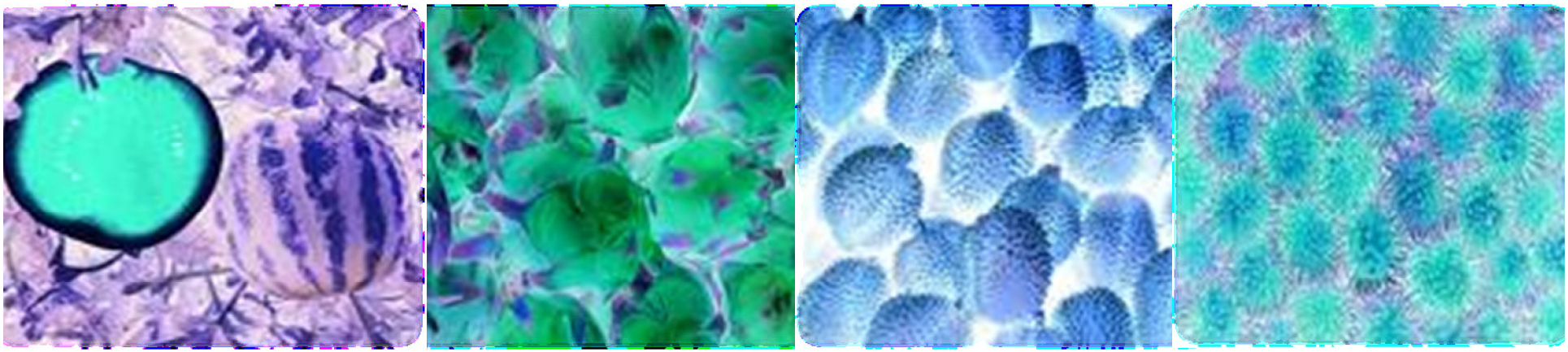

Traceability
Key to Safety, Quality and Productivity

Khairuddin Md Tahir & Audrey Yong

International Seminar on Consumer Trends &
Export of Tropical & Subtropical Fruits
15 July 2008

FoodReg

total traceability

Agenda

1. Definitions
2. Traceability Drivers
3. Food Supply Chain
4. Traceability Systems
5. Technologies Applied
6. Food Safety Incidences
7. Quality & Grading
8. M-FIT Project
9. Summary

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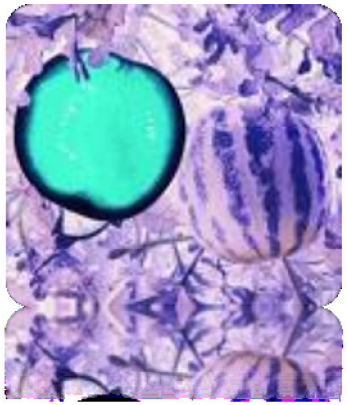

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1. Definitions

Traceability

EU General Food Law

"The ability to trace and follow a *food, feed, food-producing animal or substance* intended to be, or expected to be incorporated into a food or feed, through all stages of *production, processing and distribution.*"

Source: (EC) 178/2002, Art 18

ISO22005:2007

"The ability to follow the *movement* of a feed or food through specified stage(s) of production, processing and distribution."

Source: ISO 22005:2007 (First Edition)

ISO9001:2000

"The ability to trace the history, application or location of that which is under consideration

Traceability can relate to

- the origin of materials and parts,
- the processing history, and
- the distribution and location of the product after delivery.

Source: ISO 9001:2000 (Third Edition)

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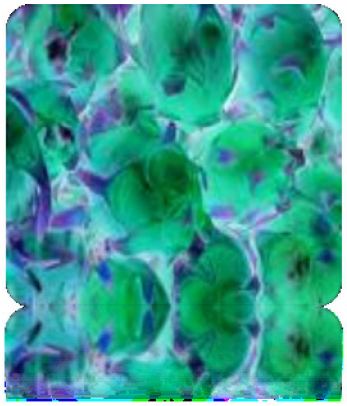

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2. Traceability Drive

In Food Sector

Traceability Drivers

Commercial Requirements & Market Access

- GlobalGap, British Retail Consortium – Global Food Standard (BRC), Safe Quality Food (SQF) and International Food Safety (IFS) etc

Food Safety & Quality

- ISO22000:2005 (Food Safety Management System) and ISO22005:2007 (Traceability in the Feed & Food Chain)
- Target Recall and Product Withdrawal

Legislation

- EU General Food Law 2002 and US Bioterrorism Act 2002

Traceability Drivers

Competitive Advantages

- Brand Differentiation and Product Differentiation

Productivity

- Optimize Production, Improve Efficiency and Increase Profitability

Environment Sustainability

- Round Table Sustainable Palm Oil Principle & Criteria, GlobalGap and Organic Farming Certification

Energy & Resource Use

- Ecological / Carbon Footprint, Food Miles, and Green House Gas Reduction

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3. Food Supply Cha

Tropical Fruits

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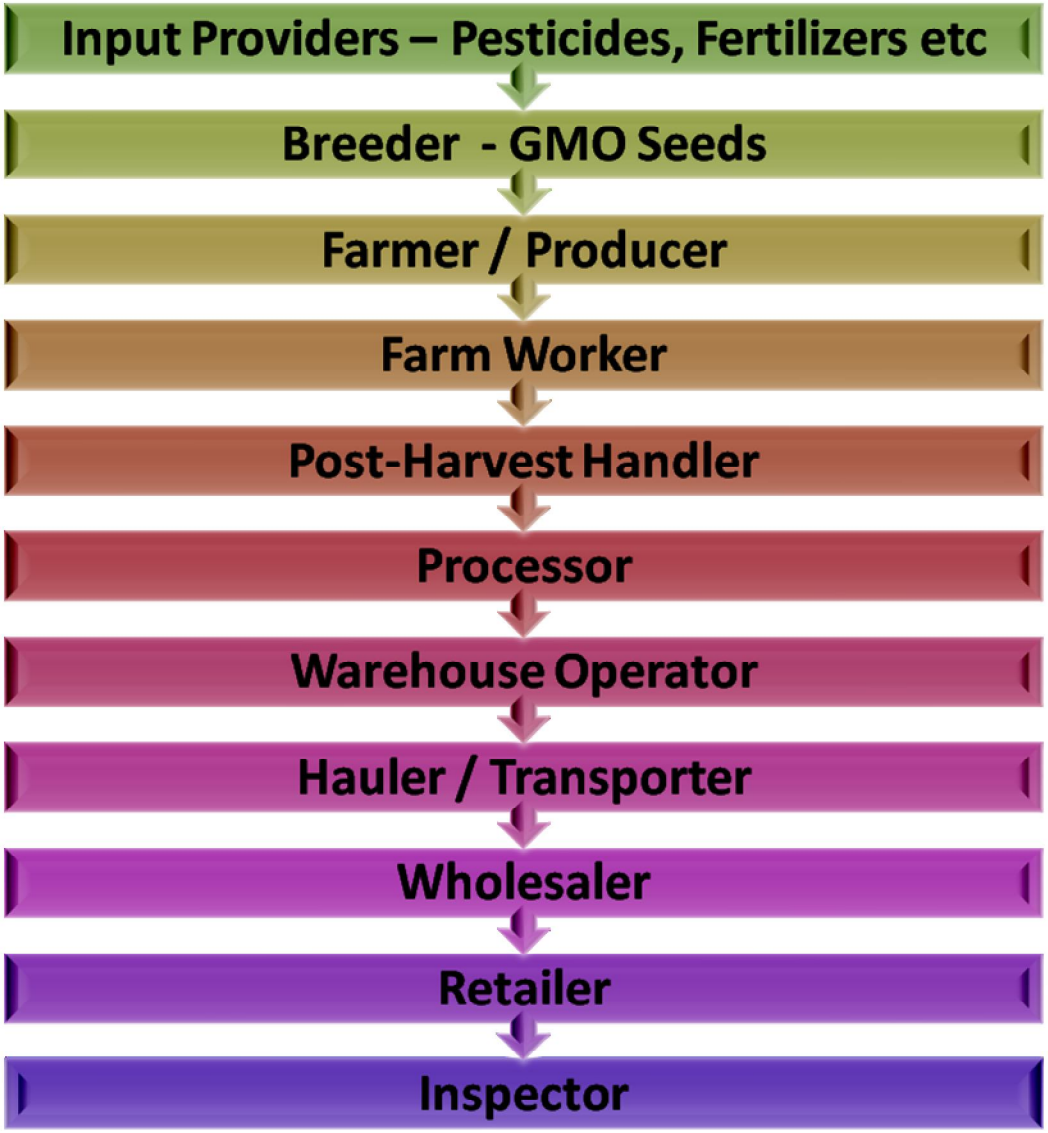
Tropical Fruit Sector



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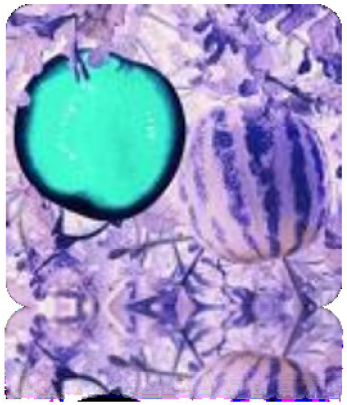

4. Traceability Syste

Worldwide

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EU Trace Project

http://www.trace.eu.org/menu/project/

Trace Tracing the origin of food

Home | About TRACE | Contact us | Sitemap

- Work Programme
- TRACE partners
- TRACE results
- Horizontal issues
- Advisory board
- Events
- Publications
- Press releases
- Intranet
- News admin
- TRACE brochures
- TRACE video

TRACE: delivering integrated traceability systems that will enhance consumer confidence in the authenticity of food

TRACE aims to improve the health and well-being of European citizens by delivering improved traceability of food products.

The 5 year project sponsored by the European Commission will provide consumers with added confidence in the authenticity of European food through complete traceability along entire fork to farm food chains. **TRACE** will develop cost effective analytical methods integrated within sector-specific and -generic traceability systems that will enable the determination and the objective verification of the origin of food. It will focus firstly on mineral water, cereals, honey, meat and chicken but will have wider applicability to other commodities.

Overview - Trace

Aim

- To improve the health and well-being of European citizens by delivering improved traceability of food products

Project Timeline

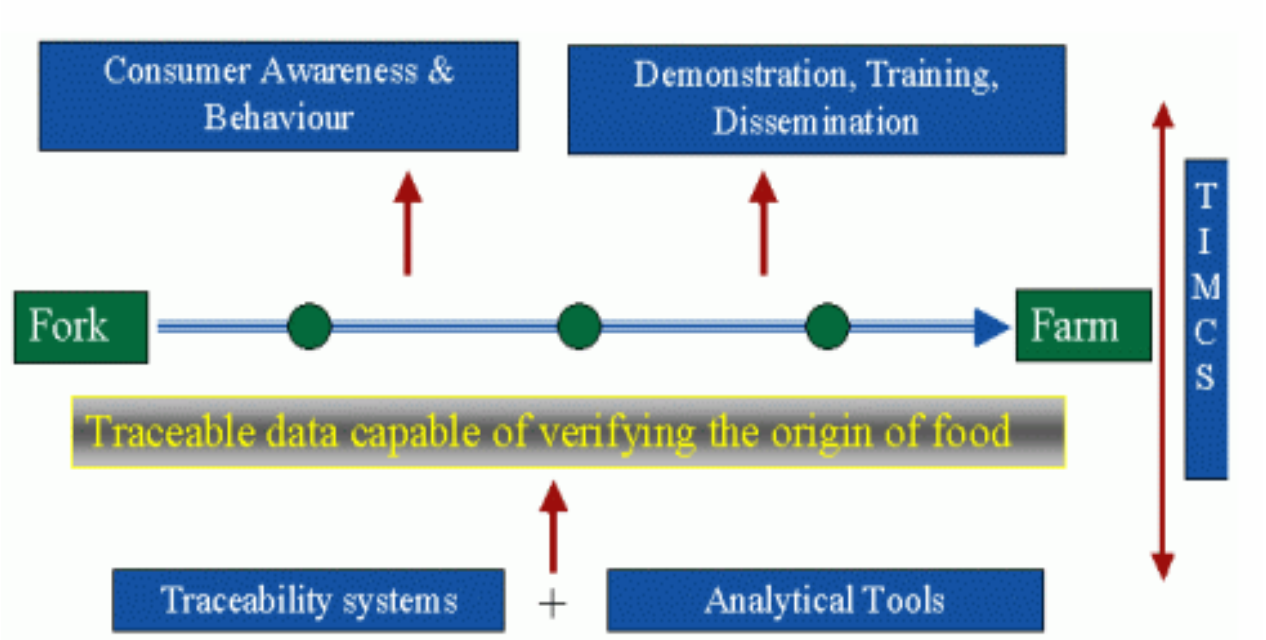
- 5 years project sponsored by the European Commission (2005 – 2009)

Sectors

- Mineral Water, Cereals, Honey, Meat, and Chicken

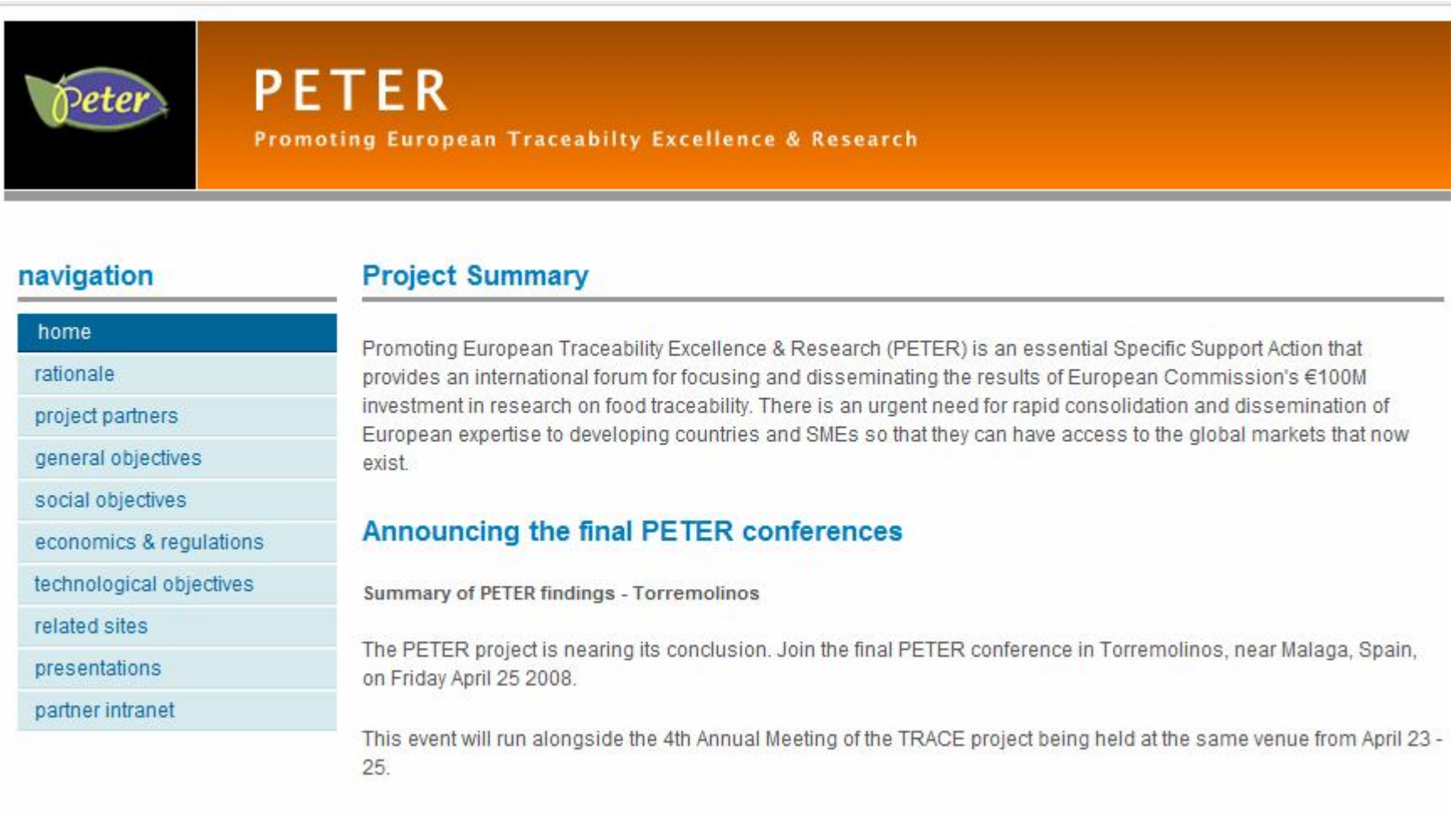
Trace Working Groups

- Analytical Tools Group
- Traceability System Group
- Consumer Behavior & Awareness Group
- Technology Transfer Group
- Management & Communication Group



