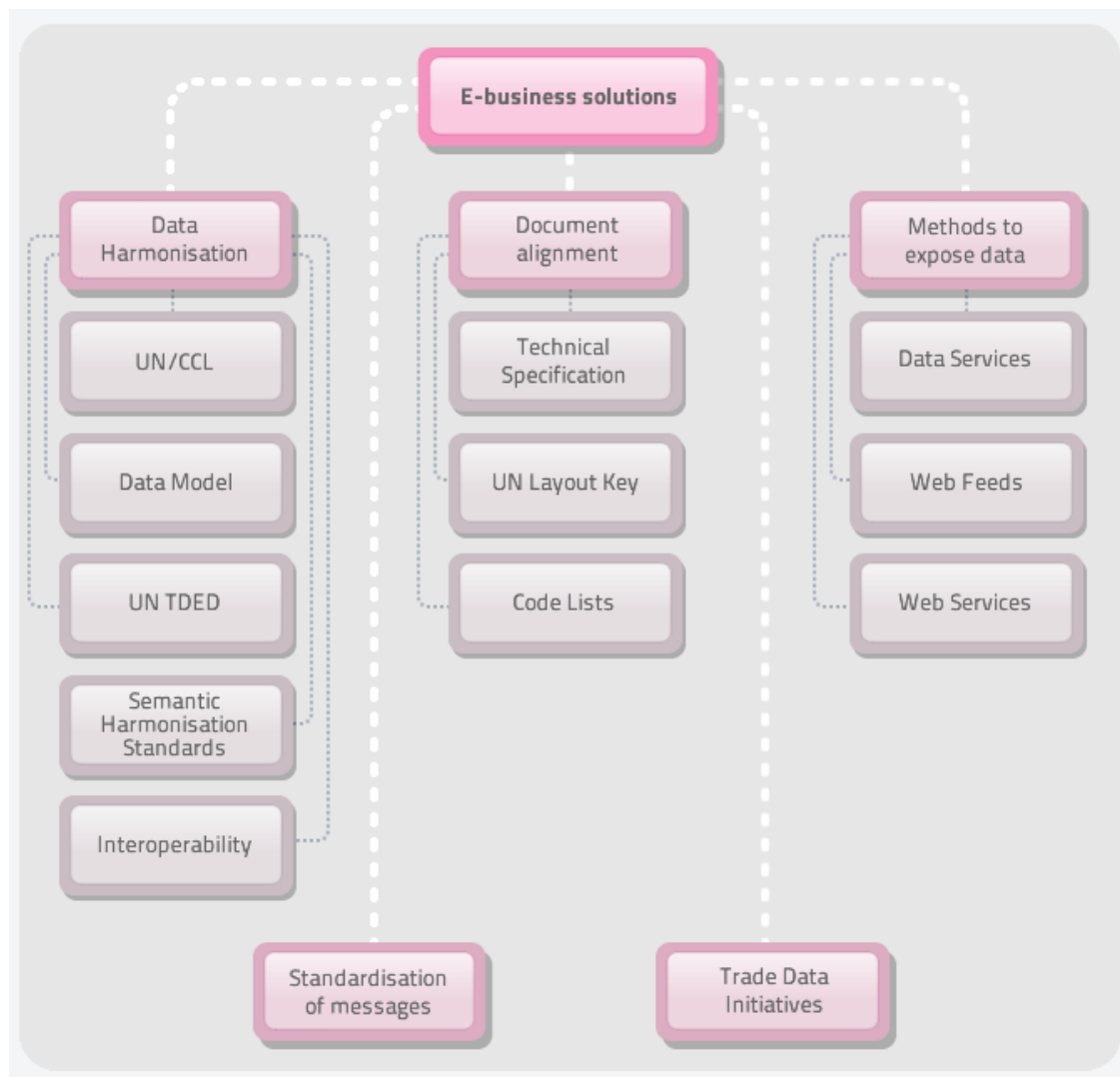


- UN/CEFACT Standard for sanitary and phyto-sanitary export certificates to facilitate trade of agricultural products
  - Assures that the commodity has met the importing government requirements
  - Improves business processes for import clearance through consistent quality data
  - Facilitates real time clearance, e.g. through early shipment notifications
- In use with a number of countries (EU, US, CA); fully paperless by 2014

- eCustoms



- Main goals
  - control and facilitate the movement of goods into and out of the internal market through efficient import and export procedures;
  - increase the competitiveness of European trade through a reduction of compliance and administrative costs and an improvement in clearance times;
  - facilitate legitimate trade through a coordinated approach relating to the control of goods;
  - improve the safety and security of citizens with regard to dangerous and illicit goods;
  - offer improved protection of the financial interests of the European Union and its Member States;
  - contribute to the fight against international crime and terrorism by providing rapid and relevant information with regard to the international supply chain;
  - allow for a seamless flow of data between the authorities of exporting and importing countries
- Project to be implemented by 2020



Trade Facilitation Implementation Guide  
[tfig.unece.org/contents/intro-domain-ebis.htm](http://tfig.unece.org/contents/intro-domain-ebis.htm)

### Pre-requisite:

Unique identification of

- Traceable units (TU)
- Logistic units (LU)
- Locations
- Contractual relations

Data carrier standards

- 1D & 2D Barcodes
- RFIDs

- Unique identification is one of the key principles required for chain food information management
  - Food being globally traded requires globally unique identification
  - Local identification for products, traceable units (such as product instances), logistic units, business sites etc is not globally unique
- Currently no globally unique identification products available free of charge
- ISO 15459 regulates globally unique identification and has a register of entities that may issue globally unique identifiers
- In early stages of the food supply chain, there is no pre-dominant supplier of identities; in later stages, particularly distribution and retail GS1 is a leading supplier of identity products. GS1 is a recognised Issuing Agency under ISO15459
  - Identification for smallholders is an unresolved issue



# RG8-VNBTAW2A-A1-2DG-0

Element		Base	Example	Elements in base	Possible combinations	Remarks
IAC	2	[A-Z,0-9]{0,3}	RG	36	1296	ISO15459 registered IA
Code type	1	[0-9]	8	10	10	
Country	2	[A-Z]{2}	VN	26	676	2 digit ISO code for country
Province	2	[A-Z]{2}	BT	26	676	
District	1	[A-Z,0-9]	A	36	36	
Business site	3	[A-Z,0-9]{3}	W2A	36	46656	
Location	2	[A-Z,0-9]{2}	A1	36	1296	00 if undetermined, 01 if single location
Serial	3	[A-Z,0-9]{3}	2DG	36	46656	Equivalent to over 120 years of daily operation per location
Check digit	1	[A-Z,0-9]	0	36	36	
Total length	17	Example	RG8-VNBTAW2A-A1-2DG-0			

## The traceability label

Clear printed name of owner of label

Two detachable  
sub-labels

QR code for mobile  
phones points to web

More information here



Code-128 barcode for  
automated registration

Clear print code for  
manual registration

























Link to more info

## VIETNAM Food Traceability Form

Data entry:  
Internet: [trace.mard.gov](http://trace.mard.gov)  
SMS: download from [trace.mard.gov](http://trace.mard.gov)

Despatch date:

Out

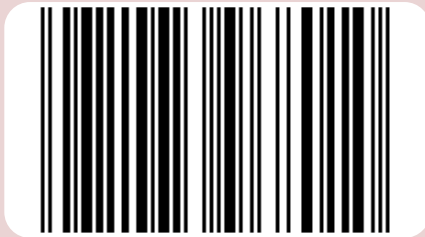
			
			
			
			
			
			

In

Space to paste detach T-label

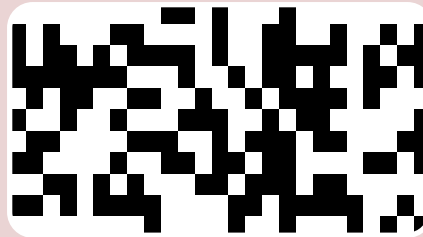
Two differently coloured areas for inputs and outputs

