**Integrated Chain Management (ICM) & ISO/DIS 22000**

*IDF World Dairy Summit 2004*
*Melbourne, AU*

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## MAJOR TREND

**Science-based risk analysis & proportionality (WTO)**

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**Focus on documented public health risks*, based on knowledge & data obtained through quantitative risk assessments**

**\*) Risk**
Function of the probability and magnitude of an adverse health effect (in a defined population) caused by a food-borne hazard

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## MAJOR TREND

**WTO requirement on equivalence in international trade**

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**Focus on measurable (quantitative) output:**

- ➤ **at the end of each food chain (it´s combined performance)**
- ➤ **at the end of the activities of each individual food busines contributing to that combined performance**

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## Current strategy

**ALARA as target** (<u>A</u>s <u>L</u>ow <u>A</u>s <u>R</u>easonably <u>A</u>chievable)
- ➤ Requirements expressed as "avoid", "minimize", "eliminate"
- ➤ Food safety expressed as "safe" or "unsafe" (qualitatively)

**Consequences:**
a) **Level of protection:**
  - ➤ Zero-tolerance /ALARA at plant level
  - ➤ General level of protection is unknown (population)
b) **Fixation of methodologies:**
  - ➤ Good hygienic practices based upon tradition (mandated)
  - ➤ Treatments that eleminate the most important hazards
c) **Trade:**
  - ➤ Difficulties in judging equivalence
  - ➤ Focus on bilateral/multilateral aggreements

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## Principle of equivalence

A "food chain"

Animals          Manufacturer          Consumer

Control measures

**Developing countries:**
- no/minimal control of animal health
- "normal" or additional control during manufacturing
- often, additional control at consumption level

**Raw milk cheese:**
- maximum control of animal health and hygiene at farm level
- control during/after manufacture, using hurdle technology and time/temperature control
- minimal control at consumption level

**Solution:**
**Quantitative targets for the food chains**

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## Consequenses of equivalence

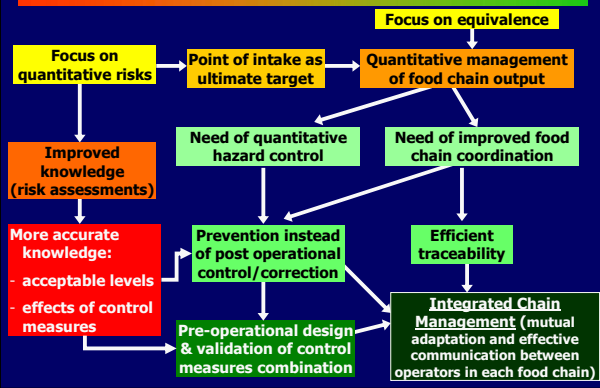Equivalence

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Quantitative risk management (governments)

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Deregulation (replacement of "recipes" with quantitative targets)

| Gives **more freedom & responsibility** to (and challenges) the individual food business | Requires **coordination**, communication og exchange of data within the food chain | Reguires **more knowledge** of the fate of hazards present in the food during distribution and consumption |

## Overview: Major trends & consequences



Flow diagram:
- Focus on quantitative risks → Point of intake as ultimate target → Focus on equivalence / Quantitative management of food chain output
- Focus on quantitative risks → Improved knowledge (risk assessments)
- Quantitative management of food chain output → Need of quantitative hazard control / Need of improved food chain coordination
- Improved knowledge (risk assessments) → More accurate knowledge: acceptable levels, effects of control measures
- Need of quantitative hazard control → Prevention instead of post operational control/correction
- Need of improved food chain coordination → Efficient traceability
- Prevention instead of post operational control/correction → Pre-operational design & validation of control measures combination
- Integrated Chain Management (mutual adaptation and effective communication between operators in each food chain)

## Integrated Chain Management (ICM)

**Interaction**, through effective **communication** between operators and **commitment** in the food chain, aiming at enhancing **mutual adaptation** of activities along the food chain to provide **cost-effective** hazard control that meets the ultimate food chain **targets**

