Risk assessment and food safety

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Joint FAO/IAEA Division on
Nuclear Techniques in Food and Agriculture

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9th Scientific Conference

of the Bulgarian Focal Point of EFSA

Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Overview

1. Joint FAO/IAEA programme
2. Risk assessment and food safety
3. Analytical testing
4. Nuclear and related techniques

The FAO / IAEA partnership

Food and Agriculture Organization (FAO)

Since 1945 FAO helps developing countries and countries in transition to modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition for all.

International Atomic Energy Agency (IAEA)

Since 1957 - IAEA has served as the world's foremost inter-governmental forum for scientific and technical cooperation in the peaceful use of nuclear technology

1964 - Joint FAO/IAEA Division of Nuclear Applications in Food and Agriculture was established

IAEA
Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

The FAO / IAEA partnership

Supports and promotes the safe and appropriate use of nuclear and related technologies by the FAO and IAEA Member States in food and agriculture, with the aim to contribute to peace, health and prosperity through the world, especially to global food security and sustainable agricultural production.

Sustainable food security and safety through the use of nuclear techniques and biotechnology

IAEA
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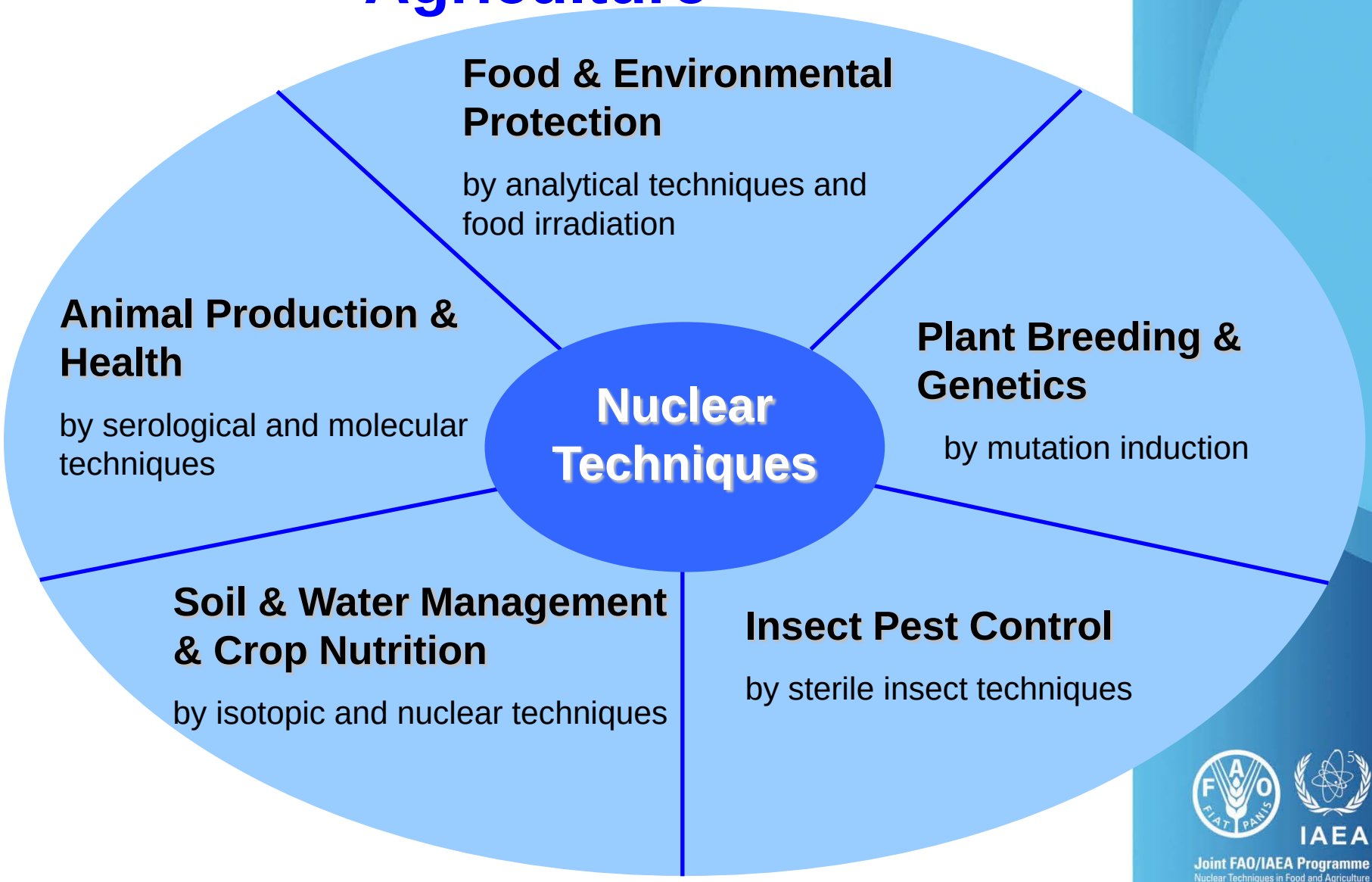
Nuclear Techniques in Food and Agriculture