- Basic data carrier types
  - Human-oriented labels
  - Data carriers for automated identification and data capture (AIDC)
- Data carriers can
  - Carry identities (animal, product, traceable unit, logistics unit, asset etc)
  - Carry information



One-dimensional  
barcodes

Standards: e.g. Code128



Two-dimensional  
barcodes

Standards: QRCode



Radio-frequency  
identifiers (RFID)

Standards: EPCGlobal

**IMPORTANT:** data carriers do not by themselves establish traceability

- ebXML
  - Developed by UN/CEFACT and OASIS
  - Open, XML-based infrastructure that enables the global use of electronic business information in an interoperable, secure, and consistent manner by all trading partners
  - Framework standard covering business interactions and addressing in particular information transport. Does not cover “payload”, i.e. document contents
- Universal Business Language (UBL) - OASIS
  - Covers electronic commerce
  - Maps a number of business processes
  - One implementation of a “payload” for ebXML
  - Initial success in eProcurement (Northern EU)
  - Latest version: 2.0 published in 2006



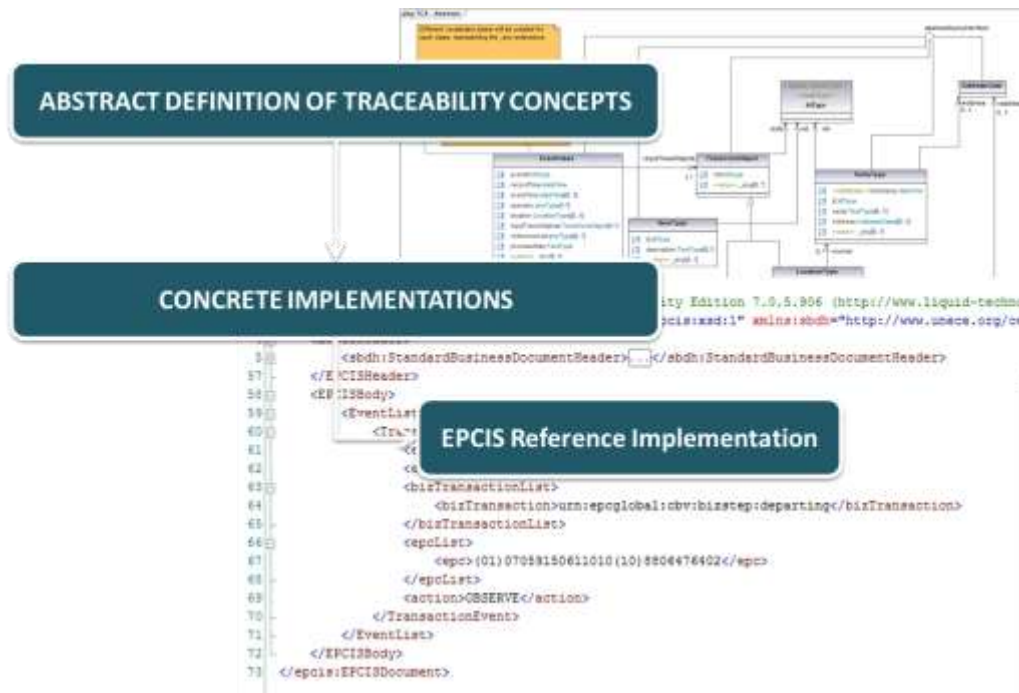
Since February 2005, use of the UBL Invoice standard has been mandated by law for all public-sector business in Denmark. 1.2 million UBL invoices are currently exchanged in Denmark every month. The Danish Ministry of Finance estimates savings to the government of 100 million euros annually from use of this one document type. With the introduction of their [OIOUBL initiative](#) in 2007, these savings are estimated to double. The adoption of OIOUBL affects 440,000 businesses in Denmark and is now in the process of forcing UBL support from every company that sells business software in Northern Europe.



- TraceFood
  - Good traceability practices
  - TraceCore
    - Ontologies
    - Exchange protocol



Europe's largest research project on food traceability with a total budget of about 20m€. Research was performed in supply-chain independent origin verification via physico-chemical analysis and on development of robust supply change information exchanges. The main aim was to enhance food safety and origin determination. There were 5 industry-based pilots.



- Electronic Product Code Information Services (EPCIS)
  - Standard for sharing Electronic Product Code (EPC) related information between trading partners.
  - Defines standard set of messages for both data capture and data exchange
  - The what, where, when, and why of events occurring in any supply chain is exchanged
  - Stores important business information such as time, location, disposition and business step of each event that occurs during the life of an item in the supply chain.
  - Not originally created for food
  - Two main areas: Event Capture and Query Interface

### Norway: eSporing

Unique effort to implement electronic food traceability country-wide. eSporing system is based on EPCIS, but had to extend the standard for food.

A workshop in Oslo reviewed the status of EPCIS as a basis for a globally acceptable food information exchange standard.



The background of the slide features a bokeh effect with numerous out-of-focus light circles in warm tones of yellow, orange, and red, set against a dark blue gradient background.

Practical Recommendations

# **IMPLEMENTATION OF CHAIN FOOD INFORMATION MANAGEMENT SYSTEMS**

### M 1. Establish roundtable(s) for food information management

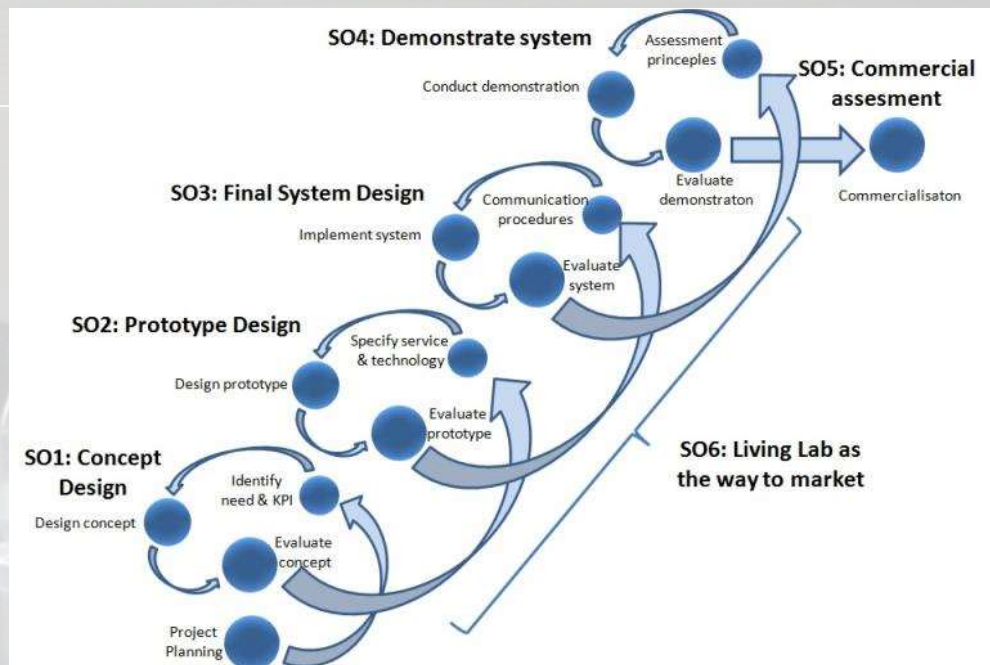
- User-driven innovation and co-creation
- Maximise efficiency and minimise development cost
- Target to address all stakeholder needs
- Define sequence of implementation of necessary systems

#### Useful tool: LivingLabs

A LivingLab is a human centric involvement platform with the potential to develop new services and products by bringing different stakeholders together in a co-creative way; see [www.litoolbox.eu](http://www.litoolbox.eu).

