



# IMK 407 RISK ANALYSIS OF FOOD

NORLIA MAROR

06012021



# CONTENT

## RISK ANALYSIS

- Risk assessment
- Risk management
- Risk communication

# RISK ANALYSIS IS AN ESSENTIAL PART OF EFFECTIVE FOOD SAFETY MANAGEMENT SYSTEM

## How to prevent hazards???

- Must have knowledge of the hazards
- Know the risks of such hazards to consumers
- Appropriate interventions

- Risk analysis aims to **improve food safety decision-making processes** and produce improvements in public health
- New **science-based approaches** to food safety provide an effective way for governments to **protect consumers** against food-borne disease and **plan appropriate response measures** when necessary.

# HAZARD VS RISK

## Hazard

- A food safety hazard is defined as any biological, chemical, or physical agent that may cause a food to be unsafe for human consumption.
- Food safety hazards can be introduced at any stage of the food chain from ingredient supplies by primary producers, through food manufacturers, transport and storage operators, retail and food service outlets.

## Risk

- Risk is a measure of the likelihood of a hazard occurring.
  - ✓ By knowing how to eliminate or reduce safety hazards with proper controls, helps reduce your food safety risks.
- Risk estimate the probability and severity of adverse health effects in exposed populations consequential to hazards in food.

---

## Examples of concerns over potential food hazards

- Microbiological contamination
- Mycotoxins and other naturally occurring food toxicants
- Pollutants –e.g. heavy metals
- Defective packaging and labelling
- Adulteration
- Extraneous matter (physical hazards)
- Pesticides residues
- Veterinary drug residues

# TRADITIONAL VS MODERN FOOD SAFETY SYSTEM

## Traditional Food Safety System

- Reactive approach
- Main responsibility with government
- No structured risk analysis
- Relies on end product inspection and testing



Level of risk reduction:  
not always satisfactory

Focus on end-product control

## Modern Food Safety System

- Preventive approach
- Shared responsibility
- Addresses farm-to-table continuum
- Science based
- Use of structured risk analysis
- Establishes priorities
- Integrated food control
- Relies on process control



Level of risk reduction:  
improved

Focus on the process control  
and science-based approach

## Examples of science-based activities

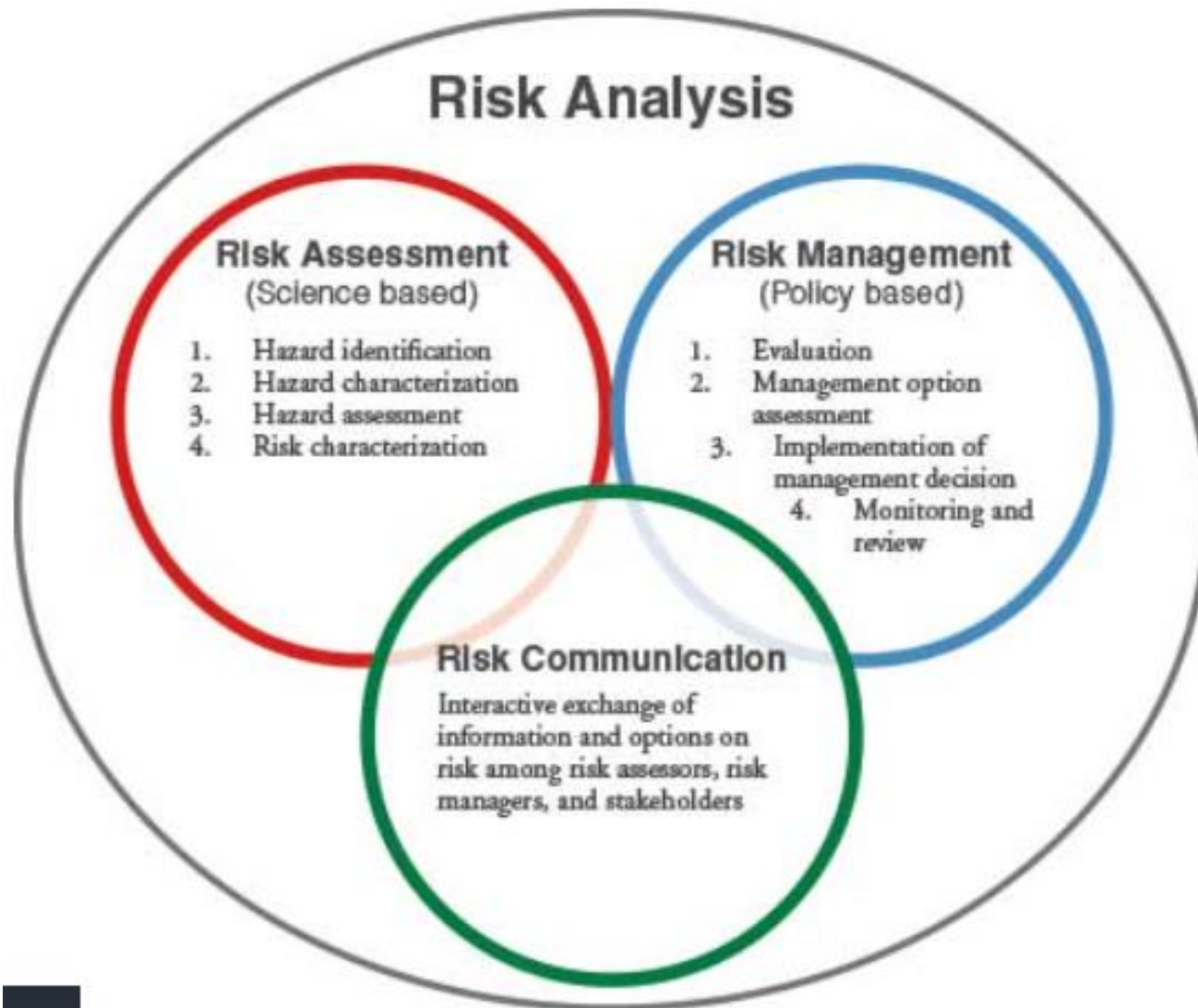
- Implementation of Hazard Analysis and Critical Control Point (HACCP) systems
- Establishment of acceptable daily intakes for chemical additives and residues of pesticides and veterinary drugs in food
- Establishment of tolerable intakes for chemical contaminants, including natural toxins
- Use of science to develop labels to warn consumers about potential risks including food allergens
- Use of risk assessment to support food safety regulations
- Establishment of product safety standards, performance standards and specifications for use in international trade
- Establishment of dose-response relations for chemical hazards and pathogenic microorganisms