Nuclear Applications in Food and Agriculture



IAEA
Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

Sustainable Development

- Building the capability for countries to tackle problems and issues through their own research & programs & skills developed through participation in research projects and technical cooperation
- Regional/interregional cooperation and partnerships
- Accelerated capacity building
    - Trained personnel contribute to sustainable development in their own countries

Delivering Results

Research

Coordination and support

Capacity Building

Technical support

Coordinated Research Projects
(Solving technical problems)

Technical Cooperation
(transferring know how and technology to meet development needs)

International Research Centres

Regional organizations

National Institutions

Other international organizations

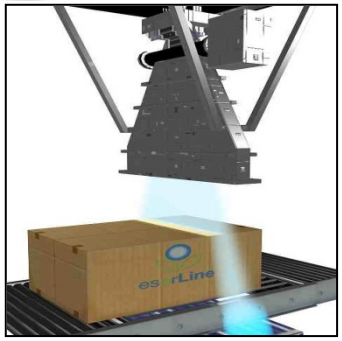
IAEA Collaboration Centres

Nuclear Properties for Applications in Food and Agriculture

Ionizing Radiation

(Energy beam)

Electric (X Ray or Electron Beam)



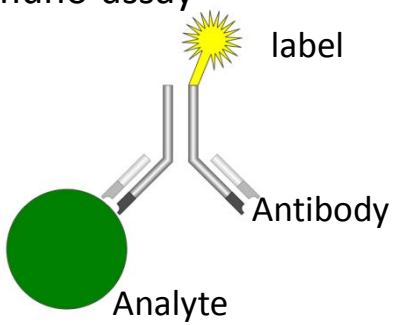
Radionuclides (Gamma Ray)

Radioactivity

(Easy to measure)

Radionuclides

Immuno-assay

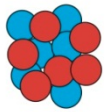


Stable Isotopes

(Finger print)

Radionuclides

carbon-12

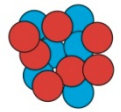


^{12}C

6 protons
6 neutrons

light

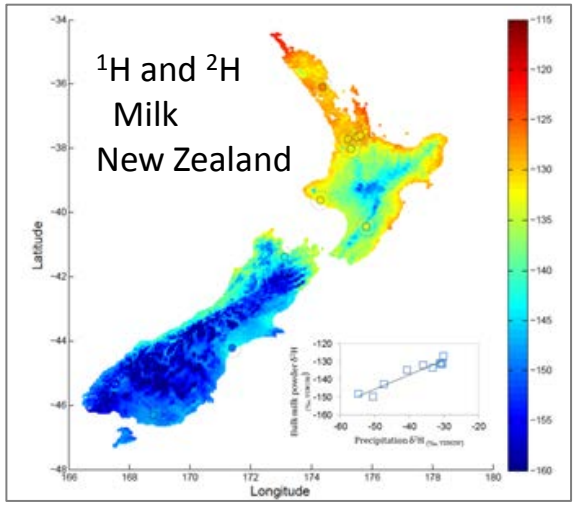
carbon-13



^{13}C

6 protons
7 neutrons

heavy



Comparative Advantages of Nuclear Techniques

Irradiation

"cold treatment" kill bacteria, induced genetic variation, sterile insects, vaccines