#### Benefits of LivingLabs

- Discover what users really need and want
- Efficient source for new ideas
- Discover unarticulated relevancies
- Test ideas, services, concepts, products
- Discover user priorities and motivation
- Enlist users as future sellers
- *Increased satisfaction, commitment and system acceptance*
- *Sense of ownership and decrease of implementation barrier*



- A key stakeholder in the adoption of any food information management system is the food industry
- Many government-sponsored projects have failed to incorporate the private industry properly
  - As a result: many pilots, few large scale implementations
- Chain food information management requires a change of attitude towards increased *transparency*
  - “Open-source food”, similar to open source software
  - Major paradigm change for the food industry



Src: [www.foodtraceability.eu](http://www.foodtraceability.eu)





## M 2. Database of food production locations

- Draws on existing farm and food premises registration schemes
- Integrated with existing geospatial information



## M 3. Product type database

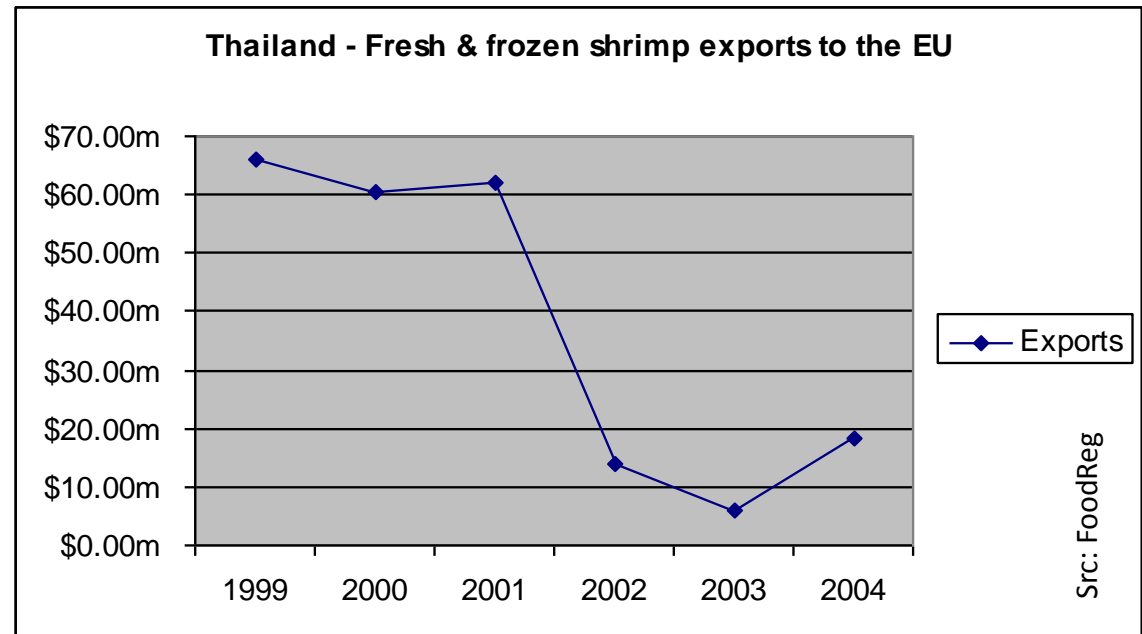
- Based on UN Central Product Classification (CPC)
- Introduction of product classification in all relevant government processes



## M 4. Land use database

- The link between premises and product types, supporting geo-traceability
- Integrates with existing data sources

- Understanding what is produced where helps
  - Manage disease outbreaks better
  - Improve base for SPS measures
  - Provide early alerts locally, regionally and globally
  - Increase international trust
  - Detect local production inefficiencies



- M 4. A globally unique numbering system, apt for identifying
- Product types
  - Batches
  - Trade units
  - Logistic units
  - Business partners
  - Business locations
- M 5. A framework which
- Names uniquely all relevant parameters for a food stuff
  - Decides on what data to the authority will need access at what point in the supply chain
  - Defines a set of exchange protocols how to exchange data
- M 6. Food information system deployed in layered architecture
- Allow interconnectivity with variety of information systems
  - Guarantee governmental access only to agreed parameters
  - Maximise efficiencies with other information needs (B2B, Certifiers, B2C etc.)
- M 7. Use of international standards for information exchange
- Interconnect to national and international systems



- Global identification has not been resolved yet
  - Identifiers must be globally unique or should be constructed so that they can become globally unique
  - Main issue: smallholders
  - In the absence of a global solution: technical platforms must be able to use combinations of ISO15459-based identification solutions
  - Government agencies should approach providers of identification solutions to find suitable ways to handle smallholders
- There is no set of golden standards to implement chain food information management
  - Separation of abstract model and concrete system implementation
  - Separation into system layers with defined interfaces

### M 8. Law on data ownership and confidentiality

- Protect individuals and business
- Rules of access by governments

### M 9. Regulation on mandatory electronic data

- Data to be supplied to government via food information systems
- Small producers exempt if trading partners enter data

### **Data and system ownership is a key issue to resolve**

One of the main causes for failed adoption

Reservations on all levels of operation from small to global scale

### **An entity must be identified that enjoys trust by stakeholders**

Strict laws on data confidentiality can help to establish that trust

Deciding what precise data is required for each business case limits the risk. For some cases, aggregated data might be enough

Entity must be guaranteed to be independent and serving stakeholder interests only

### **Solution is country-specific**

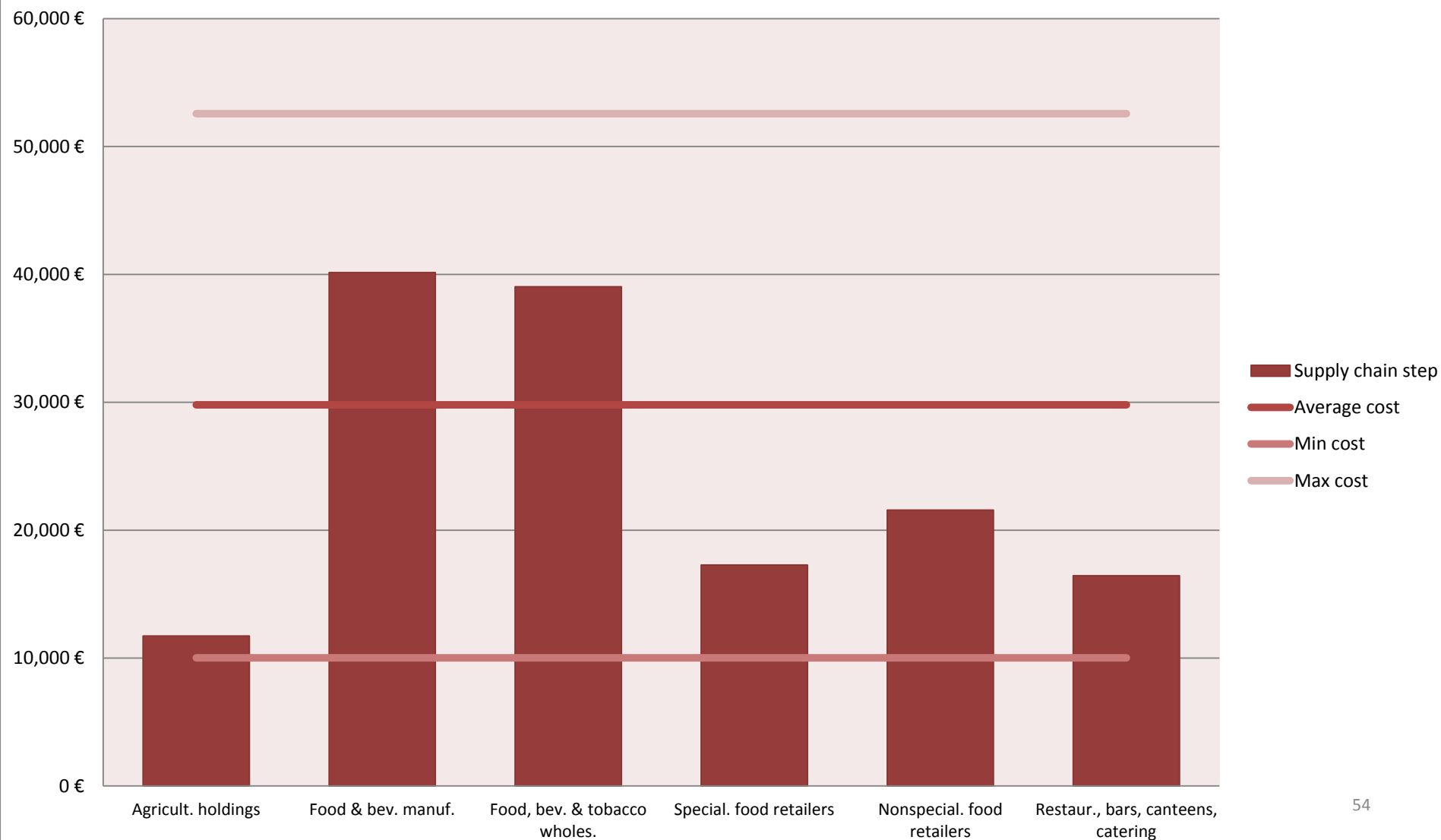
Potential candidates: industry associations, multi-stakeholder associations, universities, independently set up entities

