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Microbiological Risk Assessment in Developing Countries

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In a nutshell...

- Microbiological food safety: an evolving problem
- Liberalization and globalization of world food trade
  - Benefits, opportunities & new risks
- New International discipline (SPS)
  - "Scientific evidence........assessment of the risk as appropriate to the circumstances"
In a nutshell.....

- MRA continuously evolving in developed countries
- Many developing countries lack technical and financial resources, data and information
- Need for capacity building, technology transfer

Food Safety in the new millennium requires enhanced levels of international cooperation

Outline

1. THE VALUE OF MICROBIOLOGICAL RISK ASSESSMENT

2. Contrasting developing and developed countries - the current situation and the challenges faced

3. The way forward - building capabilities for MRA
1. THE VALUE OF MICROBIOLOGICAL RISK ASSESSMENT

The approach

- Scientific information and evidence
- Qualitative approach to
  - hazard identification
  - hazard characterization
  - exposure assessment
  - risk characterization

- Quantitative approach
  - quantitative data
  - models - probabilistic (stochastic) simulation

→ Consolidated Risk Conclusions
  - “cardinal” evaluation (quantitative)
  - “ordinal” evaluation (qualitative, real life, expert judgement)
### 1. THE VALUE OF MICROBIOLOGICAL RISK ASSESSMENT

#### For food control
- Design of “production to consumption” food safety programmes - modelling effectiveness of different food safety measures
- Objective evaluation of risk management options [controversial - costly]
- Development of risk based performance criteria
- Demonstration of equivalence of different SPS measures

**BUT** full MRA may not be necessary when developing basic hygiene infrastructure, good hygienic practices, process oriented / technical requirements

#### Utilities of MRA
- Structured, explicit approach to hazards, adverse effects, human exposure, risk
- Improved understanding of key issues
- Guidance and source for key information
- Appraisal of management options

#### Public Decisions
- Policy determinations
- Regulation - Standards
- Food Control
- Allocation of resources
- Guidance for scientific research
- Education
- Communication
Outline

1. The value of microbiological risk assessment

2. CONTRASTING DEVELOPING AND DEVELOPED COUNTRIES - THE CURRENT SITUATION AND THE CHALLENGES FACED

3. The way forward - building capabilities for MRA

2. CONTRASTING DEVELOPING AND DEVELOPED COUNTRIES

Some important characteristics of an ideal & effective food safety system

- Dynamic inter-dependence of players involved, partnership - interaction -collaboration
- Food safety built into the food-chain from primary production to consumption
- Science based - use of risk assessment in a risk analysis approach
2. CONTRASTING DEVELOPING AND DEVELOPED COUNTRIES

**Some important characteristics of an ideal & effective food safety system**

- Adequate infrastructure - use of technology appropriate to the tasks to perform
  - Culture of capacity building - technology transfer, research, education, training
- Effective control - containment of food safety hazards

**Developed countries**

- Scientific, technological, legal, societal advances = many of the attributes of effective food safety systems - increasingly consumer driven
- A few priorities
  - Increasing the resilience of source systems along the food chain
  - Enhancing the scientific base
  - Organizational support for effective participation of all parties
2. CONTRASTING DEVELOPING AND DEVELOPED COUNTRIES

**Developing countries (1/4)**

- Systems very diverse - different stages of development
- Heavy challenges
  - growth of population
  - urbanization
  - lack of resources
- security - safety - quality of the food supply, wider range of potential risks?

**Developing countries (2/4)**

- Some weaknesses
  - Technical infrastructure
  - Human and financial resources
  - Legislation regulatory framework
  - Enforcement capacity (limited staff, experts laboratories, management and evaluation of activities)
  - Monitoring, surveillance, hazard containment Less effectively or efficiently covered?
  - Lack of awareness of food safety matters
## 2. CONTRASTING DEVELOPING AND DEVELOPED COUNTRIES

### Developing countries (3/4)
- MRA - early stage of evolution
- National policies limited in scope
- Food control systems fragmented
- Difficulties in prioritizing resources
- Lack of technical infrastructure - scientific capacity - financial resources to carry out MRA for direct application
- Lack (or inappropriateness) of data
- Lack of qualified or trained staff