Radionuclides and stable isotopes

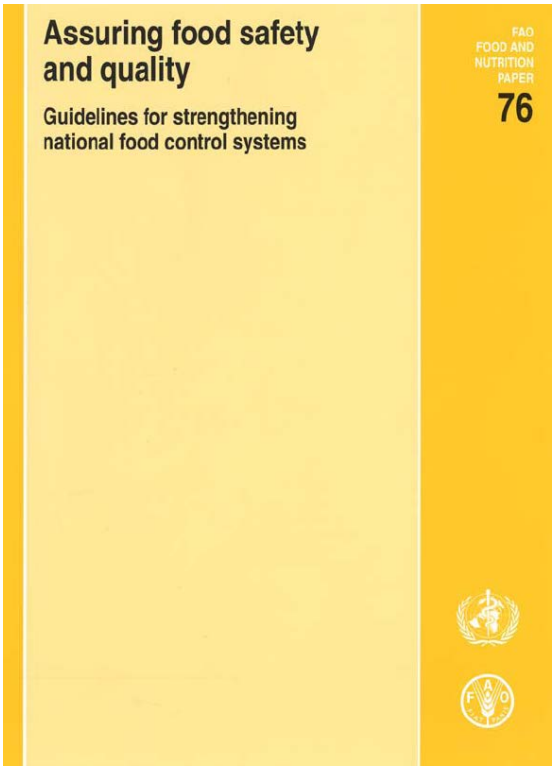
- Traceability – tracers as "markers"
- Measurability – Radionuclides and stable isotopes
- Accuracy – analytical methods
- Specificity – specific and sensitive

[Measuring for managing]

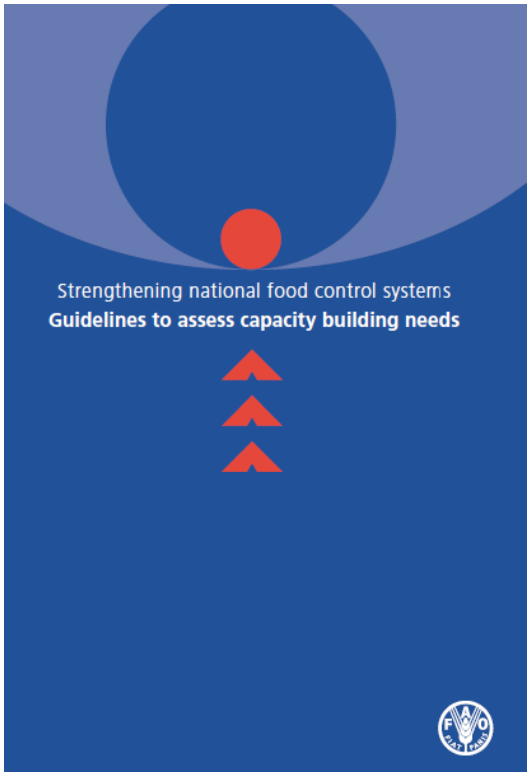
Food for the global consumer

- Increased global trade has made a wide variety of foods accessible to consumers worldwide
- Demand for increased production
- Climate change - changing production systems, regions, pests, contaminants Challenges such as food fraud, food contamination, emerging contaminants
- Exporting countries must demonstrate equivalence of food safety systems that can ensure protection of consumers and the environment