### M 10.

#### Fund development of core components

- Governments should fund core components that improve internal efficiencies and prove the viability of the system(s)
- Governments can provide financial support to the adoption and use of systems used by food business operators, but the bulk of the cost should be borne by private industry
- Governments should recognise the special situation of microenterprises in the food chain and help them with the introduction of electronic systems

Added value and cost of labour in the EU 2005/2006 (per employee, indicative)



- Globally there are about 500 million smallholders
  - supporting 2 billion people
  - accounting for 97 per cent of agricultural holdings
  - producing food for a substantial proportion of the world's population
- Smallholders are hard to integrate into the food information chain
  - Technical capacity/computer literacy or simply: electricity
- Mobile technology might provide a solution
  - Solutions must be built accordingly
- Government support is essential in adoption

Src: [Univ. of Cambridge](#)

	Total	1-99	100-999	1000-2999	3000-4999	5000-9999	10000-49999	50000-99999	>=100000
dk	360	190	10	0	0	0	60	70	20
de	9820	8340	450	60	20	30	590	240	90
gr	181770	176870	4130	30	20	180	450	50	20
it	43680	40770	1340	190	170	60	710	260	180
at	2740	2310	60	60	40	70	200	10	
pt	122820	121500	320	100	220	210	400	60	20
	1970	570	150	50	20	60	460	290	380
Totals	363160	350550	6460	490	490	610	2870	980	710
		97%	2%	0%	0%	0%	1%	0%	0%

Number of agricultural holdings with broilers, by size of the holding in 2005 (source EUROSTAT)



## Are time savings enough?

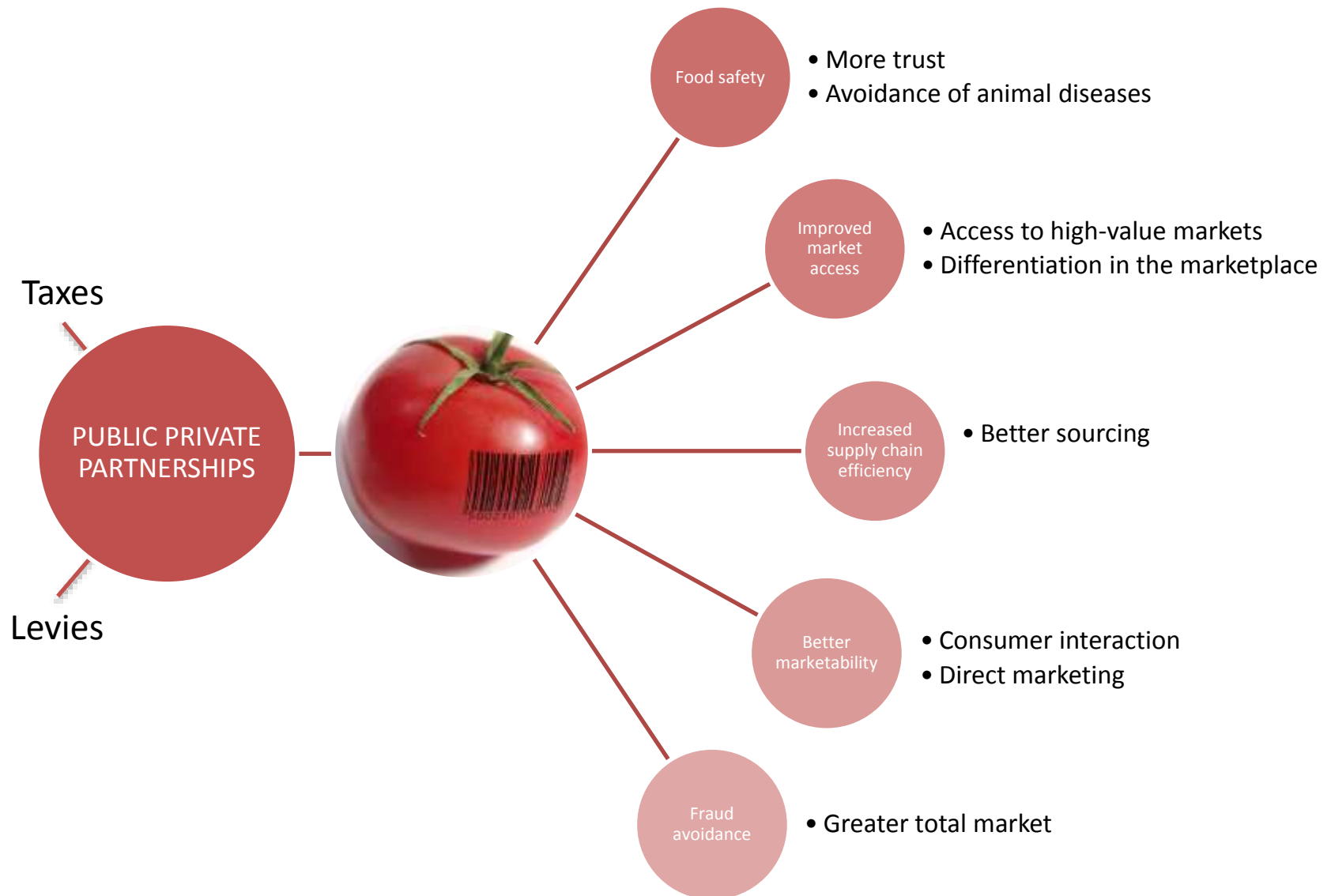
- The total amount of time savings globally through paperless food information management can be estimated very roughly as

**5,000-30,000 person years per annum<sup>1</sup>**

- Assuming an average annual income of 18,000USD (ILO calculated global average wage) and 20% overhead costs

**100-600m USD per annum  
(0.01-0.04% of global food trade)**

<sup>1</sup>Base: FDA reported about 20m food related import shipments per year. US imports represent about 8% of global imports, it may therefore be assumed that very roughly 25m food shipments are executed each year. The bracket then result from assuming that per shipment total time saving (export, import and other time savings) average 10 min – 60 min.





Examples

# IMPLEMENTATION OF CHAIN FOOD INFORMATION MANAGEMENT SYSTEMS



- Food safety: M-FIT
- Sustainability: RSPO – trading of sustainable palm oil (Global)
- Customs: eSPS systems

### 14 more agencies

Ministry of Health  
Malaysia Palm Oil Board  
Fishery Department  
Agriculture Department  
Veterinary Services  
Federal Agriculture Marketing Authority  
Malaysian Fisheries Development Authority  
Farmer's Organisation Authority  
MARDI  
...



1. To identify the needs and to define the methods for improved food information and traceability in Malaysia
2. To report on the administrative and legislative steps which would support the implementation of improved food information and traceability
3. To define and demonstrate the structure and methodology for implementing a Food Information and Traceability System, which can be shared by all in the food chain
4. To develop and demonstrate an electronic system platform which is used nationally and across borders to communicate food information and traceability data and documents within the supply chain





## 6 Communities, 78 Participants

- Suppliers to Farms
- Farmers
- Trading Houses
- Processors / Packers
- Distributors / Exporters
- Retailers

Participants included small, medium & large companies from each sector and position in the supply chain.

