Risk Analysis
A Tool for Biosecurity

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This programme aims at equipping high level officials from developing countries with cutting-edge knowledge and strengthening their capacity to base their decisions on sound consideration and analysis of policies and strategies both at home and in the context of strategic international developments.

Related resources
- See all material prepared for the FAO Policy Learning Programme
- See the FAO Policy Learning Website: http://www.fao.org/tc/policy-learning/en/
Risk Analysis
A Tool for Biosecurity

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About EASYPol

The EASYPol home page is available at: www.fao.org/easypol

This presentation belongs to a set of modules which are part of the EASYPol Resource package: FAO Policy Learning Programme: Specific policy issues: Food safety policies and regulatory frameworks

EASYPol is a multilingual repository of freely downloadable resources for policy making in agriculture, rural development and food security. The resources are the results of research and field work by policy experts at FAO. The site is maintained by FAO’s Policy Assistance Support Service, Policy and Programme Development Support Division, FAO.
Objectives

After this module, you should know about:

- The main components of risk analysis applied to food safety
- How risk analysis is used in modern food control systems
- The use of risk analysis in the Biosecurity framework
Categories of food safety hazards

- Biological Hazards
  - Infectious bacteria, toxin-producers, parasites, viruses, prions

- Chemical Hazards
  - Toxins, additives, pesticide and veterinary drug residues, environmental, packaging, allergens

- Physical Hazards
  - Metal, machine filings, glass, jewelry, stones, bone chips

Potential problems or risks
Risk perspectives

Risk is the scientific evaluation of the likelihood, degree, and consequences of a hazard.

It is the probability of an adverse human health outcome and its severity.

- **Scientific perception**
  - Risk = Probability + Severity (magnitude)

- **Consumer or media perception**
  - Risk = Hazard + Outrage (fear, concern, misery)
Risk analysis diagram

- **Risk Assessment**
  - Science based

- **Risk Management**
  - Policy based

- **Risk Communication**
  - Interactive exchange of information and opinions concerning risks

Risk Analysis Framework
Risk assessment

The scientific evaluation of known or potential adverse health effects resulting from human exposure to food-borne hazards

Consists of:

i. hazard identification
ii. hazard characterization
iii. exposure assessment
iv. risk characterization

At the international level (FAO/WHO), Food Safety Risk Assessment is carried out by independent expert bodies, like:

- **JECFA** (food additives and contaminants)
- **JEMRA** (microbial hazards)
- **JMPR** (pesticides residues)
Risk assessment

- **Hazard Identification**: The identification of known or potential health effects associated with a particular agent.

- **Hazard Characterization**: The qualitative and/or quantitative evaluation of the nature of the adverse effects associated with biological, chemical, and physical agents which may be present in food.
Risk assessment

- **Exposure Assessment**: The qualitative and/or quantitative evaluation of the degree of intake likely to occur

- **Risk Characterization**: Integration of hazard identification, hazard characterization and exposure assessment into an estimation of the adverse effects likely to occur in a given population, including attendant uncertainties
Risk management

The process, distinct from risk assessment, of **weighing policy alternatives**, in consultation with all interested parties, considering **risk assessment and other factors** relevant for the health protection of consumers and for the promotion of fair trade practices, and, if needed, **selecting appropriate prevention and control options.**
Risk Management

- **Risk Evaluation**
  - Identification of a Hazard
  - Commissioning of Risk Assessment
  - Consideration of Risk Assessment result

- **Risk Management Option Assessment**

- **Implementation of Management Decision**

- **Monitoring and Review**
Food safety measures risk management options: Examples

- **Ban** importation of contaminated (O157) or suspect product (BSE)
- **Intensify inspection** and sampling of selected products
- **Stop production** of contaminated/adulterated food product
- **Seize** contaminated product
- **Recall** contaminated product in the market
- Issue specific **consumer alert**
- **Set limits** for food additives, contaminants, indicators
- **Target inspection** based on known or potential risk
- Identify **control points** within the food chain to prevent or limit hazard
- **Train food producers** in GAP, GHP, HACCP, etc.
- **Educate** consumers
Risk management body

- Codex Alimentarius Commission is a risk management body.

- Standards, guidelines, codes of practices and recommendations: risk management options

- Independent scientific expert advice: JECFA, JEMRA, JMPR, expert consultations.
Risk management

1. Follows a **structured** approach

2. Protection of **human health** is primary consideration

3. Decisions and practices should be **transparent**

4. Should include **determination of risk assessment policy** as a specific component of risk management

5. Maintain functional **separation of risk management and risk assessment** to ensure scientific integrity of process

6. Take into account **uncertainty in risk assessment**

7. Clear, interactive **communication** with consumers and other interested parties

8. **Continuing process** that takes into account all newly generated data in the evaluation and review of risk management decisions
Risk communication

The interactive exchange of information and opinions throughout the risk analysis process concerning:
- risk
- risk-related factors and
- risk perceptions

among ...
- risk assessors
- risk managers
- consumers
- industry
- the academic community and other interested parties

including
- the explanation of risk assessment findings and the basis of risk management decisions.
Why undertake risk analysis?

- Consistency across scientific disciplines
- Establish appropriate priority or level of protection
- Identify methods to address food safety more effectively
- Introduce appropriate food control measures
- But mainly.... Prioritize the allocation of resources
Risk analysis and biosecurity

In addition to food safety, other disciplines also use the risk analysis paradigm:

- Animal health
- Plant protection
- Biosafety

Together with food safety: **Biosecurity**
A strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyze and manage risks in the sectors of:
- food safety
- animal life and health
- plant life and health
- including associated environmental risk

**Biosecurity covers:**
- Introduction of *plant* pests, *animal* pests and diseases, and *zoonoses*
- Introduction and release of *genetically modified organisms (GMOs)* and their products
- Introduction and management of invasive *alien species* and *genotypes*
- Protection of the *environment*, including *biodiversity*
What are the advantages of a *Biosecurity* approach?

- **Share** scarce *Biosecurity* technical **resources**

- Promote **nationwide information** access, awareness and actions

- Develop new strategic **alliances**

- Ensure **consistency** in approach and outputs consequential to application of **international agreements** and instruments
Biosecurity national sectors

- Agriculture
- Forestry
- Fisheries
- Environment
- Health
- Food Industry
- Trade
- Customs
- Transport
- Finance
- Tourism, others
Requirements for harmonized and integrated approach to *Biosecurity*

- Policy framework
- Legal and regulatory framework
- Institutional framework
- Information exchange
- Technical capability (scientific underpinning, diagnostic analysis, inspection, monitoring and surveillance)
- Risk analysis
International standard-setting bodies and their parent organizations
- Codex (WHO and FAO)
- IPPC (FAO)
- OIE
- Other international instruments and agreements

International legal instruments, agreements and texts relevant to Biosecurity are usually sectorial in nature and tend to share certain common characteristics including a risk assessment and risk management approach, notification procedures and information exchange (e.g., CBD, SPS)
Conclusions

- Risk analysis paradigm has systemized an intuitive approach to risks
- Risk analysis allows to reconcile protection of consumers’ health with economic development
- Risk analysis is used by the various Biosecurity subsectors, as a tool for prioritization
Further readings