Strengthening national food control systems



FAO, 2003



FAO, 2006

FAO, 2007

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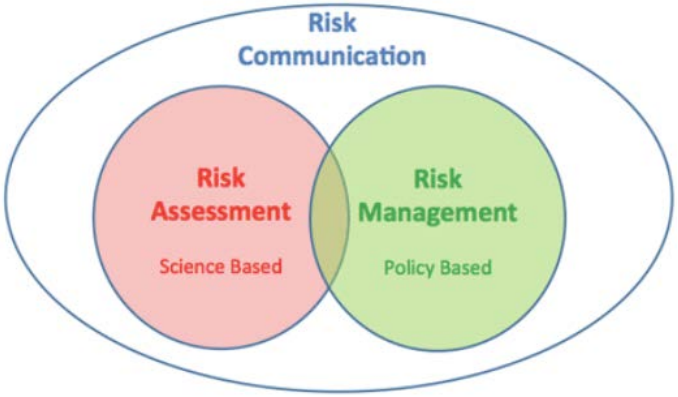
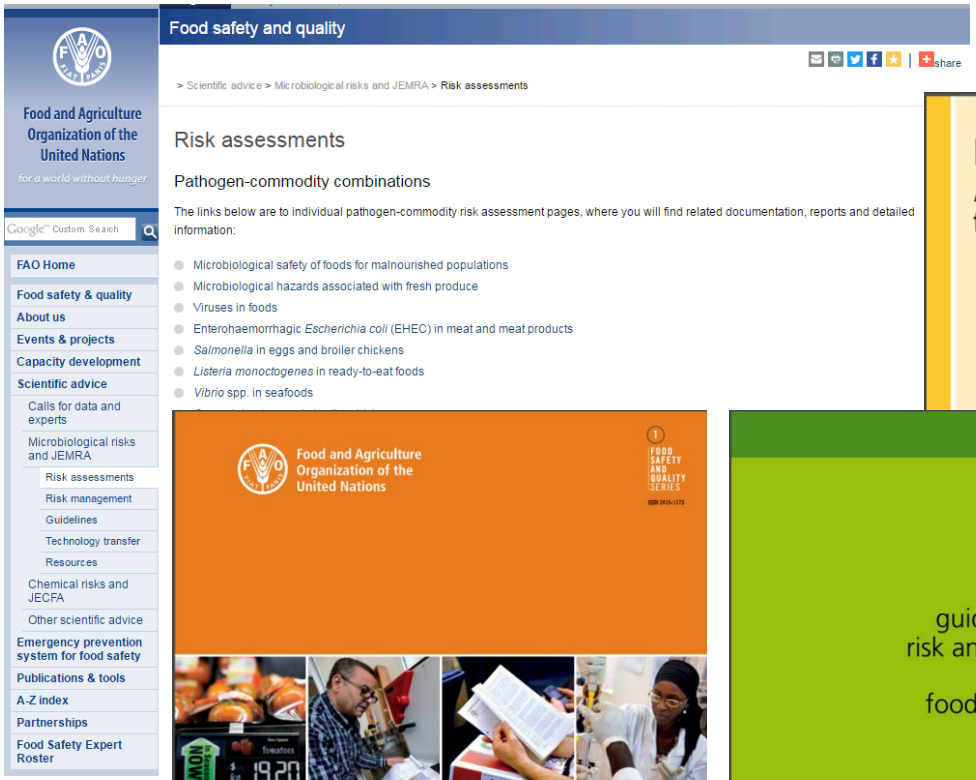
Food control systems