## Sources of data

- SALM/SPLAM/SALT
- Farmers Organisations
- FAMA
- FMM
- MITI / MATRADE



SALM



SPLAM



SALT

An initial database of 500 farmers, 300 suppliers and 200 trading houses was established.

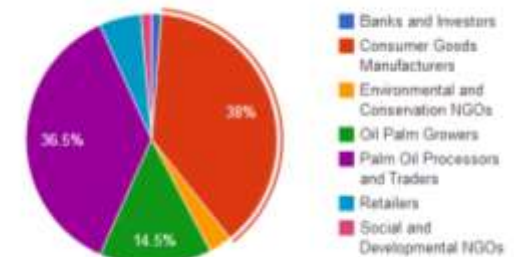
- IT is not the issue
  - Fully electronic traceability system with mobile support
  - Easy to use, fast local clients where internet connection was a problem
- Access to IT/capacity building is an issue
  - 100% paperless system posed a too dramatic change of paradigm
- Industry interest in food safety limited
  - Food safety not perceived as a strong enough driver to implement electronic traceability
  - No direct, immediate return on investment. Promise of future market access proved to be too weak an argument
  - Quality personnel typically not part of business/investment decisions
- Traceability in itself is of no interest
  - Services utilising traceability as an infrastructure are key



- Extremely efficient oil plant, also apt for biodiesel
- Commodity ingredient for many food (and non-food) products
  - Margarine and spreads
  - Cooking oil(s) for home and industrial use
  - Bakery products
  - Sweets and cocoa replacement
- But: commercial forest utilisation needs to be done sustainably
- Main issues
  - Conservation of endangered species and landscapes (in particular peat)
  - GHG emissions, land use and forest burning
  - Indigenous rights
- Result:
  - New EU regulation for biofuels puts palm oil under pressure
  - Most food companies don't use the name palm oil on their ingredient list
  - Consumer (representatives) very concerned with the replacement of ingredients by palm oil derivatives (e.g. chocolate)

- Established in 2004 as a multi-stakeholder association
  - Initial cooperation between Aarhus United UK Ltd, Migros, Malaysian Palm Oil Association and Unilever together with WWF starting in 2001
- Standard setting organisation (ca. 750 members)
  - Sustainable palm oil production (206 mills)
  - Sustainable supply chain certification (621 facilities)
- Three supply chain mechanisms
  - Certificate trading with no link to the origin
  - Mass balance (“green in, green out”) – chain of custody type system
  - Segregation with batch level traceability
- Currently uses electronic transaction system by UTZ Certified
  - Monitor sustainable volumes traded
  - Ensure buyers that volumes purchased are certified

Members By Category

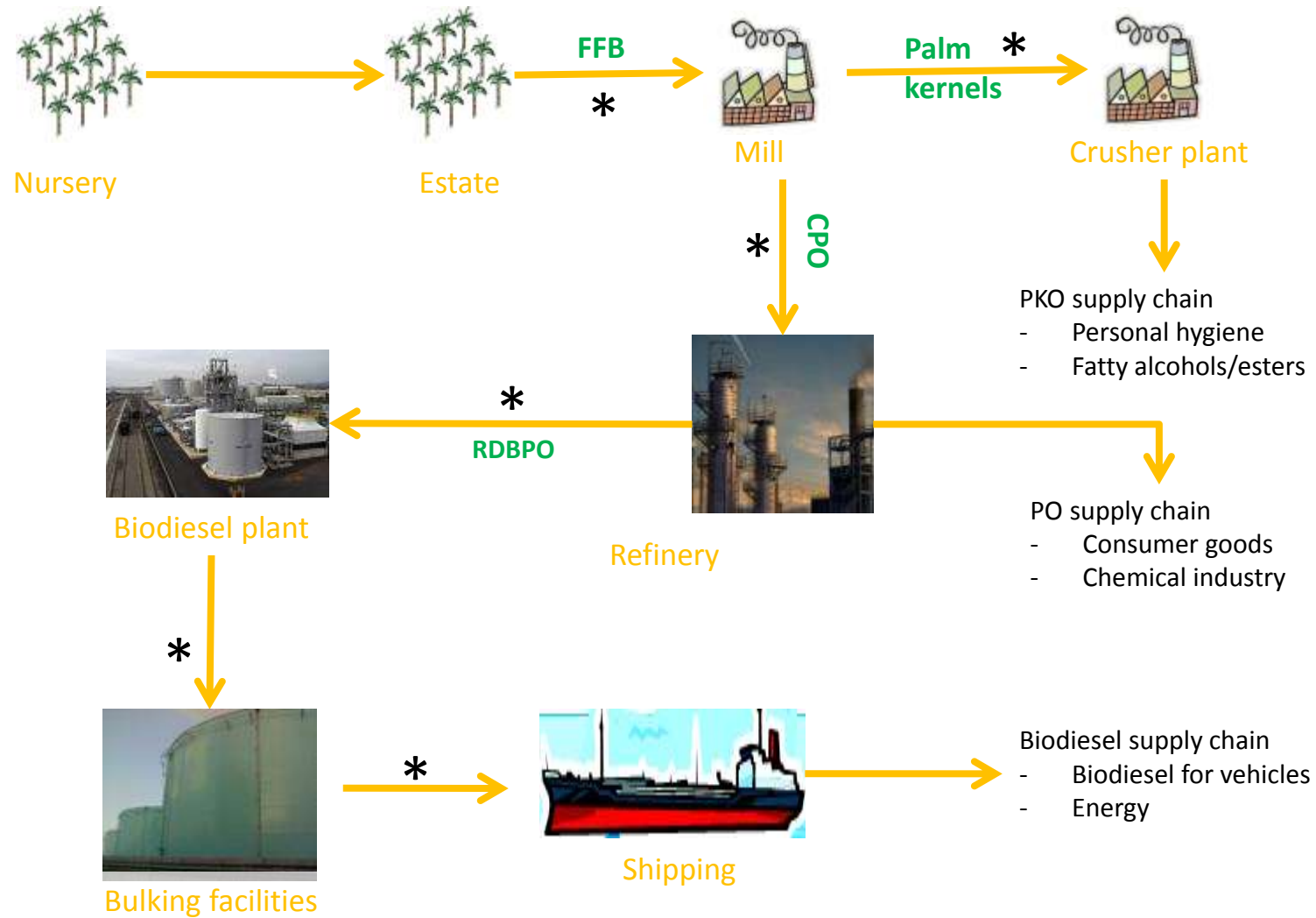


Src: rspo.org



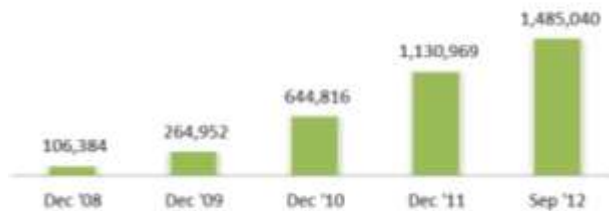


## Palm oil/biodiesel supply chain



- Adoption of the standard and supply chain mechanisms is progressing
  - Certificate trading is subject to greenwashing criticism
  - Traceability system is being studied and might be replaced
- RSPO is under pressure from other emerging standards
  - North-South conflict and perceived unfairness of cost distribution

Production Area (ha) by Year



Category	Production (Mt)	Certified (Mt)	Notes
<b>Growers</b>	16,192,235	6,724,287	Combined volume of CPO and PKO (not including PK)
<b>CPO volumes</b>	14,584,647	5,556,999	CPO and CSPO volumes
<b>PKO volumes</b>	1,607,588	1,167,288	PKO and certified PKO volumes
<b>Processors &amp; Traders</b>	24,853,375	1,911,353	Total handled and total certified (CPO, PKO, PK and Derivatives)
<b>Consumer Goods Manufacturers</b>	5,754,200	2,330,830	Total volume PO and derived products sold in own brands
<b>Retailers</b>	254,616	185,201	Total volume PO and derived products sold in own brands
<b>Total certified</b>		<b>4,427,384</b>	

Src: [RSPO Annual Communication of Progress 2012](#)



Plantation

HOME

OUR WORLD-WIDE EFFORTS

I HAVE A CODE

SOME GLOBAL DATA

HOW DO WE DO IT?