**Motivation factors:**

- Meeting (shared) responsibility requirements for food safety at the time of consumption (all parties produces "food")
- Improve options to perform due dilligence & contingency preparedness
- Mutual interests in an "undisturbed" market

## THE DAIRY FOOD CHAINS
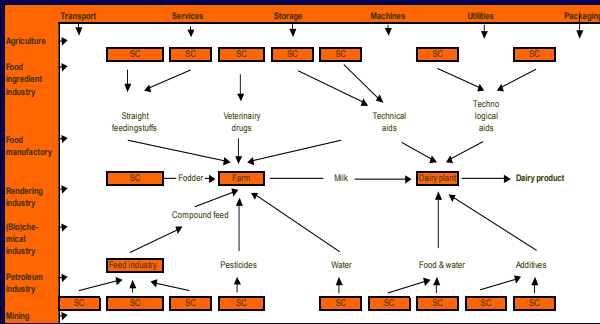


Source: Paul Mathot (NL)

## New international documents addressing ICM

- **Codex Code of Hygienic Practice for Milk and Milk Products**

- **Codex Principles and Guidelines for Microbiological Risk Management (at Step 3)**

- **ISO 22000 – Food Safety Management Systems – *Requirements for organizations throughout the food chain (DIS)***

## The Codex Milk Hygiene Code & ICM

- From raw material production to the point of consumption, dairy products should be subject to a **combination of control measures**, that are shown to achieve establshed FSOs and related criteria
- No individual step of the food chain should be managed without consideration of what takes place in the chain of events prior to the particular measure being applied or what will take place subsequent to a particular step
- The interrelationship and impact of one segment of the food chain on another segment is important to ensure that potential gaps in the continuum are dealt with through communication and interaction between the milk producer, the manufacturer, the distributor and the retailer.

## ISO 22000 and ICM

- Effective **arrangements** shall be established, implemented and maintained **for pro-active communicating** with:
  - suppliers and contractors
  - customers, (product information, enquiries, contracts, customer feed back, systems already in place)
  - food authorities
  - other organizations that have an impact on - or will be affected by the effectiveness or updating of the food safety management system

- Adequate **information**, especially with regard to known **hazards that need to be controlled** by **other organizations** in the food chain, shall be provided
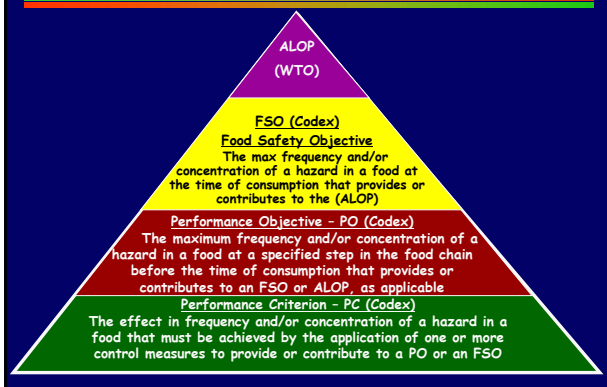
## ISO Objectives of external communication

- With **customers** to provide the basis for mutual acceptance of the level of food safety required (by the customer)
- **Along the food chain** to ensure allocation of sufficient and relevant knowledge to enable effective hazard identification, assessment and control where control is necessary and feasible
- With **food authorities** and organizations to provide the basis for public acceptance of the level of food safety identified
- With **all parties** to obtain reliability in the organization being capable of delivering that level.