### Developing countries (4/4)
- Full Codex framework - full quantitative approach complex and resource demanding
- Most current assessments = significance of microbiological hazards

- at this stage many may not choose to invest in MRA
  - number of disadvantages
- understand, contribute to and utilize international MRA
Risk assessment.......to use or not to use

Risk Assessment

Conformity

Equivalence

Goal setting approach

Technical Measures

Outline

1. The value of microbiological risk assessment

2. Contrasting developing and developed countries - the current situation and the challenges faced

3. THE WAY FORWARD - BUILDING CAPABILITIES FOR MRA
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- Need for a comprehensive - global capacity building programme
- National governments - infrastructural / technical / organizational e.g. FAO, WHO, OIE, international or regional financial institutions e.g. the World Bank - NGOs → technical assistance
- Collaboration - cooperation of organizations involved
- Alliances between food safety and MRA, public and private institutions in developed & developing countries - partnership - technology transfer
- Appreciation of each country specific situation needs and priorities

Areas for capacity building

- Improving level of awareness of decision makers
  - MRA: legal, Institutional, technical framework
- Addressing legal and regulatory aspects
  - MRA: framework for epidemiology & surveillance data collection, Use of MRA
- Institutional strengthening
  - MRA: research institutes - Reference groups
    “Food Safety Agency”
- Human Resource development
  - MRA: Training transfer of knowledge/experiences
    Partnership, collaboration on studies
3. THE WAY FORWARD - BUILDING CAPABILITIES FOR MRA

Key activities
- Development of national food safety/control strategy
- Updating food laws & regulations
- Strengthening of inspection services
- Implementing food safety & quality assurance options in food production
- Updating food control laboratories
- Development of links between foodborne disease surveillance and food safety programmes
- ENHANCING SCIENTIFIC AND TECHNICAL EXPERTISE

Enhancing scientific and technical expertise

Institutional and technical organization
- development of foodborne disease surveillance programmes
- Strengthening of laboratory infrastructure
- Comprehensive training and training materials
  - training of decision makers
  - guidance & technical reports on MRA
  - “do MRA” cooperative training modules
  - commitment of trainees to train

Risk Assessment of Microbiological Hazards in Foods: an International approach
Enhancing scientific and technical expertise

Strengthening national ownership to MRA -

International vs. country specific aspects/studies

<table>
<thead>
<tr>
<th>Hazard identification</th>
<th>New emerging hazards possible differences in perception</th>
<th>International group of experts, Taking into account regional specificity</th>
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<tbody>
<tr>
<td>Hazard characterization</td>
<td>Lack of technical capabilities limitations of data, sources information</td>
<td>International group of experts Modify according to regional specificity</td>
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<tr>
<td>Exposure assessment</td>
<td>Need for quantitative production, consumption data Need for useful models to characterise country's situations</td>
<td>Country specific efforts Seek assistance to develop national expertise</td>
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<tr>
<td>Risk characterization</td>
<td>Need for understanding risk</td>
<td>Country specific efforts Training assistance</td>
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Enhancing scientific and technical expertise

Strengthening national ownership to MRA

Development of tools for modular approach

MRA Support System

Validation/optimisation modules

Analysis Modules

Hazard identification
Hazard characterization
Exposure Assessment
Risk Characterization

Problem

Managerial question

Tasks

Database Modules
Enhancing scientific and technical expertise

**Development of skills and competencies**
- Creation of professional interaction and operational networks
  - Group of multidisciplinary professionals
  - Capacities in MRA and risk analysis
  - Studies on technological processes & control
  - Evaluation of impact on hazard and risk
  - Programs in foodborne disease epidemiology, surveillance and research
- Development of guidance for MRA
- Development of reinforced teaching and training programs

**Conclusions**
- Organizing infrastructure / data collection
- Creating credible sources of scientific advice and MRA
- Interfacing risk assessments & risk management
  - without this, any important choice may lead to uncertain or controversial outcome
  - with this it is possible to legitimize a transparent and consistent decision
Further Information

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