# Our world-wide efforts

## Sustainability efforts

Take a look at what we have done.

[→ More info](#)

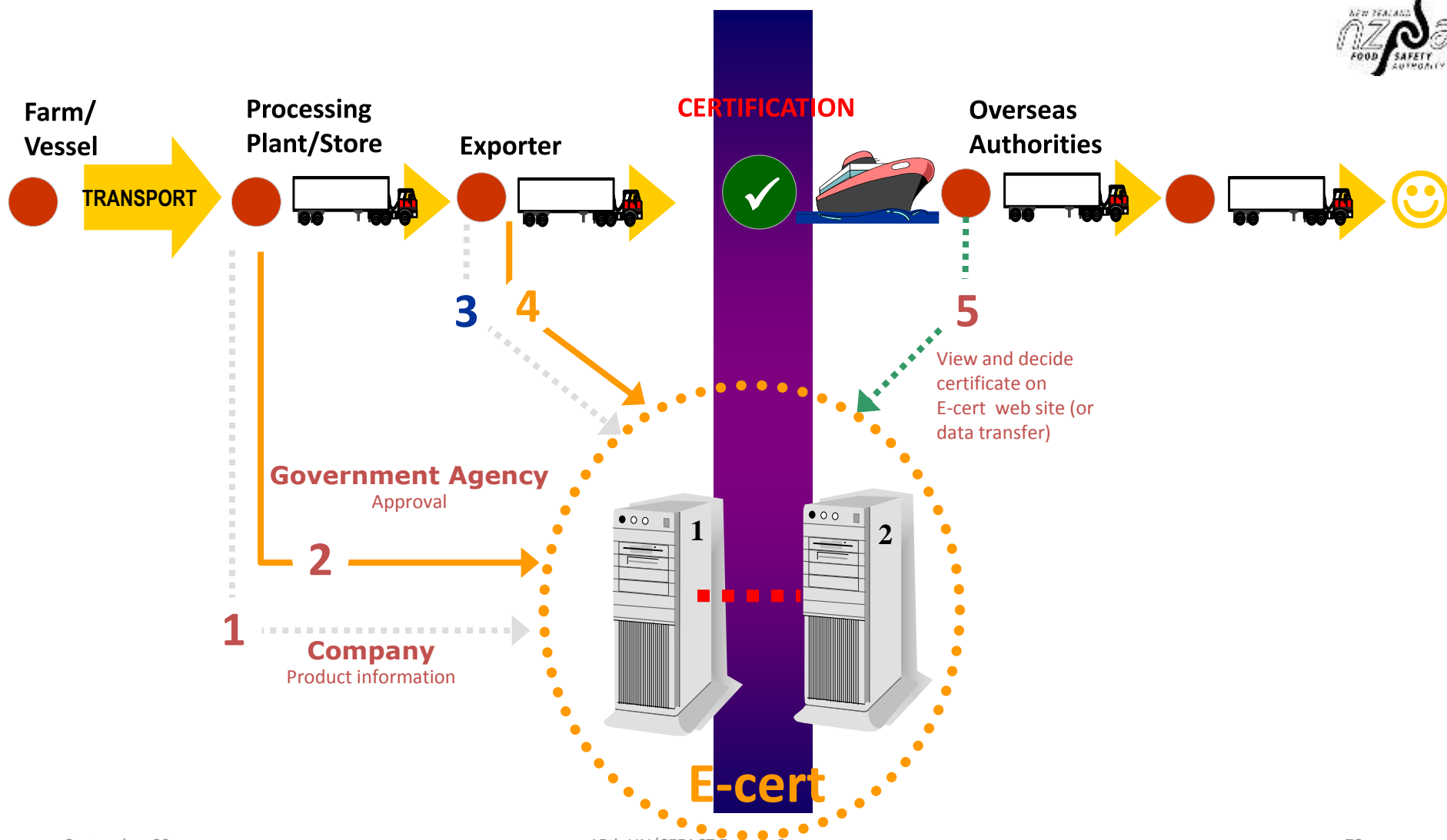


- Industrial food production is complex
- Communication of sustainability is complex, too
- Making sustainability information available is a long term project
- Chain food information requires collaboration by all
- Layered model allows for basic control and value creation, but leaves space for individual companies to differentiate themselves on the market

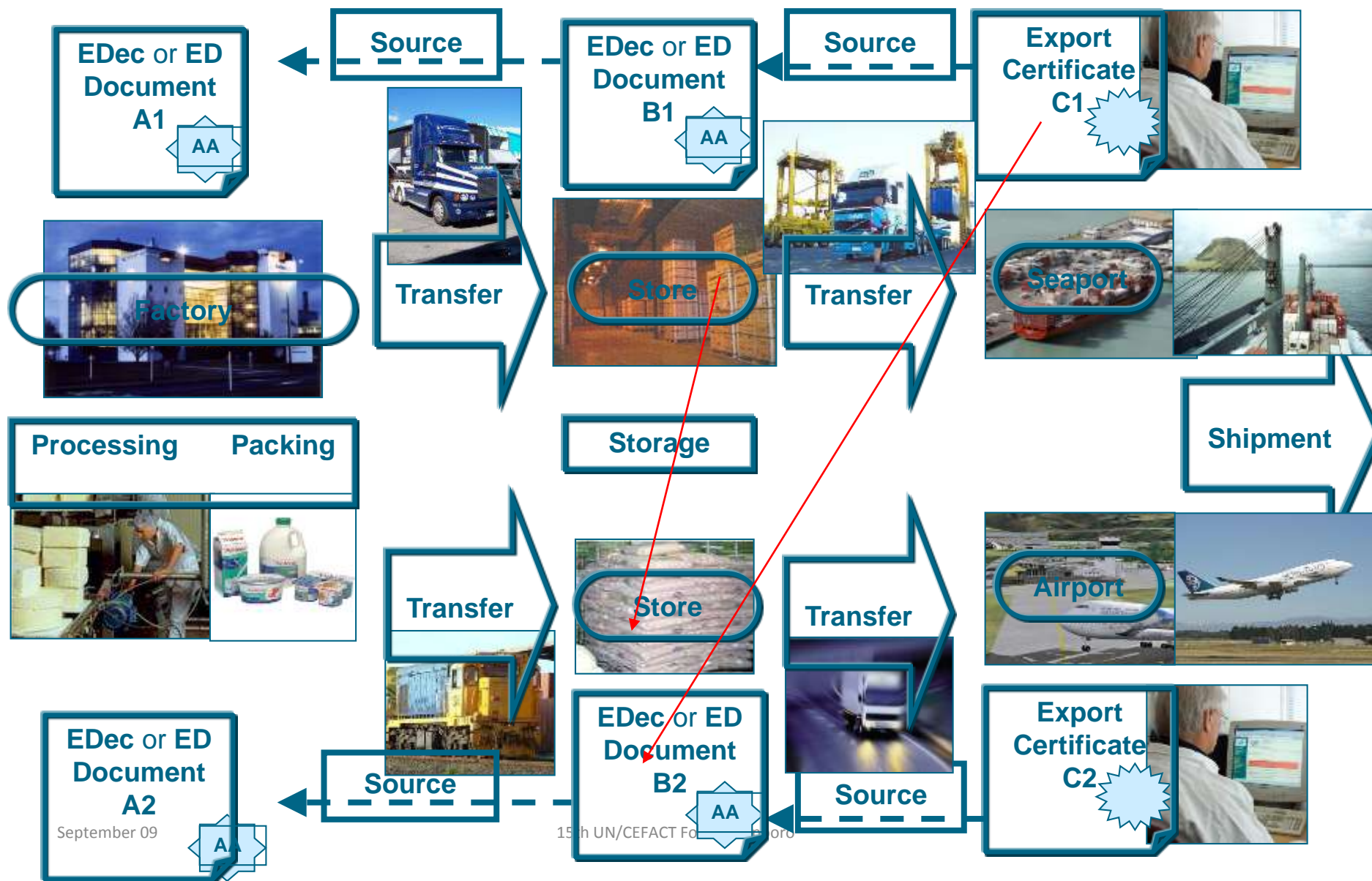
- E-cert is the NZFSA Internet application for providing Government to Government assurances about the compliance of New Zealand's animal products with importing country regulatory requirements.
- E-cert's purpose is to track market eligibility and product status from the time of production until export and the approving of an export certificate.