PETER Project

http://www.eu-peter.org/



Overview - PETER

Aims

- Promoting European Traceability Excellence & Research (PETER) is to provide an international forum for focussing and disseminating the results of European research on traceability
- Facilitate global trade by developing harmonised traceability practices

Project Timeline

- 2 years EC Specific Support Action project commencing in April 2006

Key Projects

- Co-Extra
- TRACE
- SEAFOODPlus
- FoodTrace
- GTIS CAP
- GeoTraceAgri
- DNA-TRACK
- ALCUEFOOD
- Oilv-TRACK

Co-Extra GM and non-GM supply chains: their CO-EXistence and TRAceability

Trace

SEAFOOD plus

FOODTRACE

GeoTraceability Integrated System for the Common Agricultural Policy

GTIS-CAP

Specific Support Action
Contract n° 006468 (SSPE)

CCI du GERS

Gers Chamber of Commerce and Industry geomatics technology centre website

DNA-TRACK

ALCUEFOOD

OLIV-TRACK

Quality of Life and Management of Living Resources

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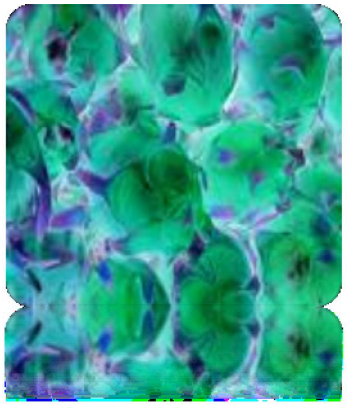
total traceability



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5. Technologies Appl

Traceability

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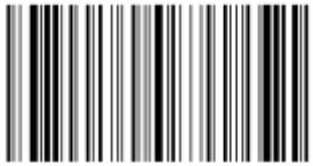
Bar Coding

- Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry

QR Code / 3D Barcode



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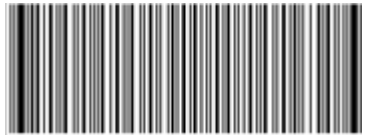


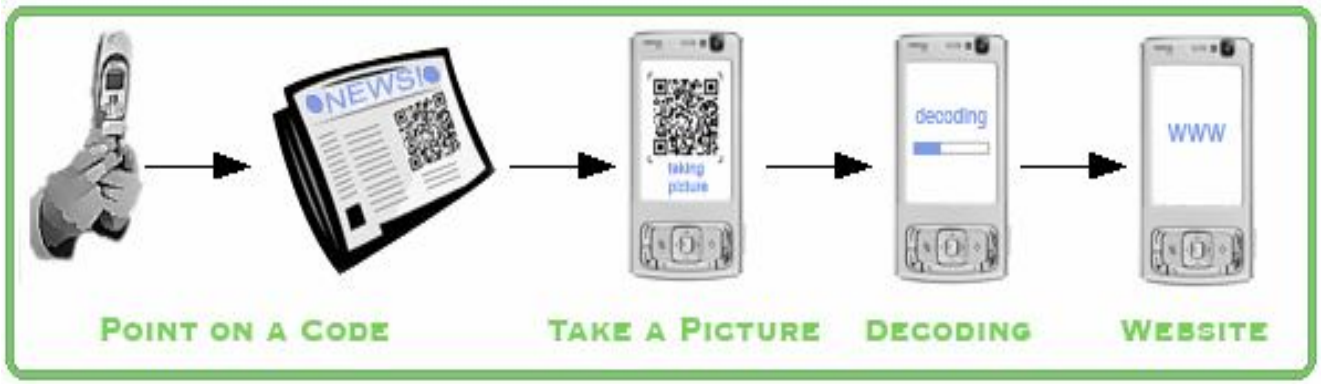
Code 93

1D Barcode

Source: Wikipedia

Mobile Tagging

- Reading out a 2D- or 3D-barcode by using a camera in a mobile device



Source: Wikipedia

Genetic Marker

- A genetic marker is a known DNA sequence
- A genetic marker may be a short DNA sequence
- A single base-pair change (single nucleotide polymorphism) or a long one, like mini satellites

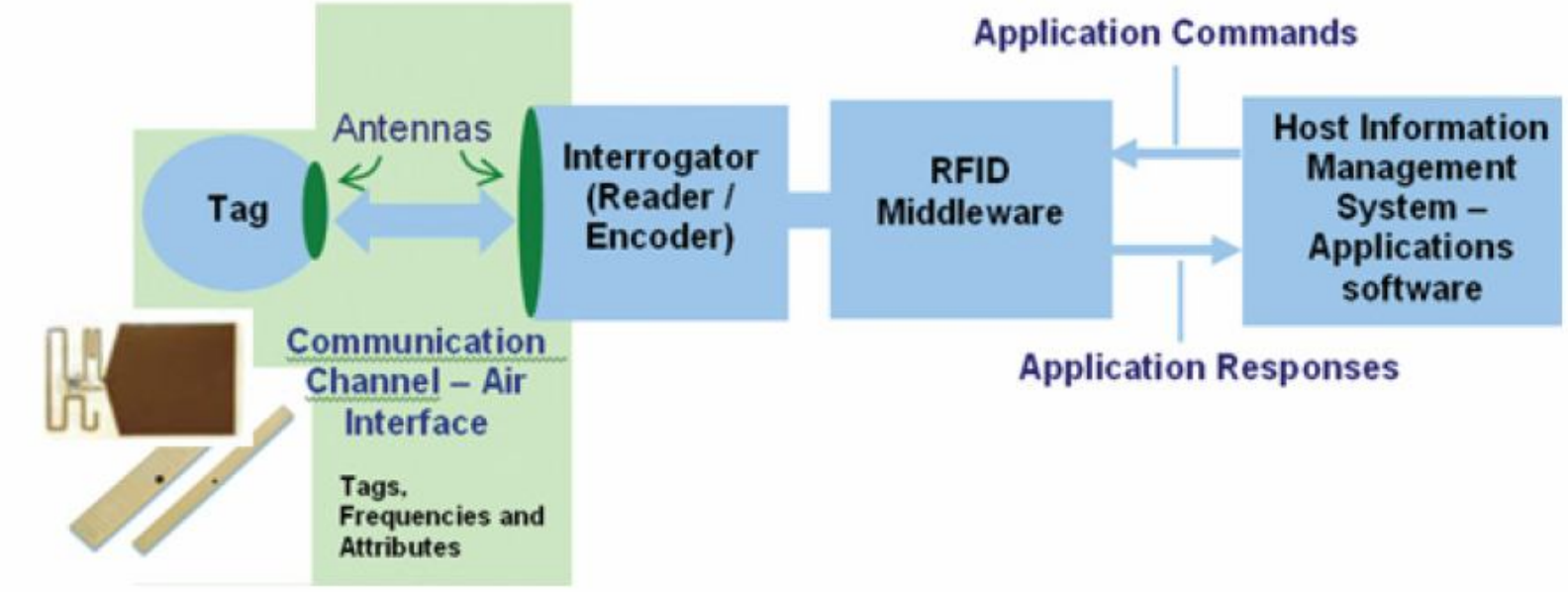
Some commonly used types of genetic markers are:

- RFLP (or Restriction Fragment Length Polymorphism)
- AFLP (or Amplified Fragment Length Polymorphism)
- RAPD (or Random Amplification of Polymorphic DNA)
- VNTR (or Variable Number of Tandem Repeat)
- Microsatellite Polymorphism
- SNP (or Single Nucleotide Polymorphism)
- STR (or Short Tandem Repeat)
- SFP (or Single Feature Polymorphism)

Source: Wikipedia

RFID

- RFID = Radio Frequency Identification
- Practical solutions include Tags, Reader(s), RFID Middleware and Back-end application solution



Animal Tracking

Industry initiative

- A CCIA tag is applied to the ear prior to leaving the farm of origin
- Established 2001, enforcement from 2002
- 6 different tags from 5 different vendors have been qualified

Mandatory RFID tagging

- All tags have visual and electronic unique identification number
- The unique number is maintained until the point of export of carcass inspection where animal is either accepted for consumption or condemned

Fine Wine

ePROVENANCE

RFID tag embedded in wine bottle

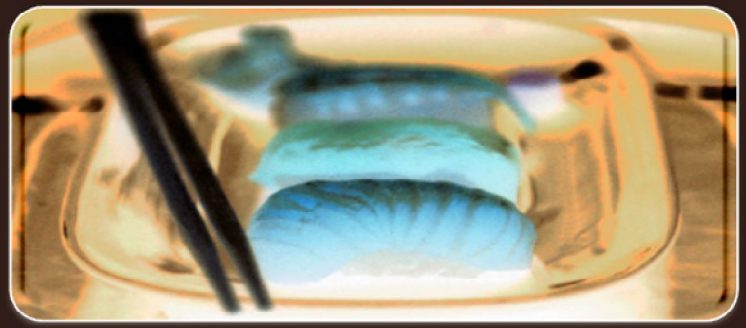
- Temperature logged 3x per day
- Internet-enabled data base for authentication

Objectives

- Ensure deviation from suitable environmental conditions can be tracked
- Anti-counterfeit

Conveyor Belt Sushi

BLUE C SUSHI



Traditional operation

- Colour coded plates indicates different price level
- Plates bar coded to verify time on belt for food safety purposes

RFID enhanced operation

- Content, time when dish was made and placed on the plate recorded for every plate
- Provide accurate real-time inventory information to chefs
- Less waste
- More accurate for billing purposes

Wal-Mart Initiative

Ambitious initiative

- Launched 2003
- Required top 100 suppliers to label pallets and cases from 2005 onwards
- RFID enabled 12 of 130 distribution centers by 2006

Status

- 600 of 60,000 suppliers are participating
- 600 of 4000 shops RFID enabled (2006)
- Main issues reported: cost of readers, tags and systems and readability for products containing metal, liquids and frozen food
- Refocused on RFID enabling stores instead of distribution centers

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6. Food Safety Incidei

Worldwide

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Food Safety Incidence

Media has reported many food safety outbreaks in the last 5 years

Contaminants	Food / Category	Country Affected	Year
Dioxin	Mozzarella Cheese	Italy	2008
Methamidophos (Insecticide)	Chinese Dumplings	Japan	2008
Melamine (Pesticide)	Wheat Protein	USA	2007
Salmonella	Chocolate	UK, Ireland	2006
Sudan I (Food Colouring)	Sauce	UK, Canada	2005
Bird Flu (H5N1)	Poultry	Asia	2003

EU RASFF

Rapid Alert System for Food & Feed (RASFF)

- It is a network
- Notification of direct or indirect risks to human health
- Deriving from food and feed
- Including Pet Food

Notification Types

alert notifications

Alert notifications are sent when the food or feed presenting the risk is on the market and when rapid action is required. Alerts are triggered by the Member State that detects the problem and that has initiated the relevant measures, such as withdrawal/recall. The notification aims at giving all the members of the network the information to verify whether the concerned product is on their market, so that they also can take the necessary measures.

information notifications

Information notifications concern a food or feed for which a risk has been identified, but for which the other members of the network do not have to take rapid action, because the product has not reached their market. These notifications mostly concern food and feed consignments that have been tested and rejected at the external borders of the EU.

news notifications

Any type of information related to the safety of food or feed which has not been communicated by a Member State as an "alert" or an "information" notification, but which is judged interesting for the food/feed control authorities in the Member States, is classified and made available as a news notification.

Rejected Notifications 2006

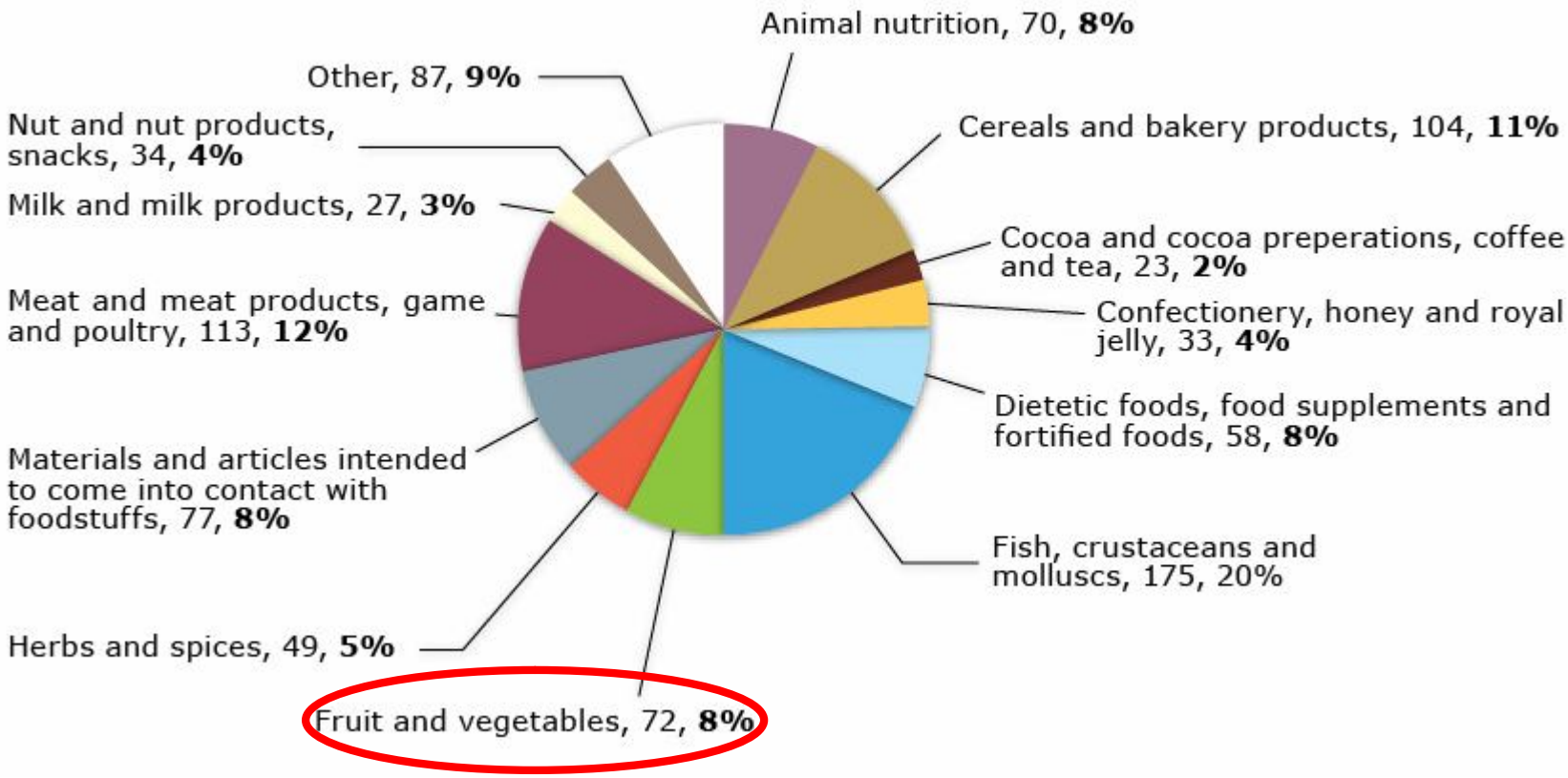
Type of hazards identified in the rejected notifications

adulteration	1
composition	1
food additives	4
GMO / novel food	1
heavy metals	1
labelling absent / incomplete / incorrect	12
microbiological contamination	12
migration	6
not determined / other	32
organoleptic changes	3
packaging defective / incorrect	3
pesticide residues	12
(potentially) pathogenic micro-organisms	47
residues of veterinary medicinal products	3
Total	**139**