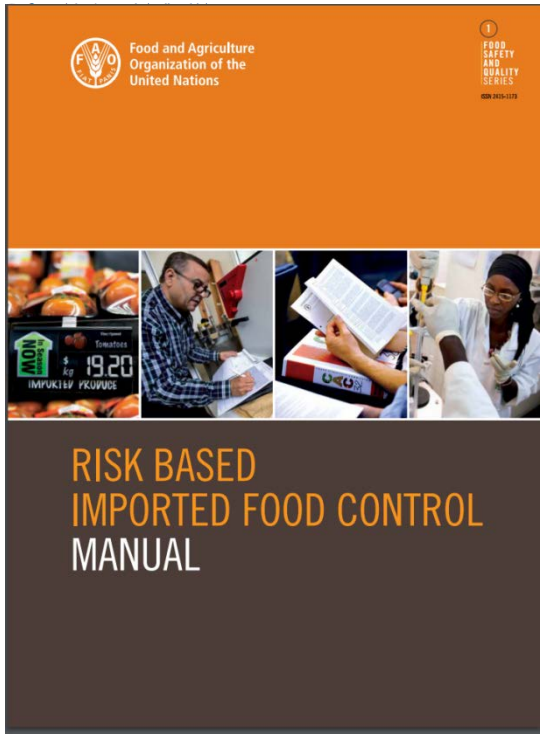
Risk analysis in the EU

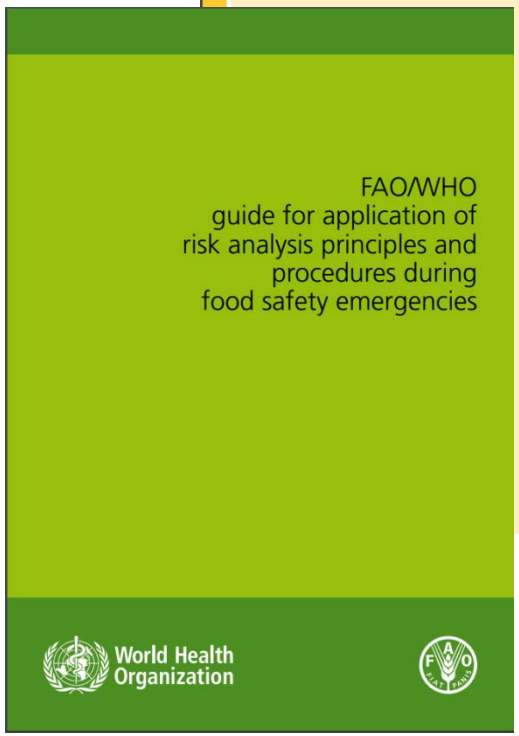
- Risk Communication- Commission, EFSA and RASFF
- Risk Management- Commission and legislative tools
- Risk assessment – European Food Safety Authority (EFSA)