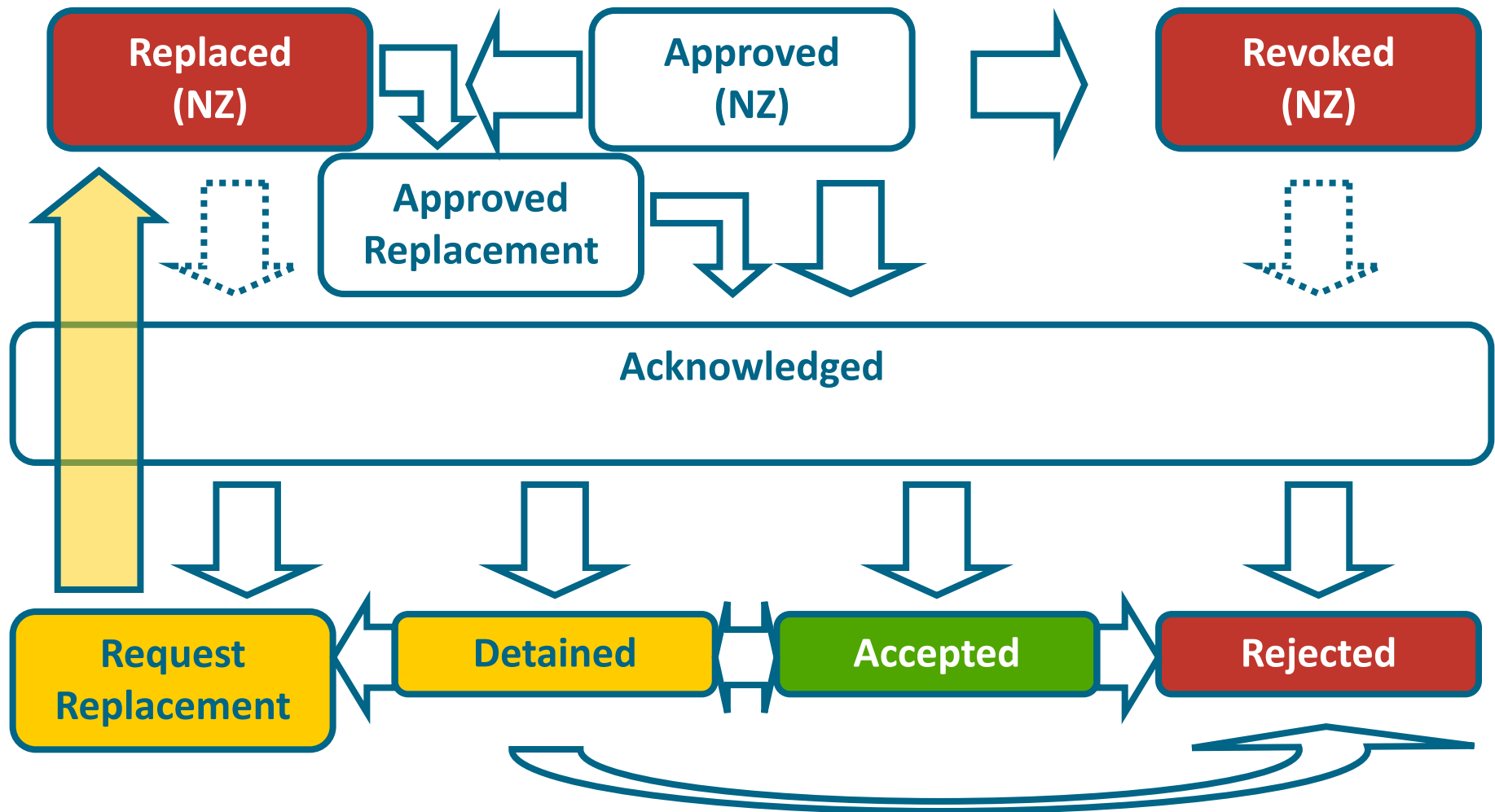
*Slides kindly provided by Dr Drasko Pavlovic*

- When the product is ready for export, an export certificate is created in E-cert and approved by NZFSA
- An approved certificate is available online to importing country officials
- An automated, secure, certificate data exchange method is also available to importing country officials
- If required, an approved certificate may be printed and signed by NZFSA certifying officer.



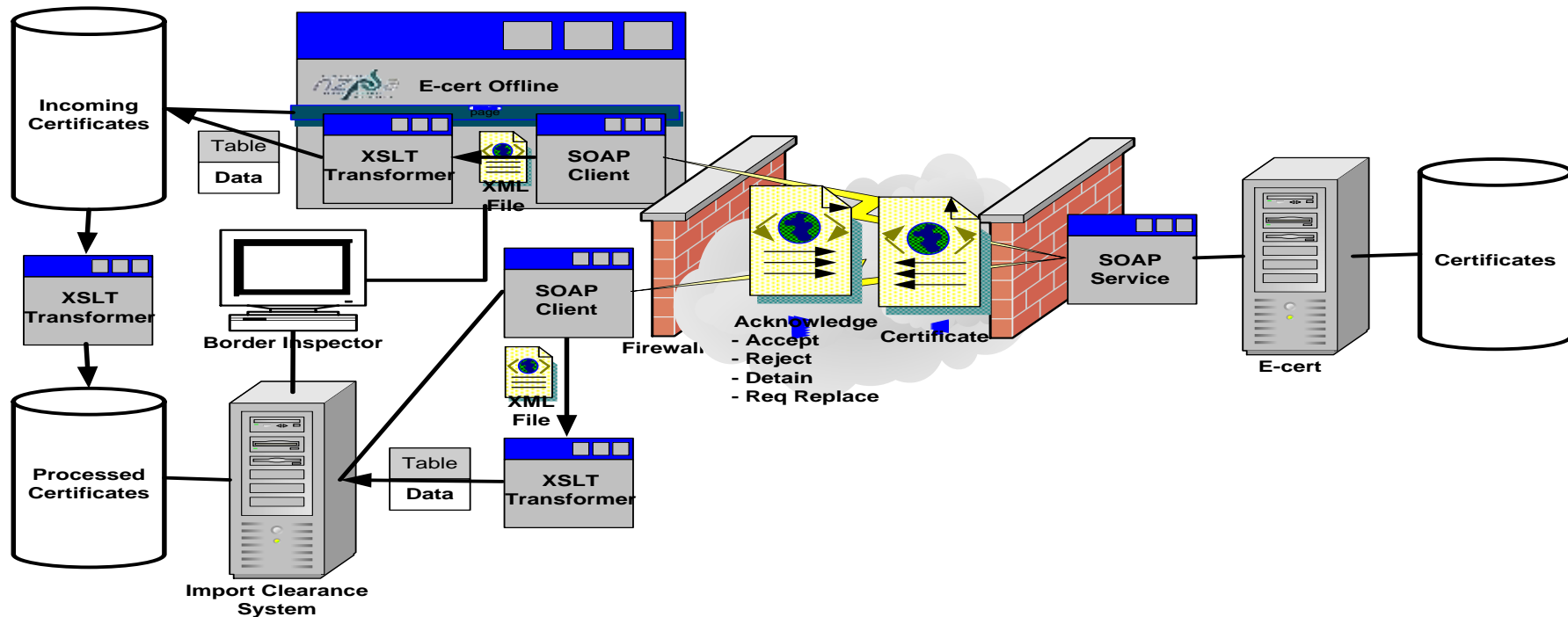






## Secure Govt-Govt Data Exchange using SOAP

- A. Border agency requests latest export certificates
- B. Border agency updates its database as required
- C. Border agency submits acknowledgement file





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New Zealand Food Safety Authority

## Electronic Health Certification

Version: ecert live 08.04.01 (Build 0), Thu Jul 10 19:23:31 2008

Good morning Drasko,  
 Welcome to the Electronic Certification Web Site.