Source: RASFF Report 2006

Alert Notifications 2006

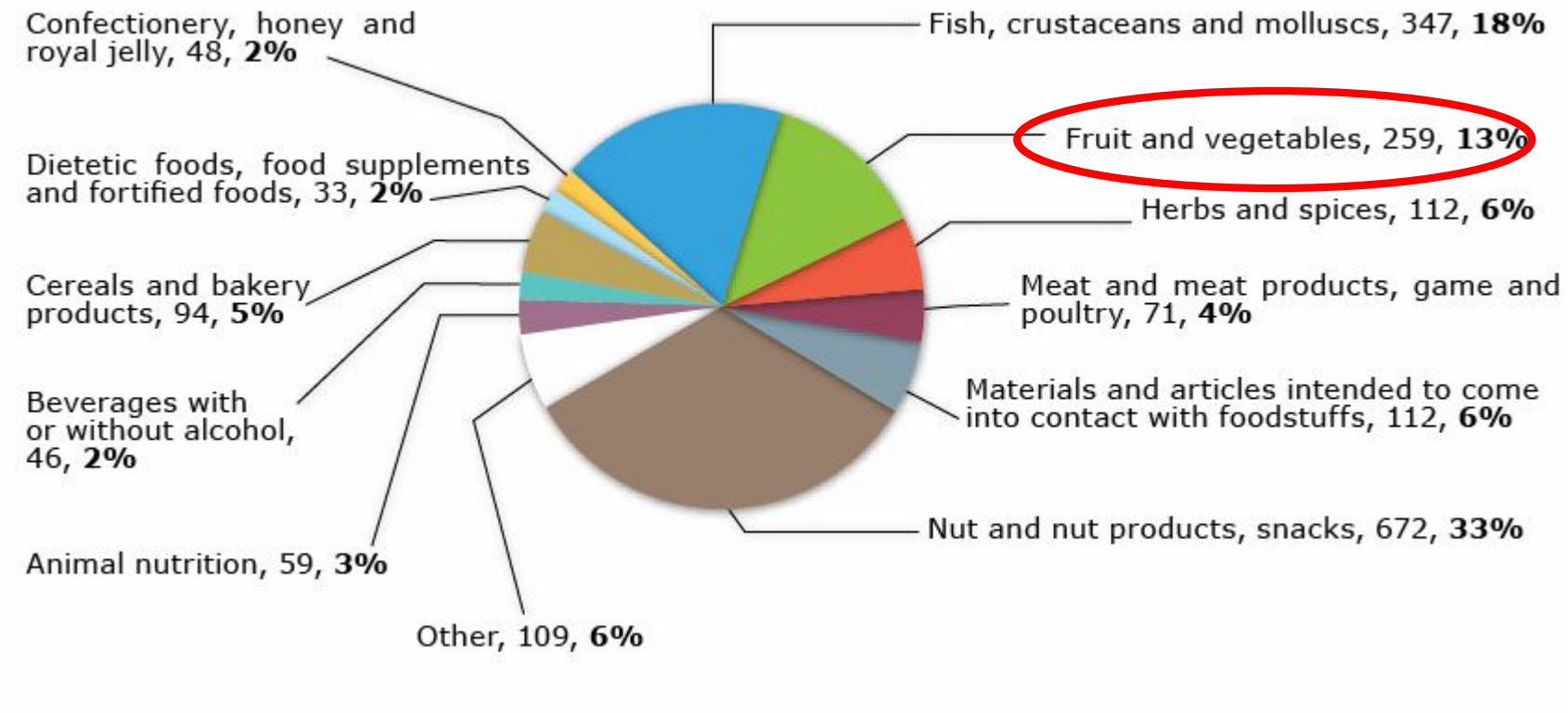
Alert Notifications by Product Category



Source: RASFF Report 2006

Information Notifications 2006

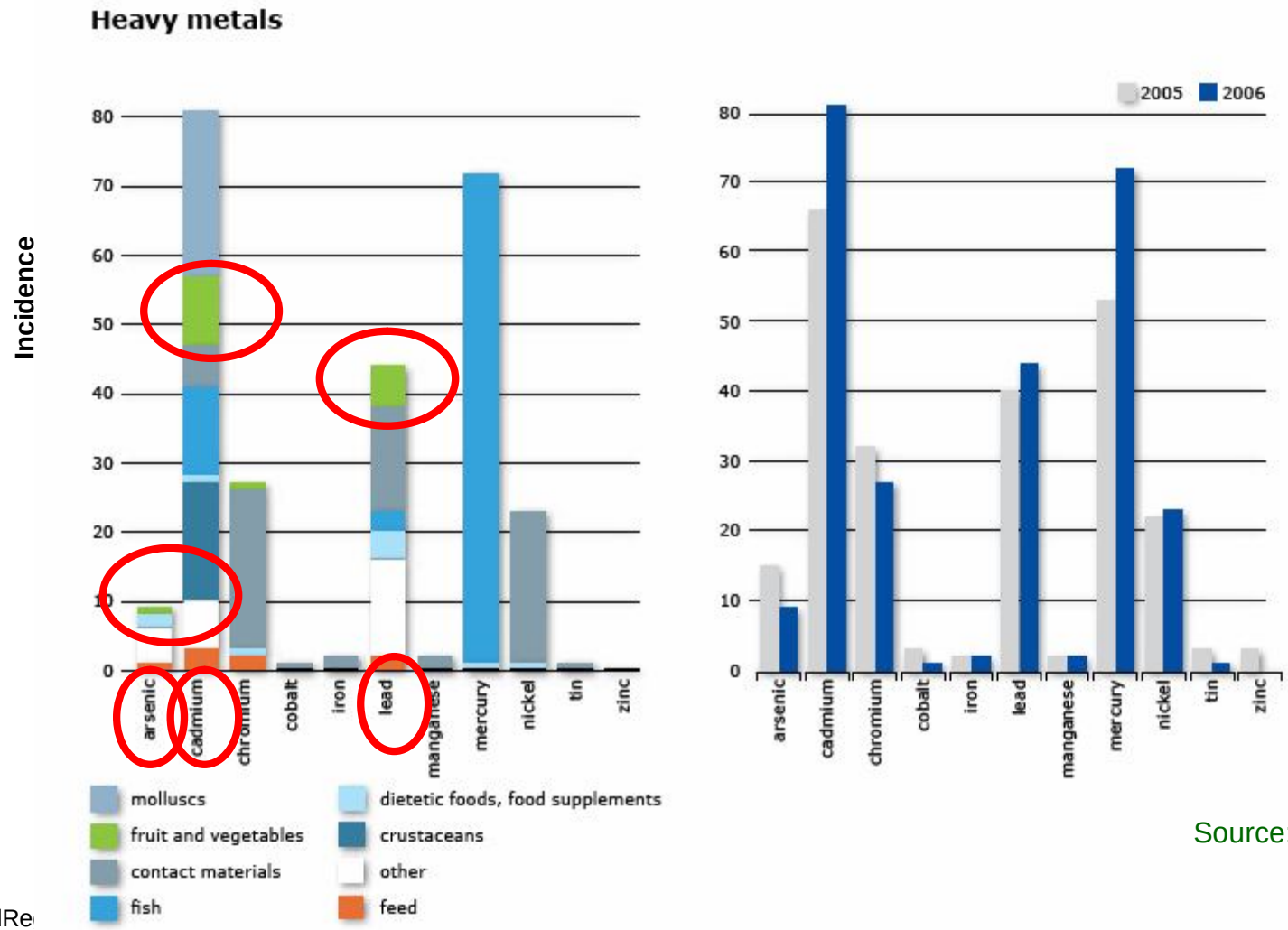
Information Notifications by Product Category



Source: RASFF Report 2006

Information Notifications 2006

Heavy Metal Notification



Source: RASFF Report 2006

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7. Quality & Gradin

Starfruit

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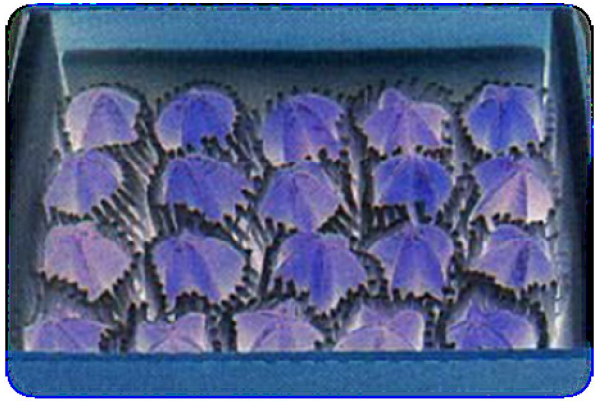
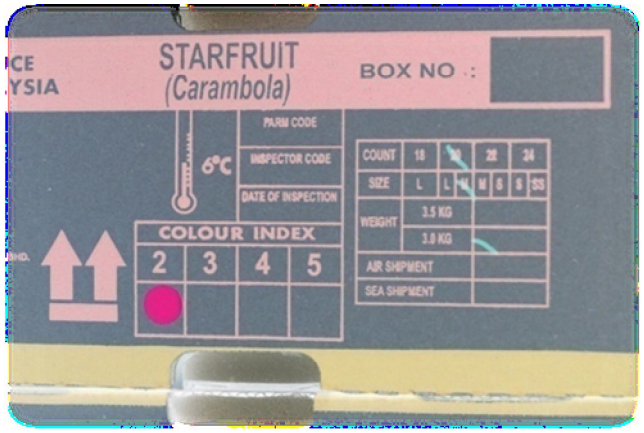
GAP to Preserve Quality

- Inspection at Farm
  - Remove fruit fly infested fruits
  - Discard damaged fruit
  - Post harvest cleaning in insect-proof facilities
- Transportation to Packing House
  - Insect-proof cold trucks
- Facilities at Packing House
  - Insect-proof storage facilities
  - Cold room

Post Harvest Handling

- Packaging
  - Individually wrapped with protective materials
  - Packing boxes with cushion
  - Air holes covered with plastic netting
- Storage Conditions
  - Sealed boxes
  - Storage temperature of 5 – 10°C
  - Relative humidity of 85 – 90%





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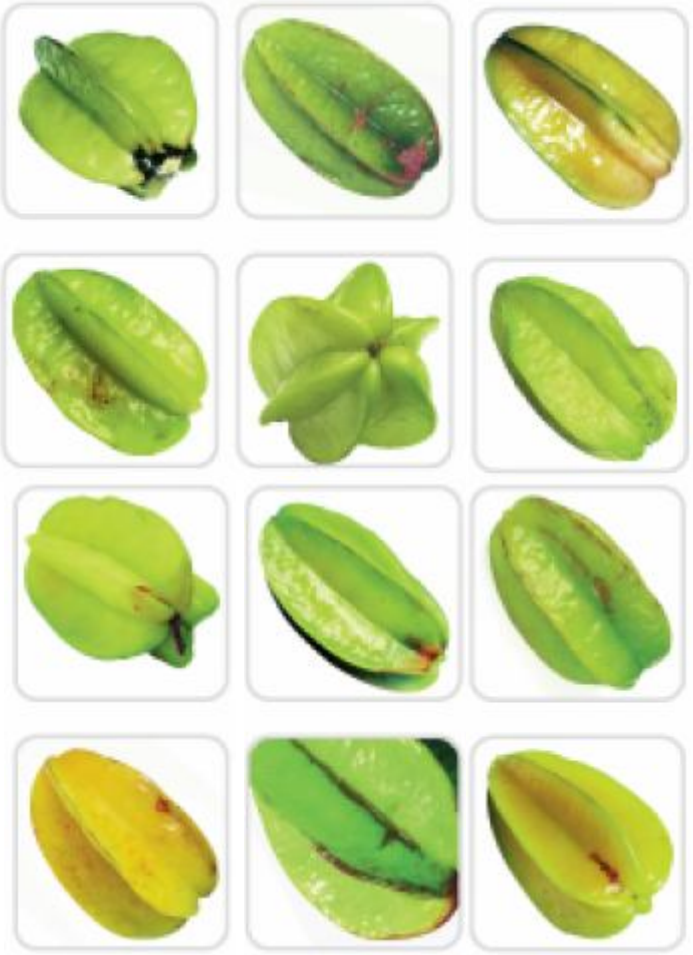
Storage Temp & Storage Life

Type of Fruits	Storage Temperature	Storage Life
Yellow Fruits (25% on the skin)	20 – 30°C	1 – 3 weeks
	10 – 15°C	5 weeks
	5°C	9 weeks
Fruits with less than 25% yellow skin	-	Do not withstand long storage periods; prone to chilling injuries

Grading of Starfruit

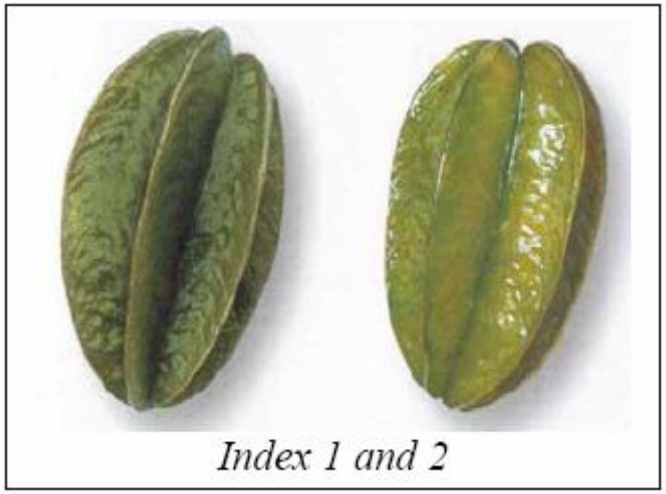
Grade	Specification	Range of Flexibility (Maximum)
Premium	Fruits are collected from same cultivar, fresh and clean. Uniform size and maturity index and free from damages.	Maturity ≤ 3% Freshness ≤ 5% Damages ≤ 3% Abnormality ≤ 3% Size uniformity ≤ 5%
1	Fruits are collected from same cultivar, fresh and clean. Uniform size and maturity index and slight or free from damages	Maturity ≤ 5% Freshness ≤ 5% Damages ≤ 5% Abnormality ≤ 3% Size uniformity ≤ 10%
2	Fruits are collected from same cultivar, fresh and clean. Uniform size and maturity index and slightly damaged.	Maturity ≤ 10% Freshness ≤ 10% Damages ≤ 10% Abnormality ≤ 10% Size uniformity ≤ 10%