---

Risk analysis provides a framework to effectively **ASSESS, MANAGE, and COMMUNICATE** risks in cooperation with the diverse stakeholders involved (government, industry, academia, consumers)



# COMPONENT OF RISK ANALYSIS



Risk assessment involve scientific elements that describe the likelihood and magnitude of specific hazard

Risk management uses the output from the risk assessment to put in place actions to control hazards e.g. policies, regulations, CCPs, SSOPs

Risk communication is the dialogue / exchange of information between interested parties regarding the outputs of the above e.g. training, press release, labelling

# 1 - RISK ASSESSMENT

To determine the hazards and identify its effects on human health based on scientific evaluation

## Questions ?

- What could be the problem/go wrong?
- How likely is the event to happen?
- What are the extent/level of the hazard?
- What would be the outcome or impact if this event happened?

## When a risk assessment is needed?

- The use of new additives in the facility's food products
- Facility changes that affect exposure and product safety



# 1 - RISK ASSESSMENT

4 components of risk  
assessment

- **Hazard identification** – includes identification and evaluation (in HACCP)
- **Hazard characterization** – evaluation of the nature of the adverse effects associated with the hazards which may present in food.
  - Perform the dose-response assessment
  - May results on the establishment of an acceptable daily intake (ADI) for additives, tolerable daily intake (TDI) for contaminant
- **Exposure assessment** – evaluation of the degree of intake likely to occur (dietary exposure assessment)
- **Risk characterization** – provides estimates of the potential risk of adverse effect to human health under different exposure scenarios that is likely to occur in a population

## 2 - RISK MANAGEMENT

To establish the appropriate control measures to prevent, reduce, or minimize the risk

Likelihood	low severity high likelihood	high severity high likelihood
	low severity low likelihood	high severity low likelihood
	Severity	

Risk is measured in term of likelihood and severity

### ■ Evaluate the risk

- ✓ Identify the food safety problem – Inspection, Environmental monitoring, Laboratory analysis, Clinical and toxicological studies, Outbreak investigations, Food industry, Media
- ✓ Develop a risk profile - can be used to set priorities among food safety issues and facilitate risk management decision-making – e.g to decide whether or not a risk assessment is needed
- ✓ Rank each hazard for risk assessment priority
- ✓ Set priorities for risk management
- ✓ Interpret the risk assessment result – e.g. set regulatory limit for chemical contaminant based on the tolerable daily intake (TDI) estimated during risk assessment.

## 2 - RISK MANAGEMENT

To establish the appropriate control measures to prevent, reduce, or minimize the risk

- **Determine a course of action**
  - ✓ Evaluate how much the risk is reduced
  - ✓ How each change being considered could affect other processes and hazards
- **Implementation - Put a plan in place**
  - ✓ Decides on the action to take
  - ✓ Develop a plan
  - ✓ Set specific tasks and timelines
  - ✓ Carry out the plan
- **Monitor and review**
- **Document all actions**

## 3 - RISK COMMUNICATION

To determine the best way to communicate the information to the affected population

### Goals of risk communication

- Promoting awareness and understanding of risks (amongst employees, government officials and consumers)
- Promoting consistency and clarity about the risk analysis process
- Providing an understanding for risk management decisions
- Strengthening good working relationship and promoting respect
- Promoting appropriate involvement of all stakeholders
- Exchanging information, knowledge, attitudes, practise, and perceptions of those involved

---

## SUMMARY OF RISK ANALYSIS

- Risk assessment
  - Hazard identification
  - Hazard characterization
  - Exposure assessment
  - Risk chareacterization
- Risk management
- Risk communication



**THANK YOU**