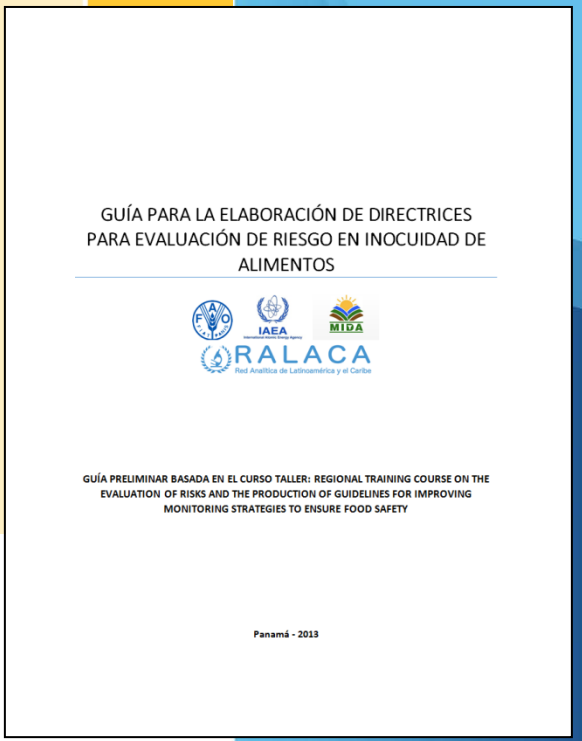


Risk analysis and FAO

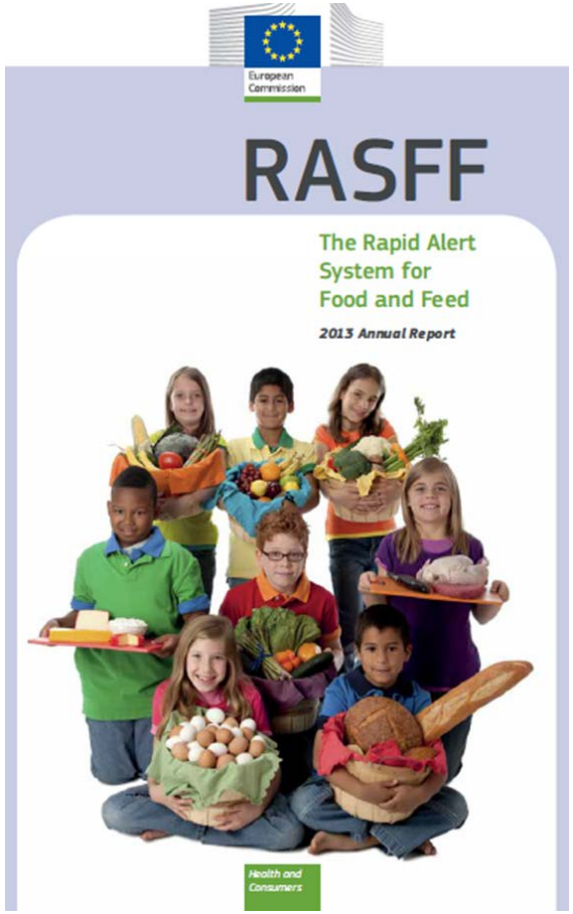








Rapid Alert System for Food and Feed (RASFF)



An informatics tool to ensure the cross-border exchange of information to swiftly react when risks to public health are detected in the food and feed chain

Increases consumer confidence in the functioning of food control systems in the EU