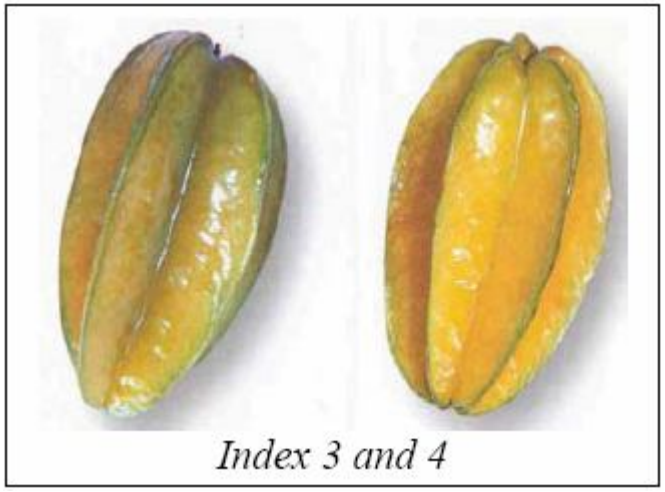
Source: FAMA – standard specification and grading for carambola. MS 1127

Colour Index

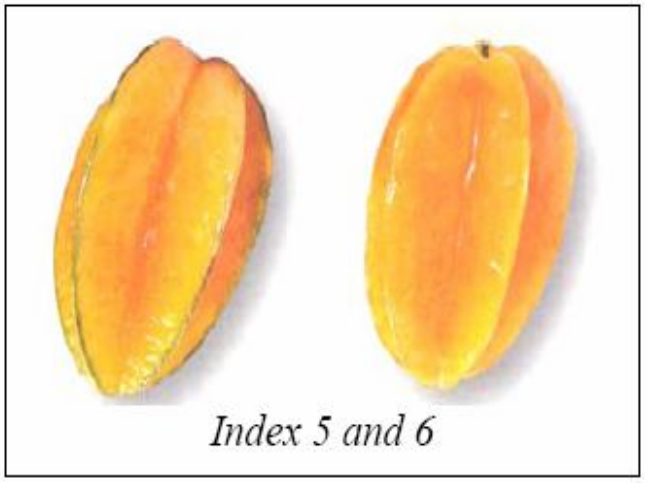
Colour index	Indicator
1	The whole fruit is green
2	The fruit turns light green
3	The fruit turns to yellowish green
4	The fruit turns to greenish yellow
5	The whole fruit turns yellow
6	The whole fruit turns orange



Index 1 and 2



Index 3 and 4



Index 5 and 6

Source: Federal Agricultural Marketing Authority (FAMA), Ministry of Agricultural Malaysia

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8. M-FIT Project

Malaysia Food Information & Traceability **(M-FIT)**

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M-FIT

Malaysia Food Information & Traceability **(M-FIT)** Project covers Poultry, Starfruit and Prawn.

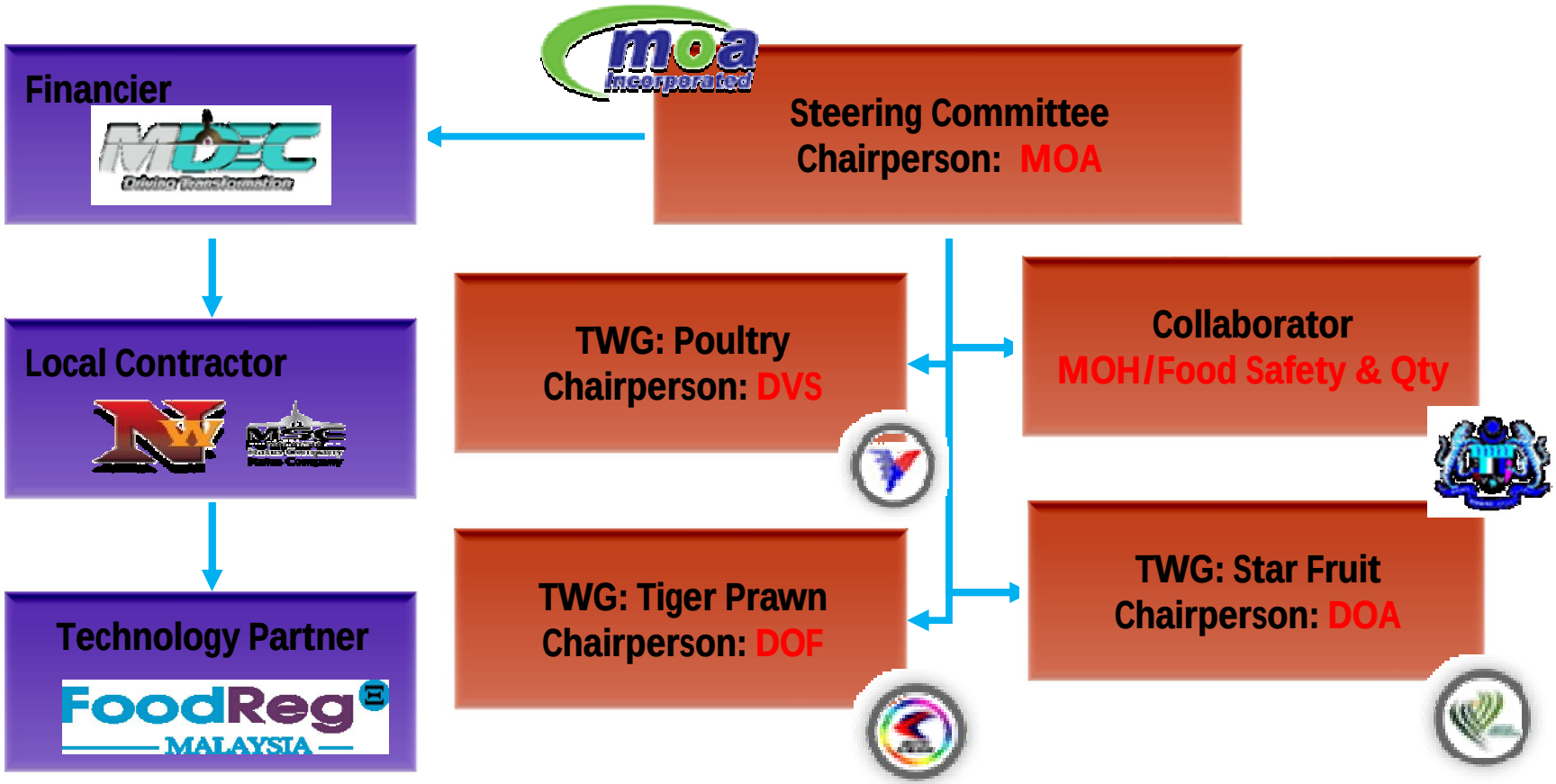


M-FIT Objectives

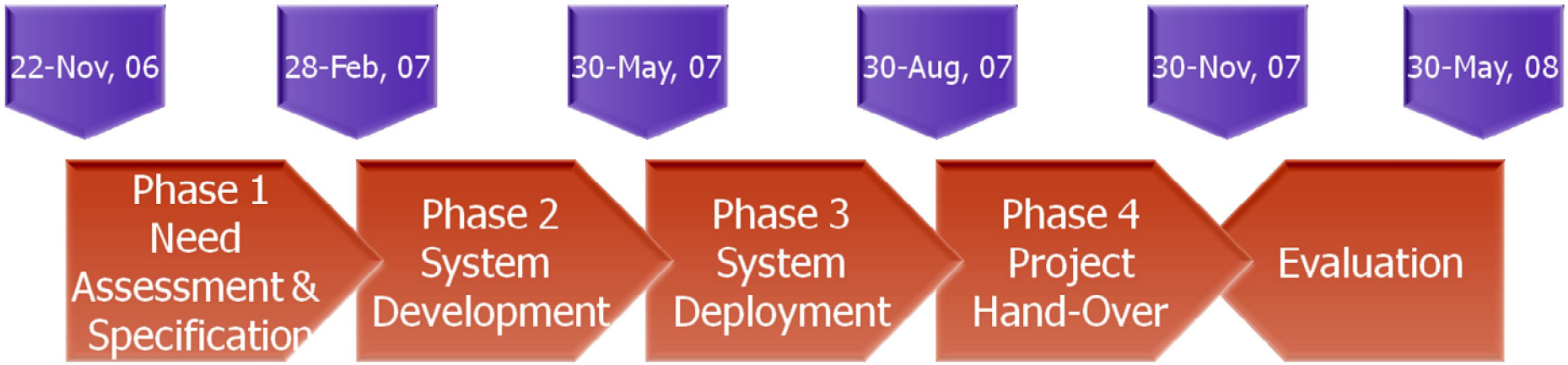
A Malaysian 'Information Hub' is an integrated database of the entire supply food chain, for domestic and export market leading to:

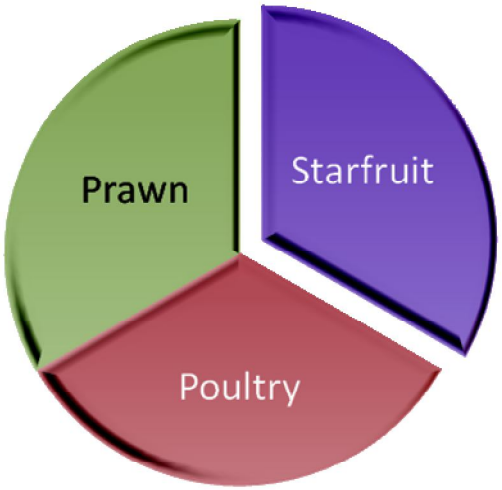
- **Better operations, food quality** and **information flow** from farmers to consumers
- **Compliance** to **national** and **international standards**
- Establishing Malaysia as a **source of high-quality** and **safe food products**