**ECert Version 8.04.01 released to ecive, July 2008**

**Maintenance Release**

Click [here](#) for full details of [What's New in Version 8.04.01](#)

The Batch File Format can be found in the [Help and Tutorials](#) section of the Animal Products Ecet site.

The following certificates need your immediate attention:

Shoulder No	Status	Consignor	Consignee	Departure	Submitted
<a href="#">H NZL2008/SBT1/2273</a>	Approved	SBT1	Indonesia	30-Aug-2008	2-Sep-2008 13:39
<a href="#">H NZL2008/ELN1046/81180</a>	Approved	ELN1046	Indonesia	31-Aug-2008	3-Sep-2008 09:00
<a href="#">H NZL2008/ELN1262/54381</a>	Approved	ELN1262	Indonesia	1-Sep-2008	2-Sep-2008 13:50
<a href="#">H NZL2008/ELN1142/1834</a>	Approved	ELN1142	Indonesia	28-Aug-2008	27-Aug-2008 08:54
<a href="#">H NZL2008/AFFCO1/306005</a>	Approved	AFFCO1	Indonesia	7-Sep-2008	2-Sep-2008 15:10
<a href="#">H NZL2008/ELN1029/5817</a>	Approved	ELN1029	Indonesia	30-Aug-2008	2-Sep-2008 14:12



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[3rd Party](#)  
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## Export Certificate NZL2008/ELN1046/5678

Status:

**Approved**

Declarations:

**AP1702.1** Sanitary Certificate for Edible Deer Products (excluding deer meat and deer meat products) to the Peoples' Republic of China / 输往中华人民共和国的可食用鹿产品（鹿肉和鹿肉产品除外）卫生证书

### Health Attestation

**AP1702.1/1V**

I hereby certify that: /

本人在此证明：

**AP1702.1/7V** ✓

a. The products described above were processed in accordance with New Zealand law in approved premises. / 上述产品来自于新西兰官方依法批准的加工企业。

**AP1702.1/8V** ✓

b. The products described above were derived from deer. / 上述产品来源于鹿。

**AP1702.1/10V** ✓

c. The products described above are derived from animals of New Zealand origin. / 上述产品来源于原产地为新西兰的动物

**AP1702.1/11V** ✓

d. New Zealand is free from anthrax, bluetongue, brucellosis (abortus and melitensis), foot and mouth disease, and chronic wasting disease (CWD). / 新西兰没有炭疽、蓝舌病、布氏杆菌病（流产布氏杆菌和马尔他布氏杆菌）、口蹄疫和慢性消耗病

**AP1702.1/12V** ✓

e. The feeding of ruminant protein to ruminants is prohibited in New Zealand. / 新西兰禁止使用反刍动物蛋白饲养反刍动物

### Official Information:

Consignor:

[ELN1046](#) (PPCS Limited, DUNEDIN)

Consignee ID:

Consignee Name:

[Traditional medicines company]

Consignee Address:

[Street name, number]

[City in China]

Consignee Representative:

Importing Country:

China

Transport Mode:

Maritime

Carrier Name:

MOL Wellington

Conveyance Ref:

VN456

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Importing country: Indonesia  
**Means of transport:** Maritime, CALIFORNIA MERCURY, V216  
**Port of Loading:** NZAKL - Auckland [AUK]  
**Port of Discharge:** Jakarta, Java  
**Place and Country of Destination:** JAKARTA Indonesia  
**Stationery Serial No:** 00875181  
**Packages in Total:** 779 Cartons

## Product Item 1

119 Cartons FROZEN BONELESS BEEF IW PS-CLO

Net: 2285.2 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME125	<b>Processing Premises:</b> ME125	<b>Slaughter Dates:</b> 18..20-Aug-2008

## Product Item 2

208 Cartons FROZEN BONE IN BEEF NECK BONES

Net: 2926.55 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME125	<b>Processing Premises:</b> ME125	<b>Slaughter Dates:</b> 20..26-Aug-2008

## Product Item 3

36 Cartons FROZEN BONE IN BEEF NECK BONES

Net: 513.2 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME84	<b>Processing Premises:</b> ME84	<b>Slaughter Dates:</b> 23..25-Jun-2008

## Product Item 4

60 Cartons FROZEN BONELESS BEEF IW C-BLADE

Net: 1372.86 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME84	<b>Processing Premises:</b> ME84	<b>Slaughter Dates:</b> 21..24-Apr-2008



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<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME125	<b>Processing Premises:</b> ME125	<b>Slaughter Dates:</b> 11-Jul..22-Aug-2008

## Product Item 6

91 Cartons FROZEN BONE IN BEEF IW C-SHORT RIB (4RIBS) Net: 1727.4 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME84	<b>Processing Premises:</b> ME84	<b>Slaughter Dates:</b> 7..27-May-2008

## Product Item 7

80 Cartons FROZEN BEEF HEART Net: 2000 kg

<b>Species:</b> BOVINE	<b>Identification Marks:</b> B37033	<b>Container (&amp; Seal) Numbers:</b> NYKU7551600 (NZFSA00094848)
<b>Slaughterhouses:</b> ME125	<b>Processing Premises:</b> ME125	<b>Slaughter Dates:</b> 12..22-Aug-2008

## Acceptance Panel

Please select an action, provide a reason and press the submit button.

Current status: **Approved**, Change Status to:

Accepted

Submit

Reason:

Accepted

Rejected

Request Replacement

Detained

Acknowledged

For enquiries please contact [ec-adm@majordomo.maf.govt.nz](mailto:ec-adm@majordomo.maf.govt.nz).





## SUMMARY

- The increasing global food trade is a major source of wealth
- At the same time, the increased risk and a perceived “loss of roots” and lack of control makes it necessary to increase the transparency of the food value chain
  - Food safety
  - Sustainability and standard compliance
  - Trade “mechanics”
- This – if used proactively – can be used to great advantage of producers
  - Gaining or maintaining market access
  - Reducing brand risk
  - Increasing market size through elimination of fraudulent activities
  - Internal efficiencies, such as faster trade transactions

- Chain food information management can deliver these benefits
- It is a platform on top of which value added services can be created
- Information technology has developed valid technical solutions already
- Major implementation challenge
  - Paradigm change in the food supply chain – for which a combination of regulations, training and marketing is needed
  - Standardisation – a global set of standards for chain food information management has yet to be adopted
  - Smallholder integration – specific challenges from identification to funding needs to be addressed
  - Governance – models to operate systems and safeguard data have to be identified and implemented

- A ten point implementation programme has been presented
  - Mix of technical, legislative/regulative and financial milestones
- There have been attempts at top down and bottom up systems have been implemented with no clear success
  - Top down: typically are burdensome without providing the full benefits to the private sector
  - Bottom up: difficult to organise and slow in the uptake
- Layered systems with clear boundaries are more likely to succeed
- Funding will most probably have to come from a range of sources both through levies (private sector) and taxes (public sector)
  - All stakeholders have to contribute and pay for the respective benefits

- Three case studies were shown
  - M-FIT: a public initiative for a food safety oriented e-traceability system, aiming to address information requirements of high-value purchasers
  - RSPO: an industry association based private initiative to market sustainable palm oil
  - eCert: a customs facilitation and traceability system based on UN/CEFACT standards operational in NZ
- All examples demonstrate that chain food information management is a considerable effort
  - No golden solutions have yet been found
  - Absence of a extensible and scalable infrastructure increases implementation efforts; the wheel is reinvented over and over again

Thank you for your attention!

SYNTESA