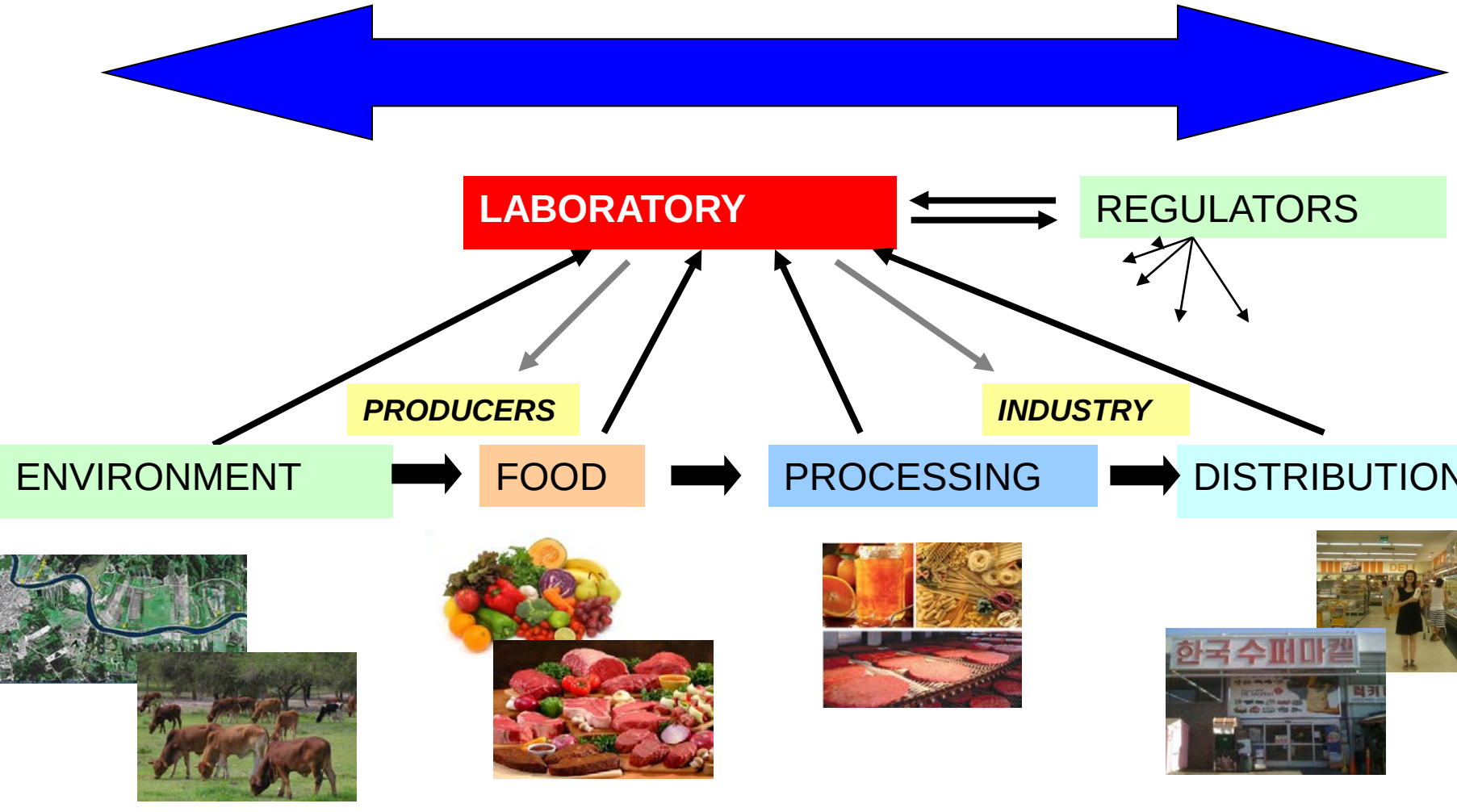
Certification and accreditation

- Necessary to improve confidence

But – pitfalls:

- Independency and transparency of certification bodies (e.g. organic production claims)
- Traceability of documentation followed by product testing

The role of reference laboratories “farm to fork”



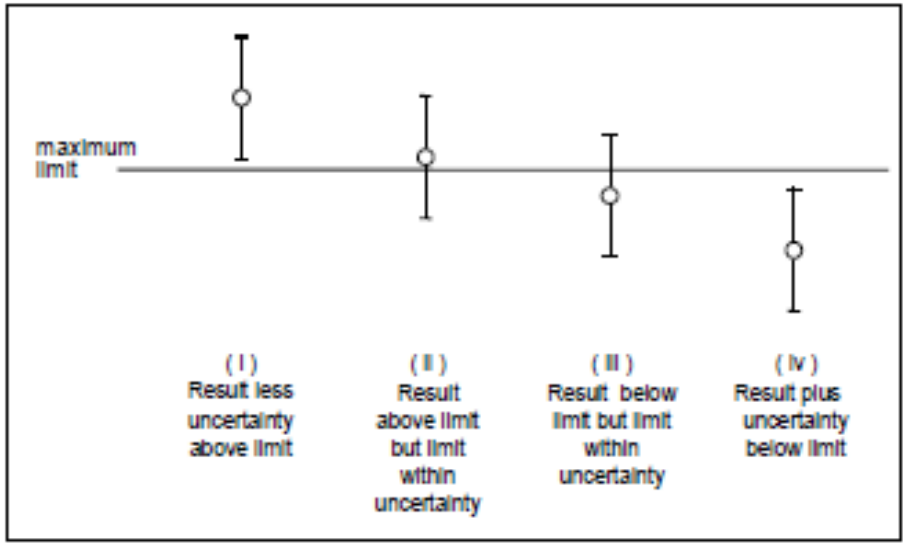
Official food control laboratories

- Testing of samples for food safety/health assurance programmes
- Provide feedback to regulators on effectiveness of good agricultural and production practices
- Provide feedback to producers/extension services on production and management practices
- Identify ‘new’ problems
- Follow-up to ensure that corrective actions were effective
- Advanced analytical techniques must be in place to enable laboratories to perform these functions

Integrated system for analytical data quality (ISO 17025 accred.)