M-FIT Project Background

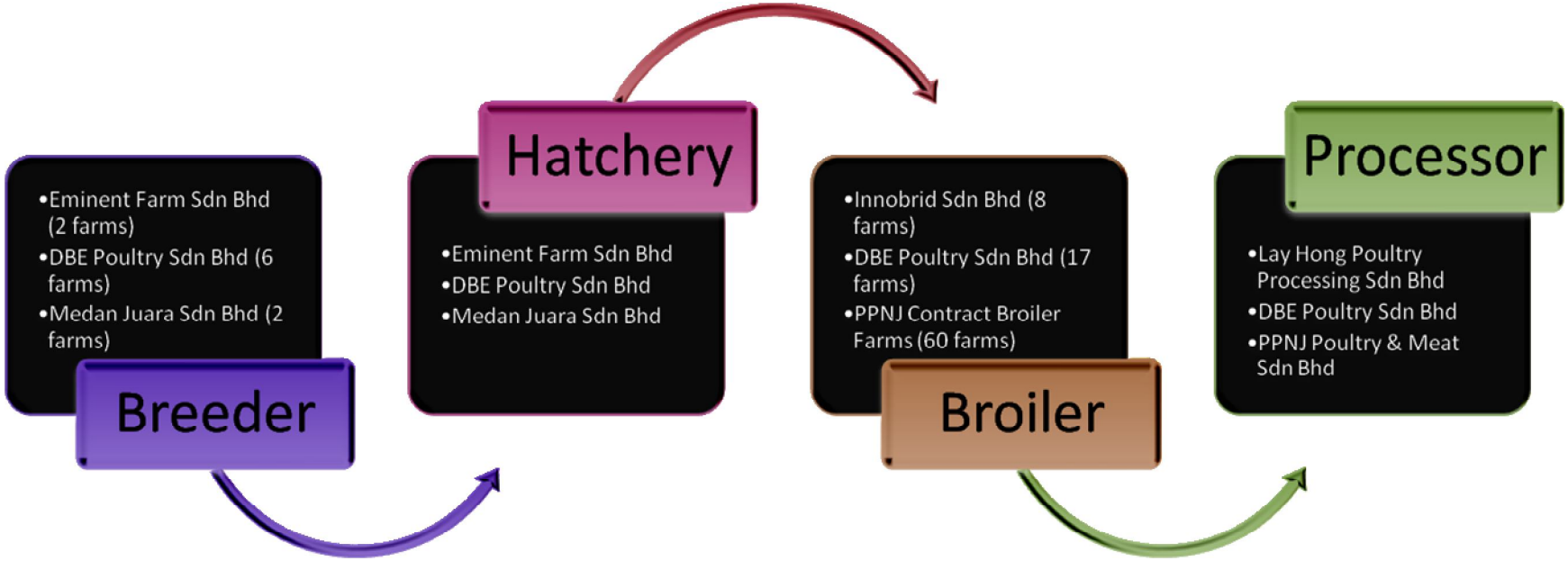


M-FIT Project Timeline

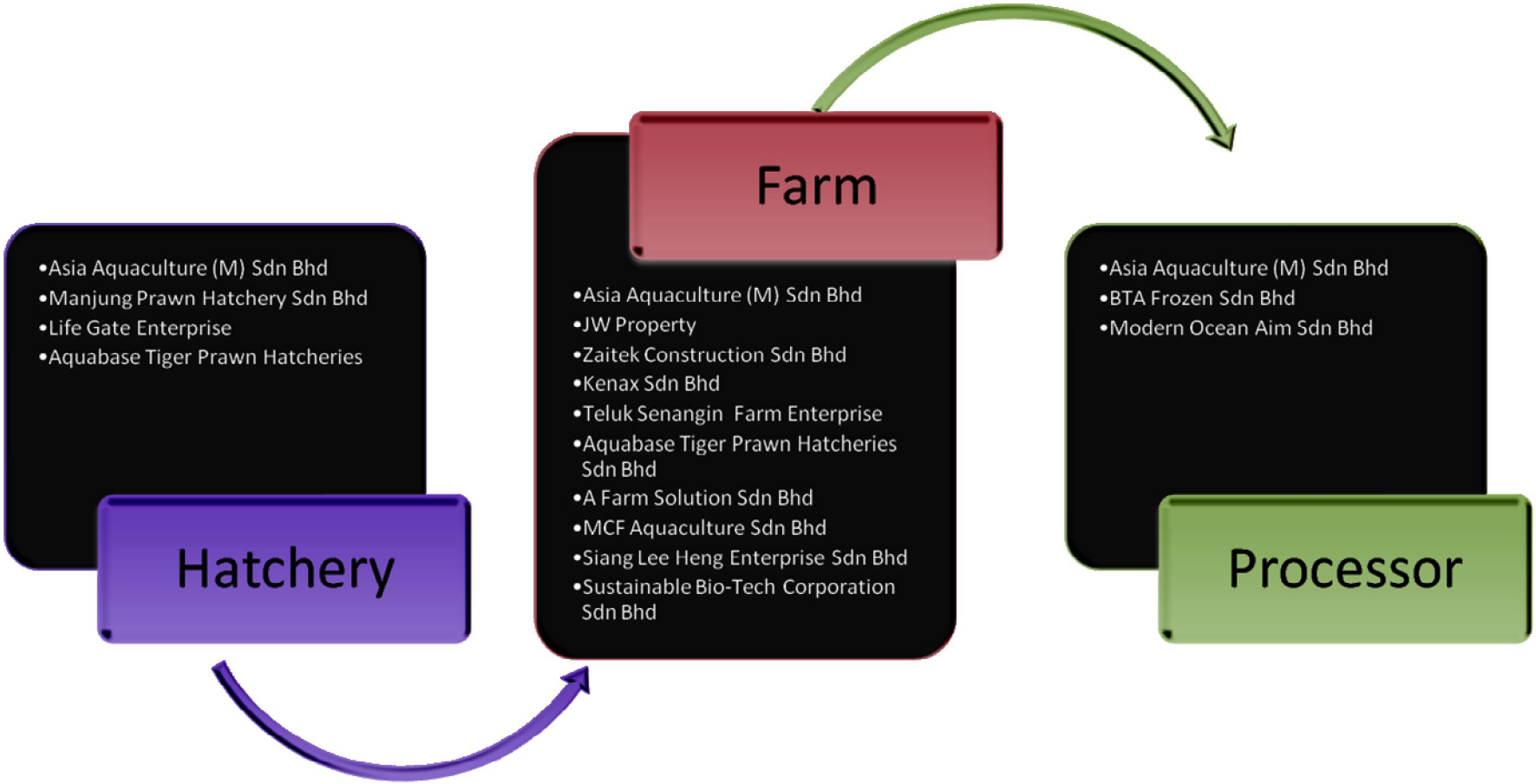




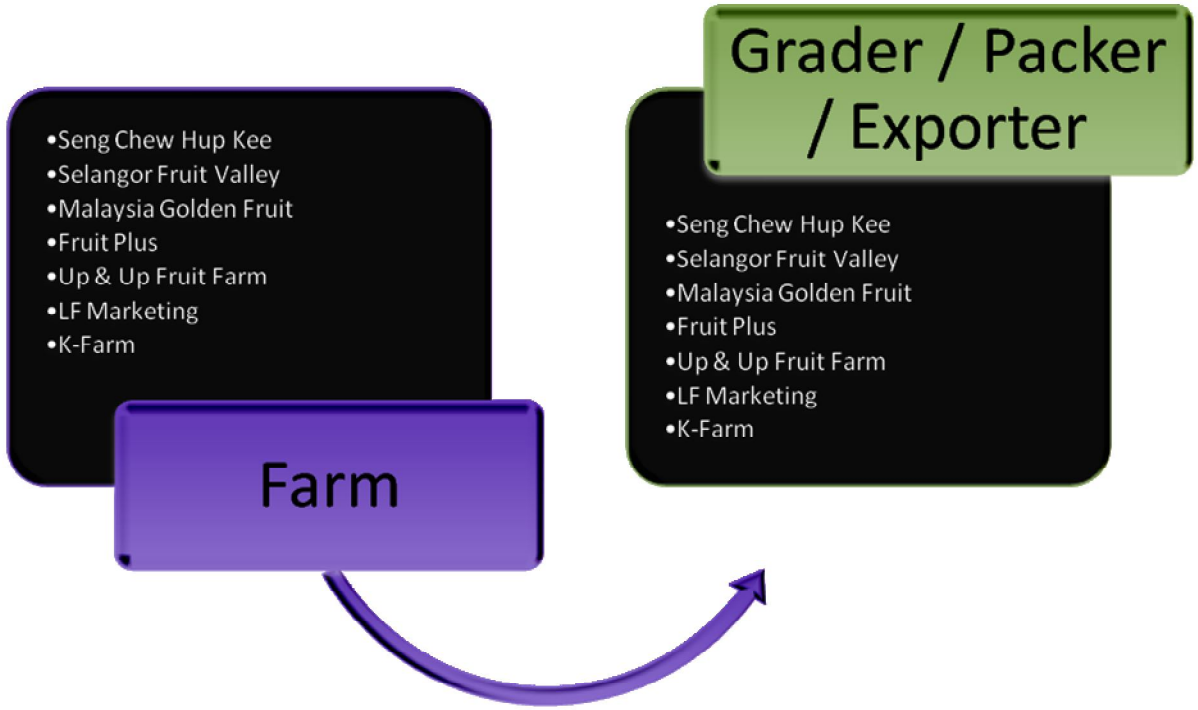
Poultry Sector



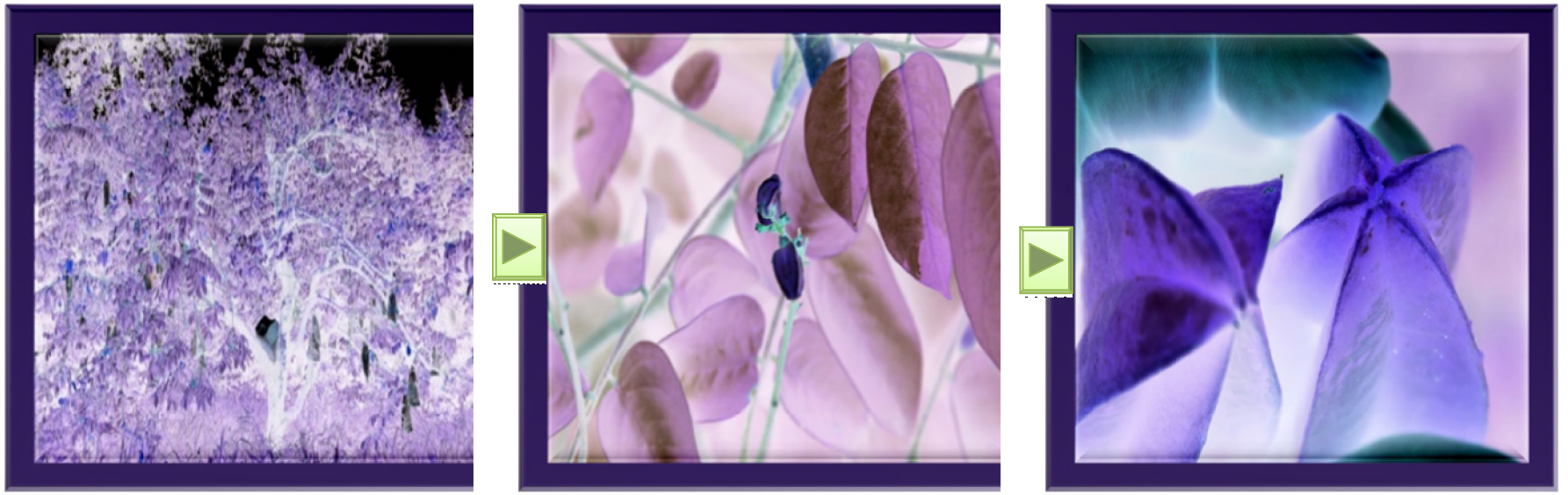
Prawn Sector



Starfruit Sector

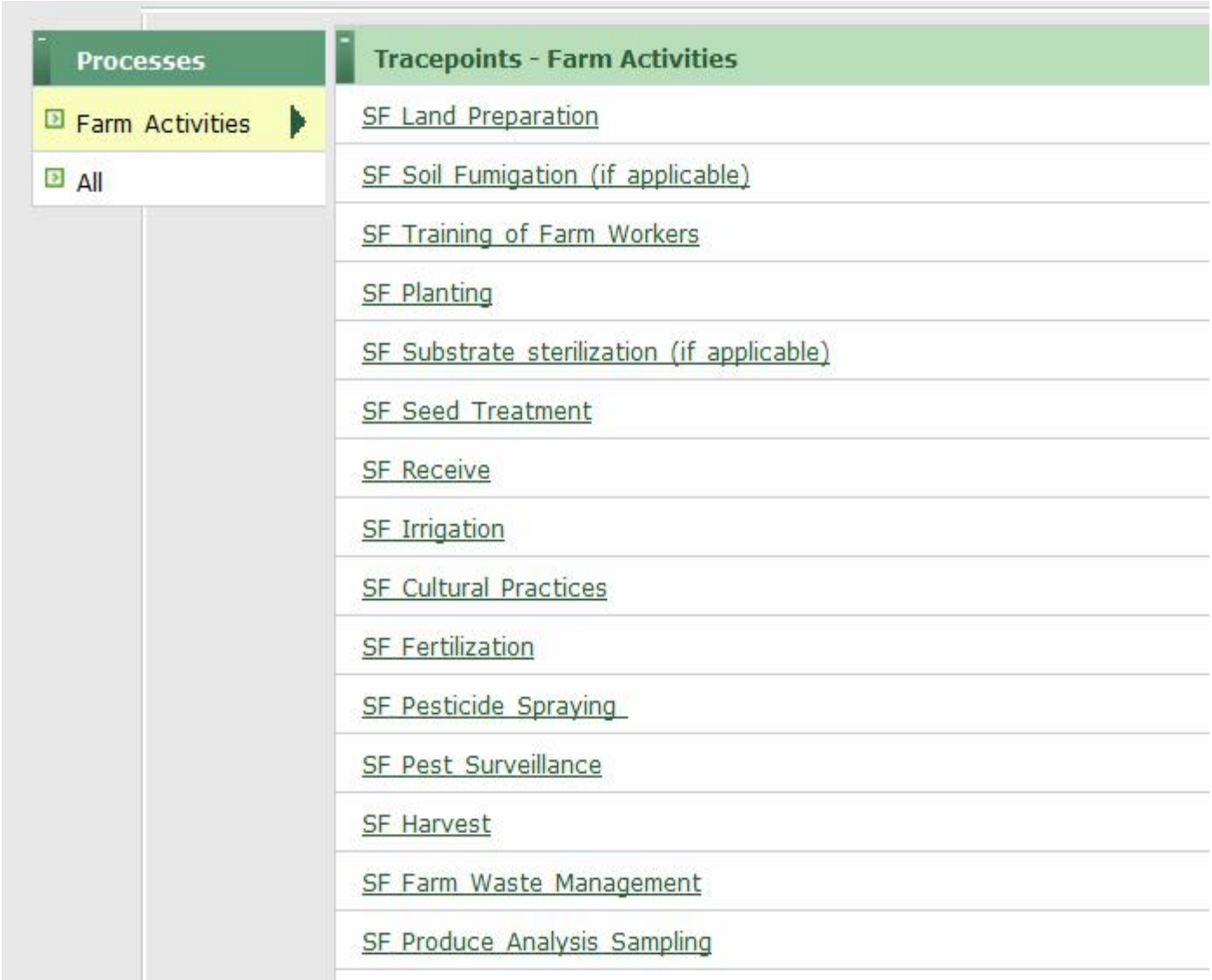


Starfruit Farm



Starfruit Farm

M-FIT System - Farm



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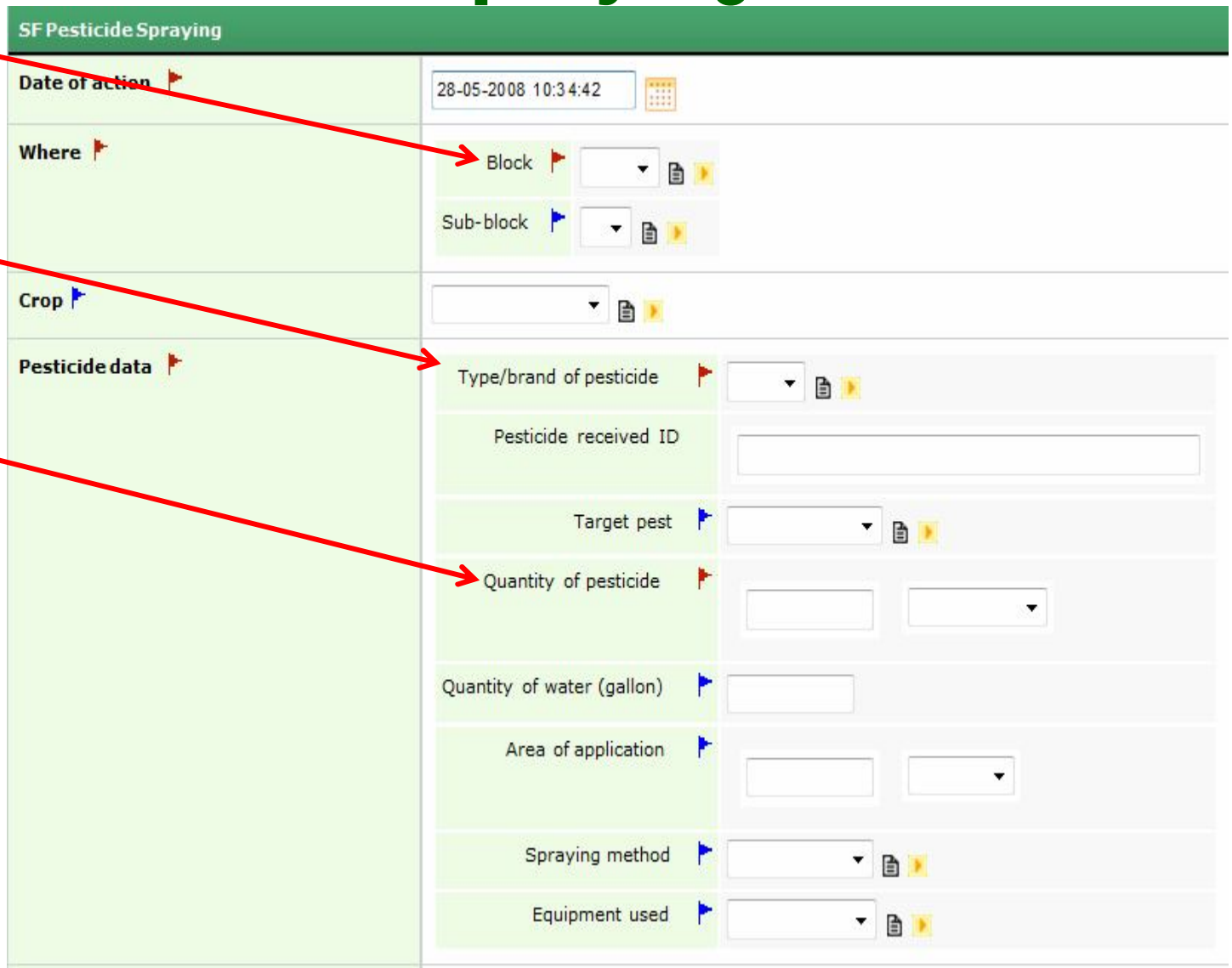
Pesticide Spraying

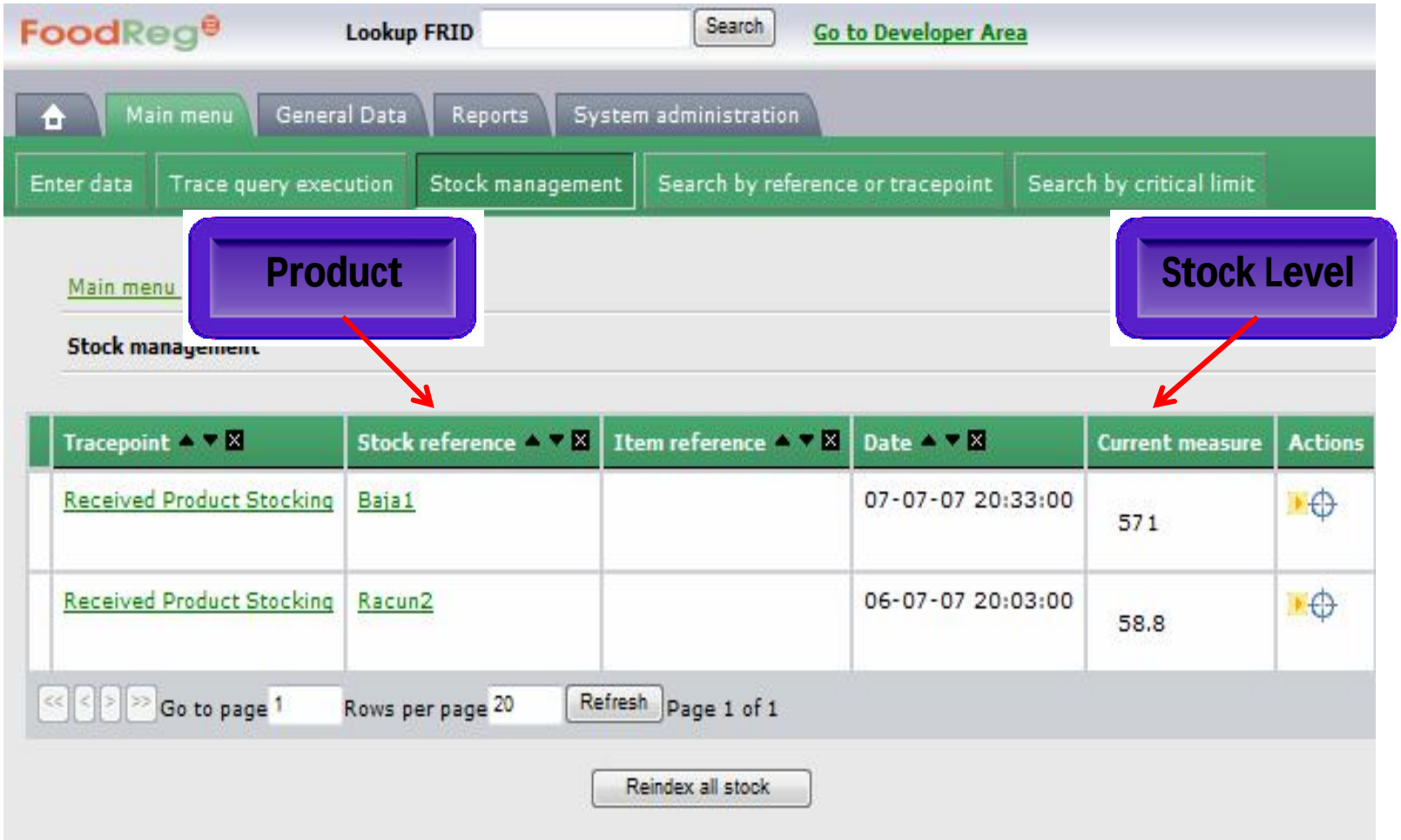
Block

Pesticide

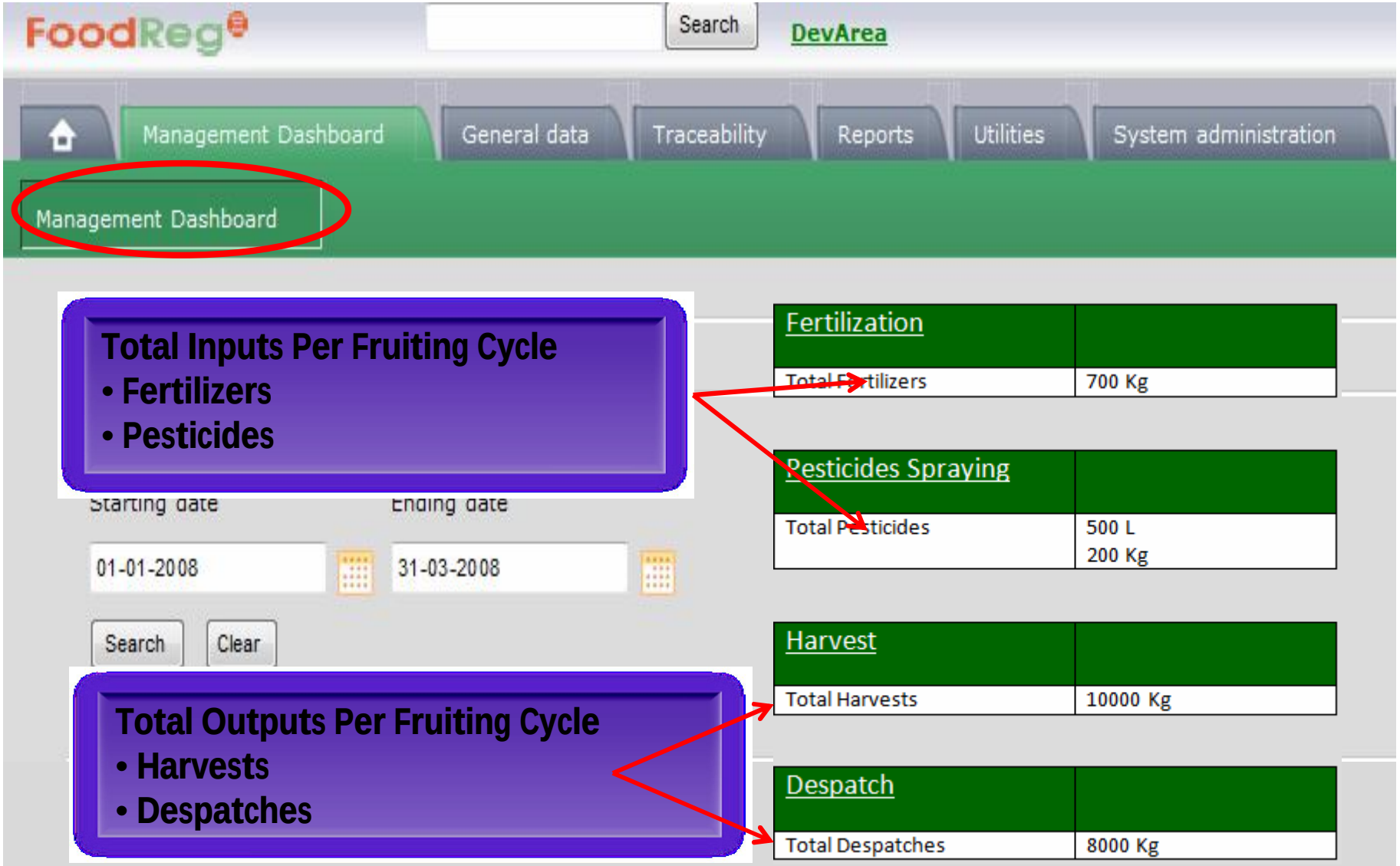
Quantity



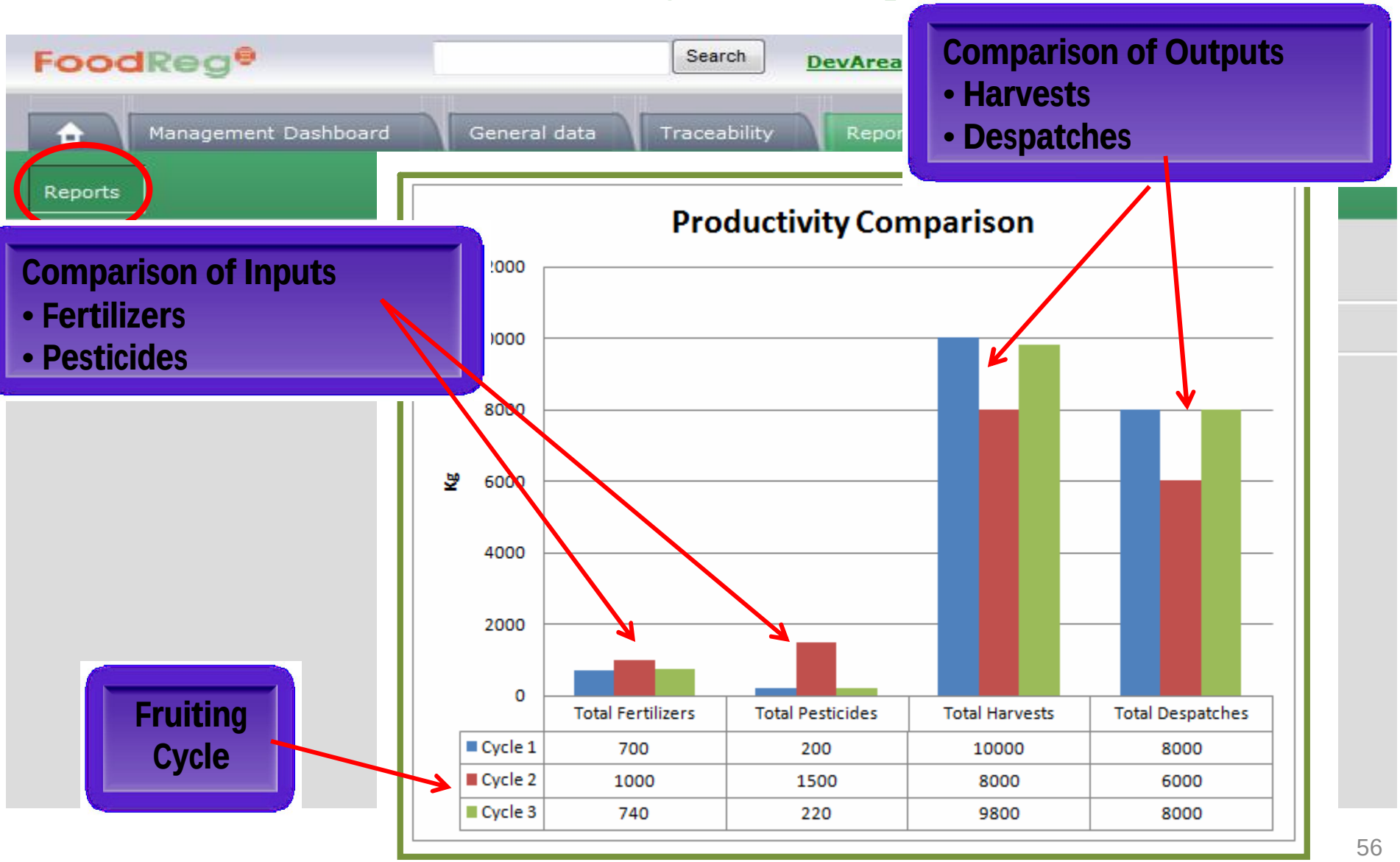
Stock Management



Productivity Monitoring

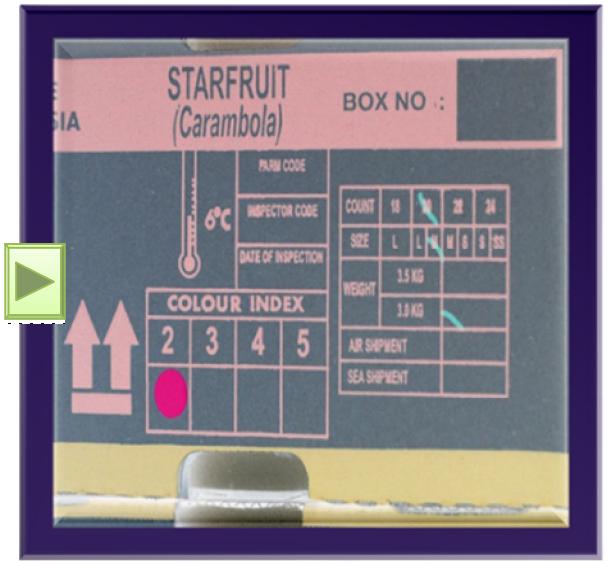


Productivity Comparison

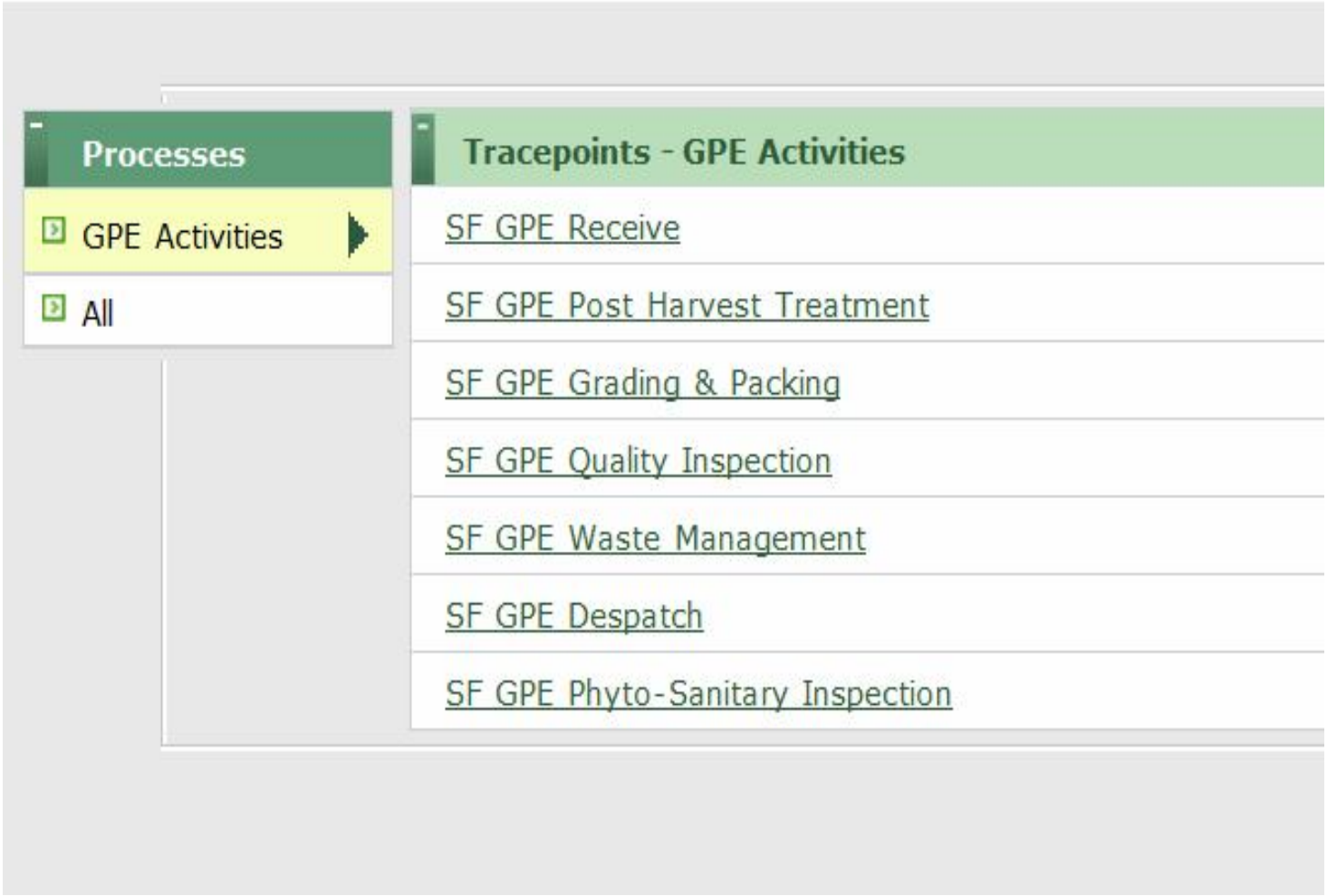


Mobile Data Entry

Grader/Packer/Exporter (GPE)