Slide from F. Ulberth, JRC

Decisions based on analytical results

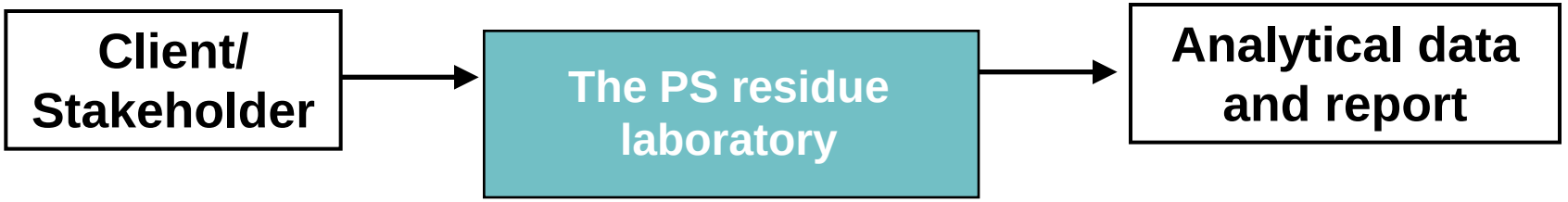


Action: reject accept accept accept

Analytical uncertainty and sampling uncertainty!!

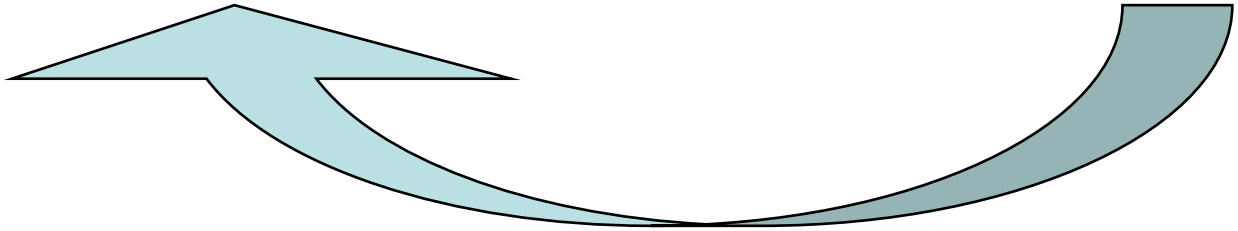
A pesticide residue laboratory

- Samples
- Physical infrastructure
- Human resources / sustainability
- Equipment & consumables



- Method-validation
- QA/QC system
- Uncertainty measurements
- Proficiency testing
- Calibration

- Maximum residue limits
- Statistical interpretation



- Feedback and advisory role
- Stakeholders communication

The expanded role of the laboratory

- Stakeholders approach & communication
- Multidisciplinary
- Feeding back results and promote farm to fork food safety (holistic)
- Risk assessment & the need for quality data
- Address decision makers and encourage risk management and communication

Accessible Institutional infrastructure

Vulnerabilities in the food chain

- Globalization
- Environmental contamination of agricultural land
- Raw materials and commodities contamination
- Production chains tampering and sabotage
- Contamination during storage, logistic, and delivery of goods
- On-the-shelf-single-product tampering and adulteration
- Emerging contaminants
- Food crime
- Legislation gaps and new challenges
- Ineffective systems for food control

Towards holistic approaches to ensure food safety

- Risk assessments
- Risk based monitoring (sampling) for food safety
- Risk based management guidelines applied
- Feedback and communication mechanisms (i.e. RASSF) in place

Thank You

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