GPE Operations

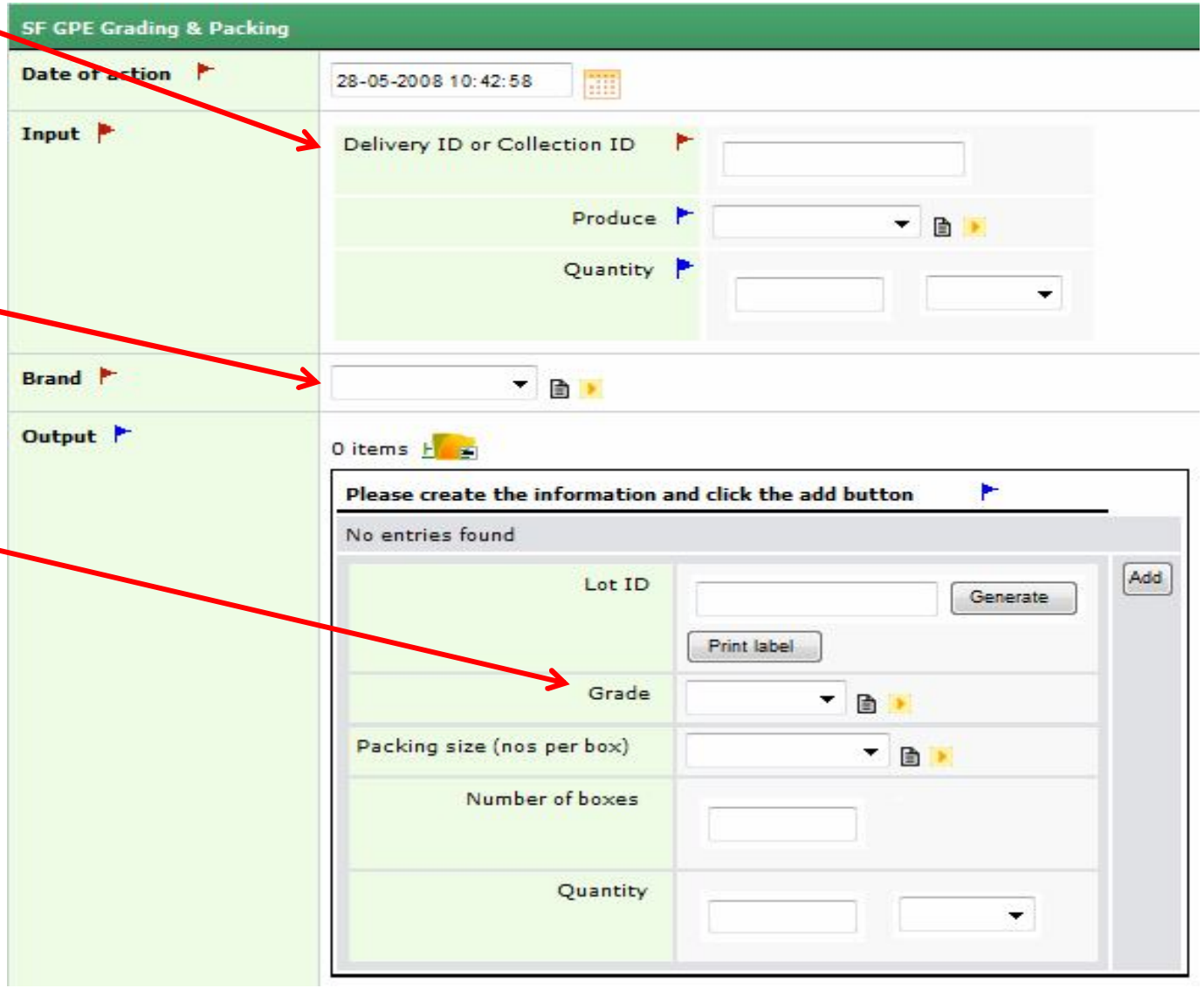


Grading & Packing

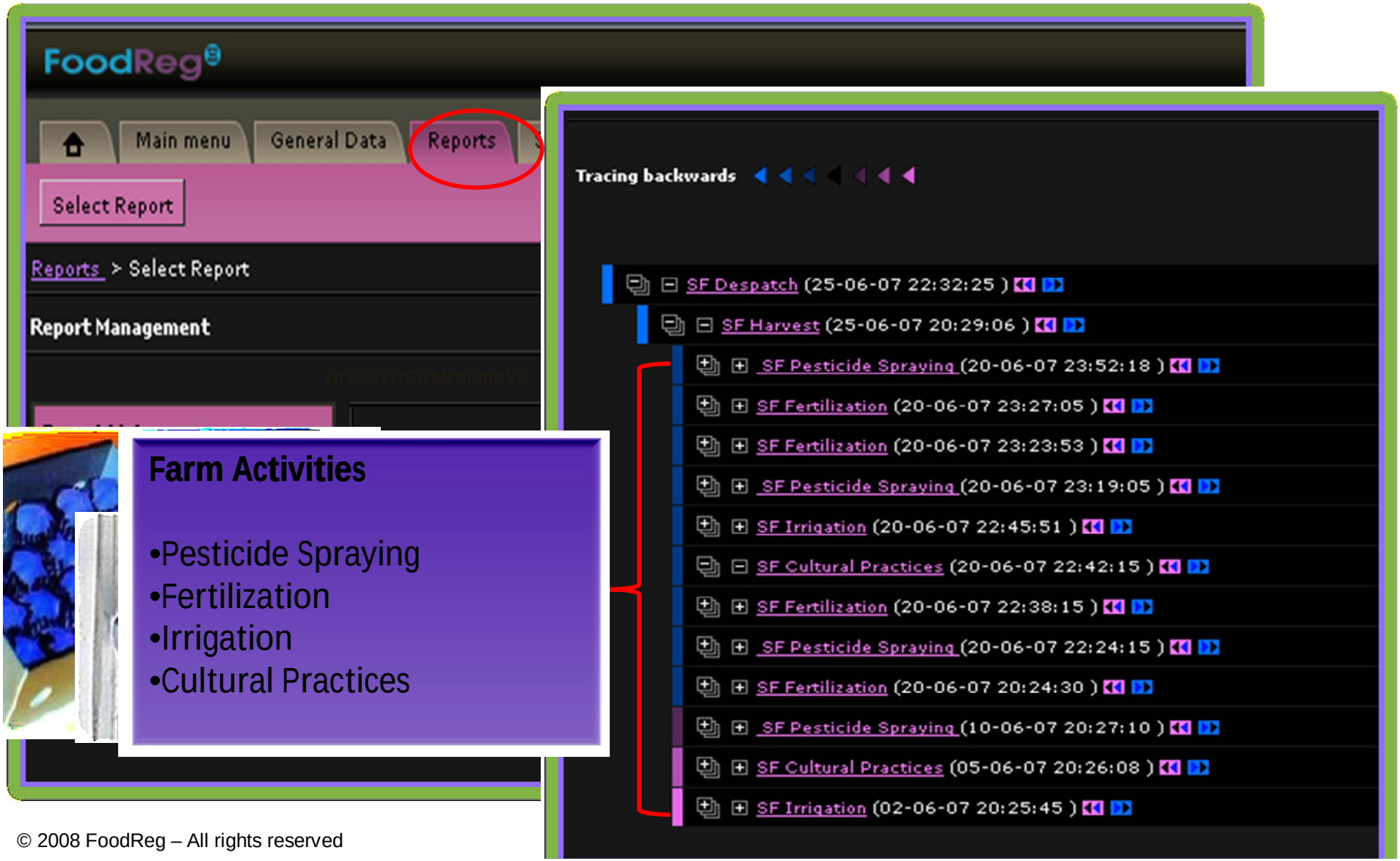
Delivery ID

Brand

Grade



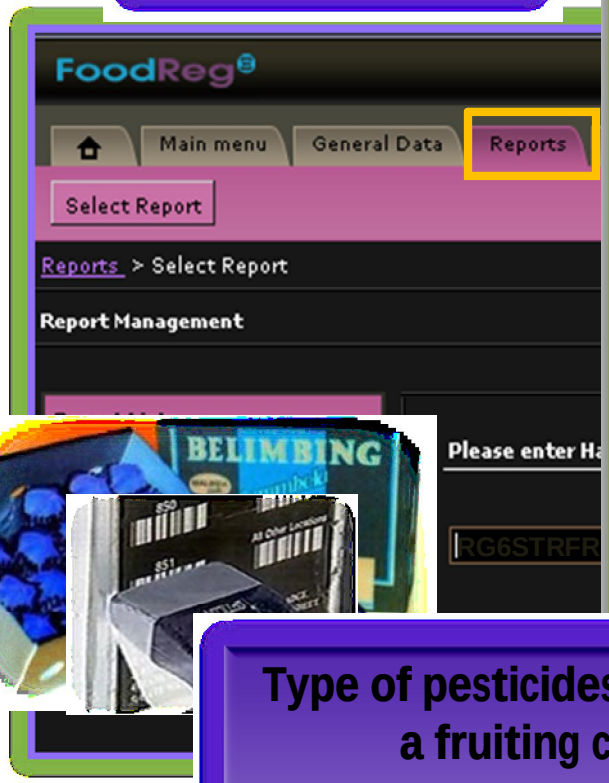
Records Retrieval

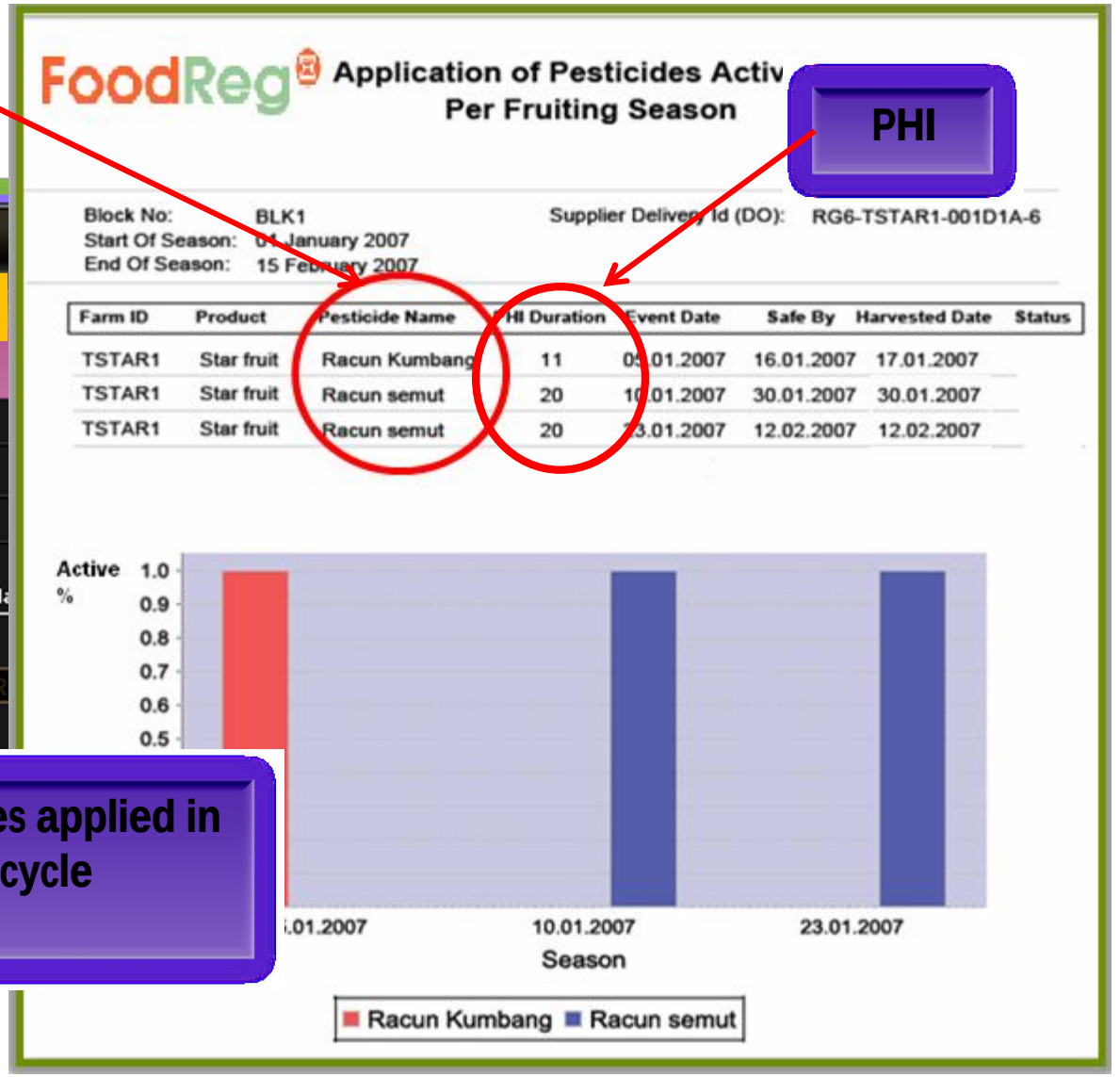


Consumer/Buyer Gets...

Type of Pesticides

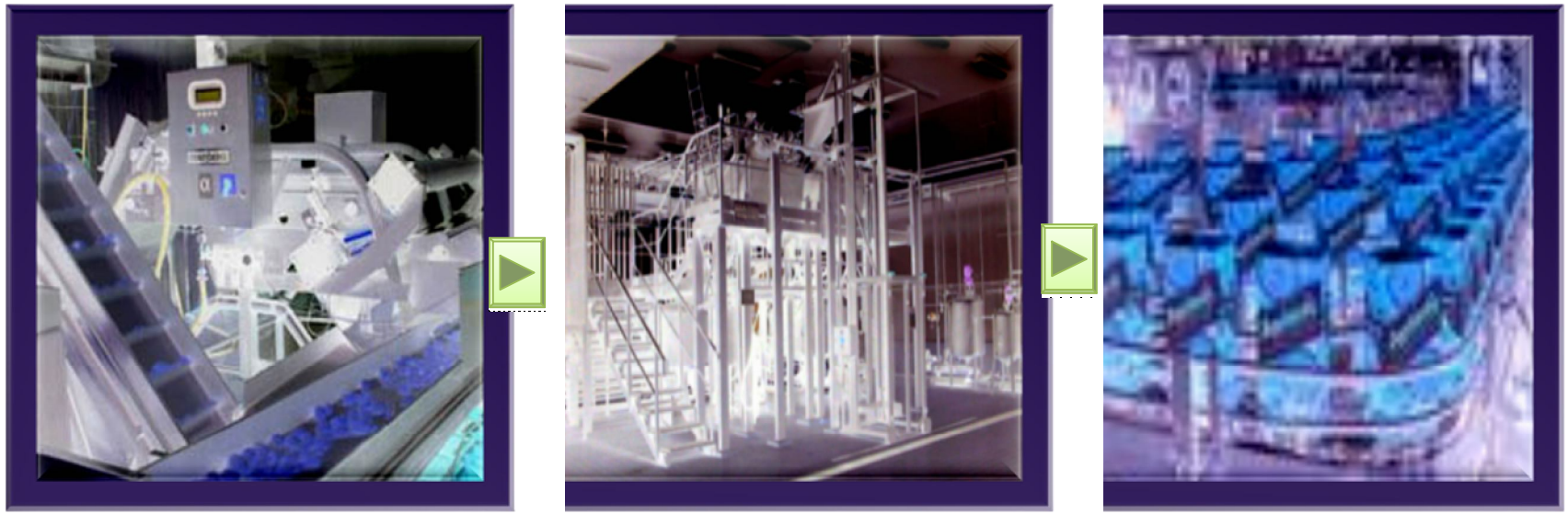
PHI



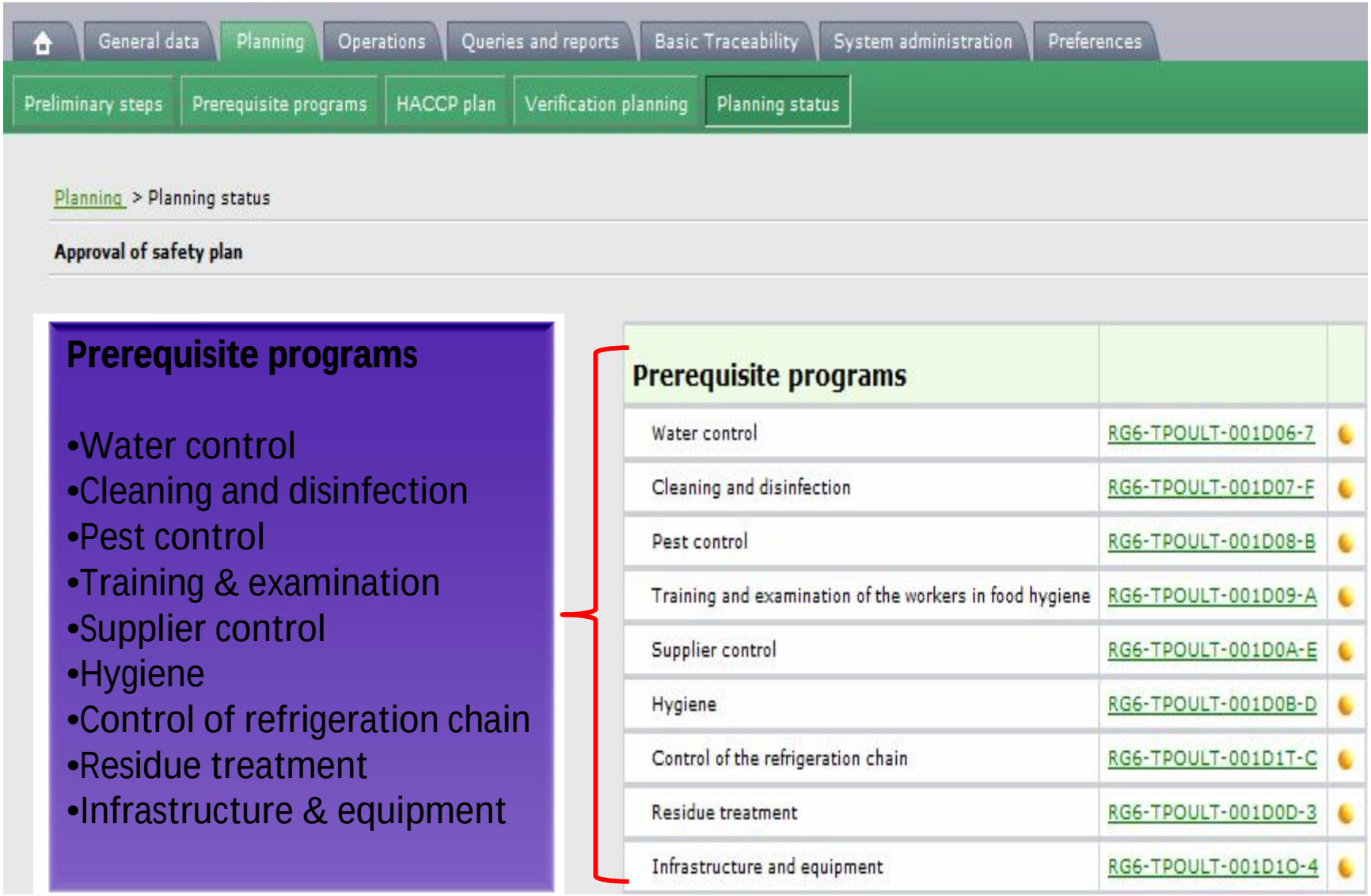


Type of pesticides applied in a fruiting cycle

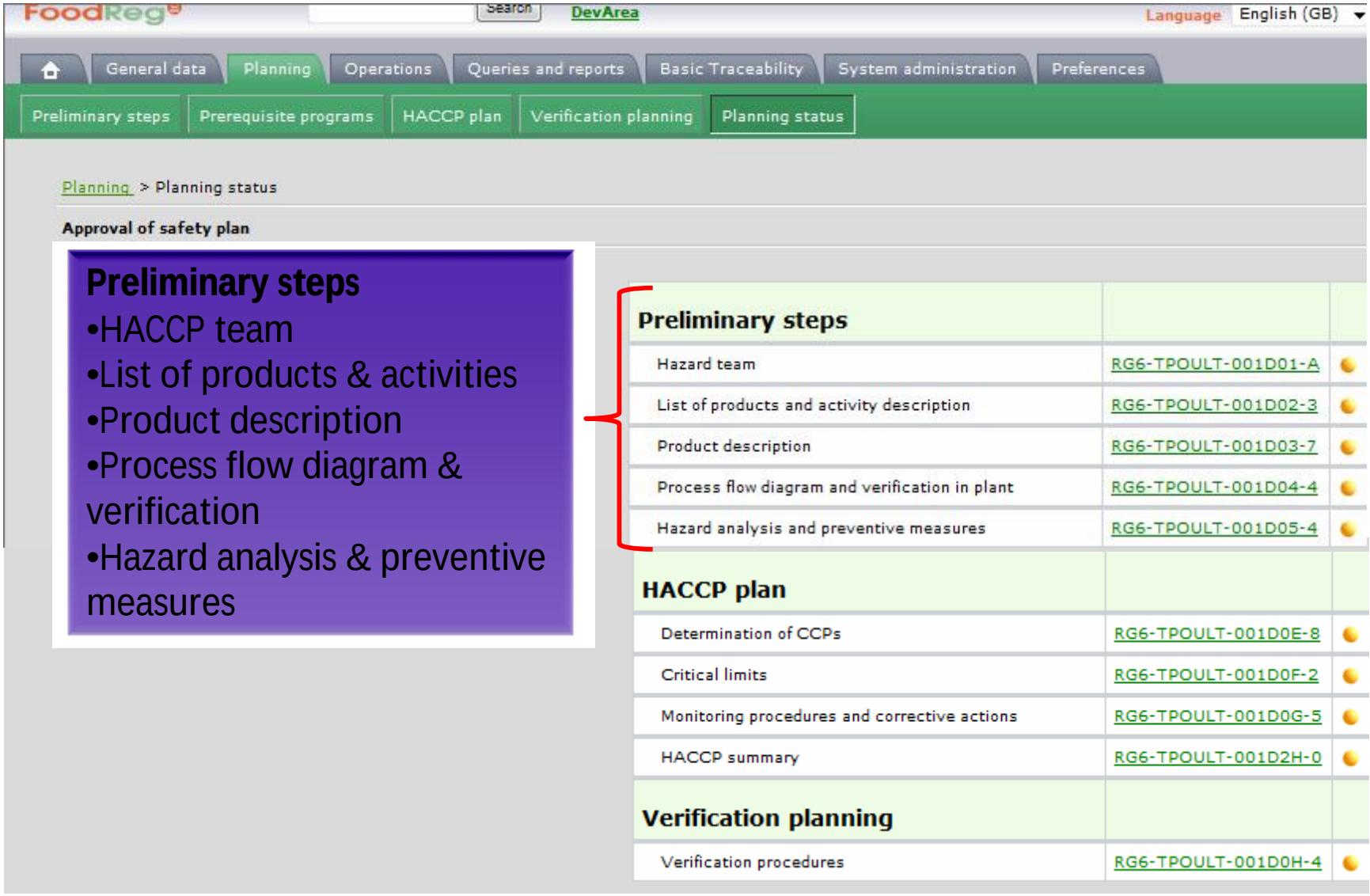
Processing Plant



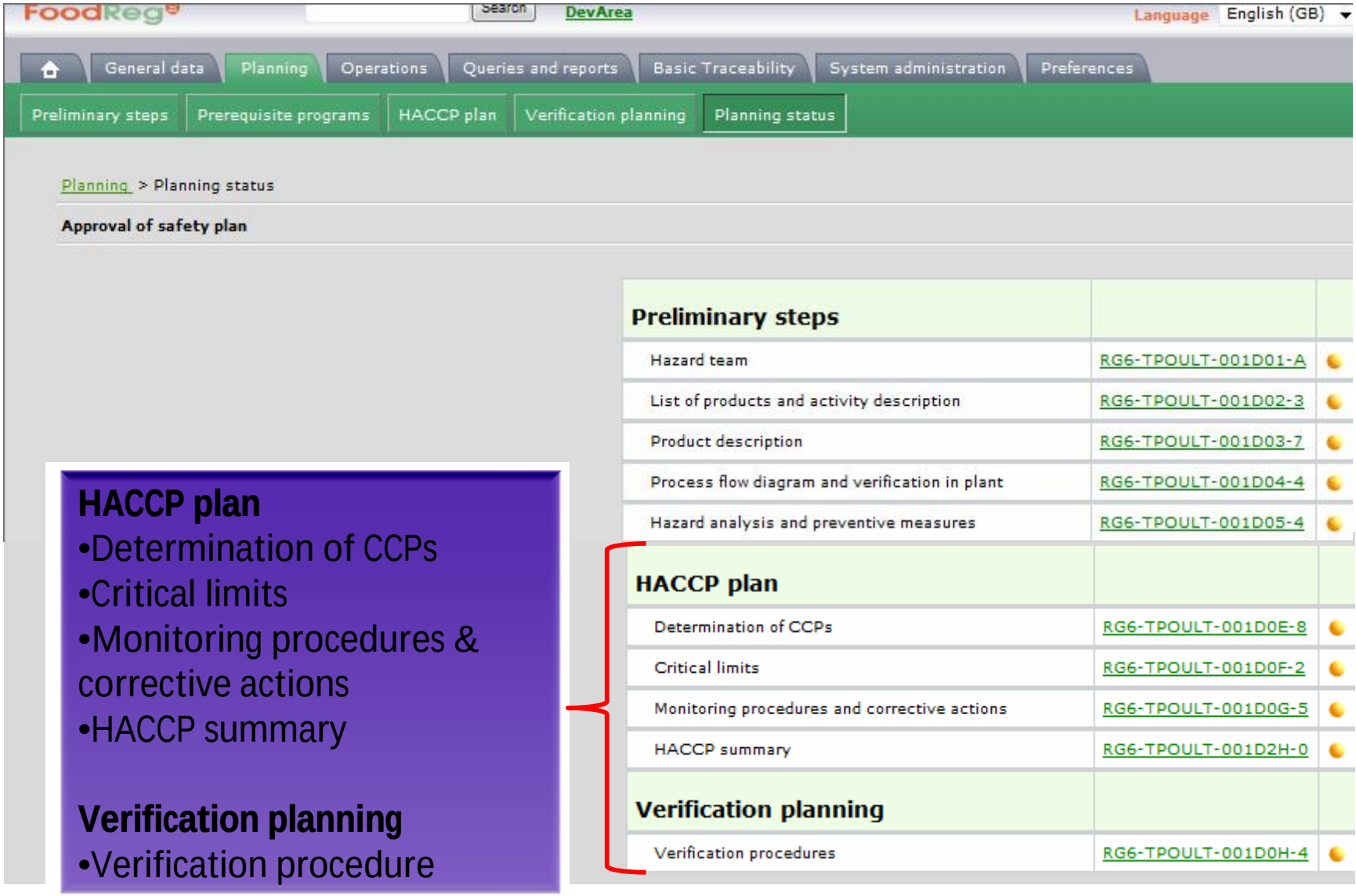
Pre-requisite Program



HACCP Plan



HACCP Plan

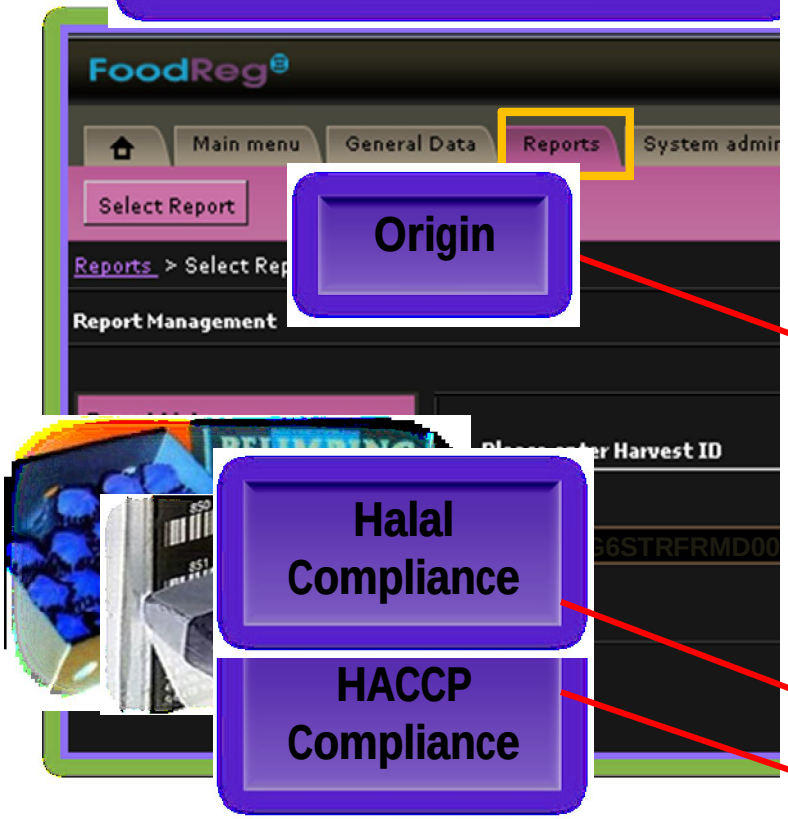


HACCP plan
- Determination of CCPs
- Critical limits
- Monitoring procedures & corrective actions
- HACCP summary

Verification planning
- Verification procedure

Consumer Confidence

Origin, Food Safety, Halal Status of Product



Production Code : 080508H		
Product Identifier : RG6STRFRMD0000Y6		
Product Type : Starfruit Juice		
Brand Name : GPO Fresh		
Manufacturer : GPO		
Halal Certificate No. : JAKIM/GPO/FF/001		
Halal Certificate Validity : 01-01-2009		
No.	**Halal Trace Check Status**	**Status**
1	Overall Status	✓
2	Supply Chain Identified :	
	Ingredient Sources ?	✓
	Packaging Sources ?	✓
3	Ingredient Safety :	
	Ingredient HACCP ?	✓
	Ingredient Halal ?	✓
4	Processing Safety :	
	Product Halal ?	✓
	Product HACCP ?	✓
5	Product Transporter Check :	
	Samak Status ?	✓

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Cost Model

- Base License Fee
  - HQ, Farms, GPE
- Electronic Records
  - Usage
- Data Maintenance
  - Database Hosting, Data Security, System Redundancy, Auto-Backup, Online and Phone Support Services
- Add-on Modules
  - HACCP, PRP, Audit etc

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Example for Illustration

- A tropical fruit franchise with 50 contract farmers

Base Cost	Cost
HQ Access License Fee	Fixed Cost
Farms/GPE Access License Fee	Fixed Cost

Enjoy Group Discount

Usage	Cost
Group Usage Fee	Variable

Enjoy Bulk Usage Discount

Maintenance	Cost
Group Maintenance Fee	Variable

Disc space and support fee

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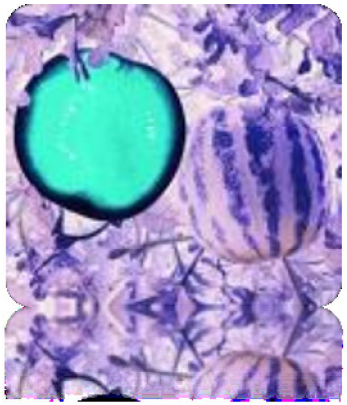
Benefits of the Cost Model

- No expensive server to maintain. Just a basic PC with internet access or mobile phone
- Remote access – anywhere, anytime
- Unlimited users per site
- All packages includes:
  - Database Hosting,
  - Data Security Features - Secure Login, IDS, Firewall, etc
  - System Redundancy and Auto-Backup,
  - Online and Phone Support Services



9. Summary

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Benefits

- Continuous improvement on supply chain operation and productivity
- Boost export potential, market access & product differentiation
- Comply to national & international regulatory requirements of traceability & quality assurance system
- Meeting consumer's demand & expectation

Future Prospects

- Growing concerns for sustainability and impact on environment
- Improved paperwork flow in dealing with government such as Application of Licence / Export Certificate
- Ancillary functions, such as premise / stock security, worker productivity, worker safety & health, waste / effluent management

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Thank You

www.foodreg.com.my

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