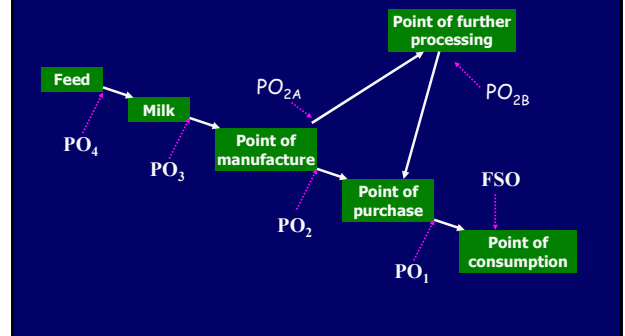## Codex MRM Principles & ICM

Introduces and connects different MRM terms in quantitative food chain management:

- Acceptable Level Of Protection (ALOP)
- Food Safety Objective (FSO)
- Performance Objective (PO)
- Performance Criterion (PC)
- Microbiological Criterion (MC)

## Hierarchical definitions

ALOP (WTO)

**FSO (Codex)**
**Food Safety Objective**
The max frequency and/or concentration of a hazard in a food at the time of consumption that provides or contributes to the (ALOP)

**Performance Objective – PO (Codex)**
The maximum frequency and/or concentration of a hazard in a food at a specified step in the food chain before the time of consumption that provides or contributes to an FSO or ALOP, as applicable

**Performance Criterion – PC (Codex)**
The effect in frequency and/or concentration of a hazard in a food that must be achieved by the application of one or more control measures to provide or contribute to a PO or an FSO

## Application of the FSO/PO concept

Feed

$PO_4$

Milk

$PO_3$

Point of manufacture

$PO_2$

$PO_{2A}$

Point of further processing

$PO_{2B}$

Point of purchase

$PO_1$

FSO

Point of consumption

## Implementation of ICM

1. **Analysing** the various steps in the chains
   a. Identification of hazards that need control
   b. Identification of control measures and point of (best) application
   c. Identification of required outcomes for the various steps in the food chains]
2. Defining the **topics** for communication
   a. hazards, hazards control options and expected outcomes
   b. Means of verification/assurance of system reliability
   c. sharing of responsibility and partnership
3. Communication **strategies**, structures and procedures

**Initiative & leadership:**
**Manufacturers of consumer products**

## ROLE OF IDF IN ICM

**"Fertilizing the soil"** for local development through:

- **Promoting the concept** of ICM towards relevant international private sector organizations, e.g:
  - Feed industry
  - Veterinary drugs industry
  - Pesticides industry
  - Suppliers of equipment (farm, manufacture)
  - Ingredients (foods, additives, starter cultures)
- Advocating a sense of **shared "ownership"** for the safety of dairy products
- **Developing means** for exchange of information and consultation
- **Coordinating approaches and tools**, e.g. appropriate food safety management systems, compatible tracking & tracing systems etc.

**ISO** International Organization for Standardization

# ISO/DIS 22000
# Food Safety Management Systems
**Requirements for Organizations throughout the Food Chain**
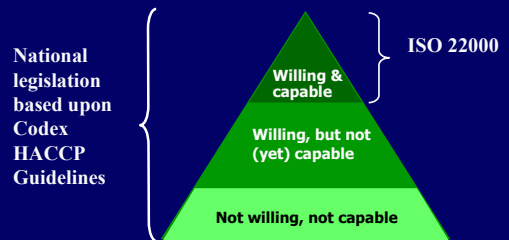
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# What is ISO ?

- **International Standardization Organization**
  - **Non-governmental**
  - **A network of national standards institutes (148 countries)**
  - **A bridge between public and private sectors**
- **An ISO Standard**
  - **Voluntary (no legal authority)**
  - **Purpose:**
    - To facilitates exchanges
    - Meet a real need (market driven)
  - **Work of experts - achieved by consensus**
  - **Auditable requirements**
- **Well-known ISO management standards:**
  - **ISO 9000** (generic quality management)
  - **ISO 14000** (generic environmental management)

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# Characteristics of ISO 22000

- Requirements for the planning, operating, checking, and updating of food safety management systems
- Requirements for addressing (assessing and, as necessary, implementing) food safety concerns and requests of costumers (e.g. retailers, authorities)
- Can be applied on its own or in combination with other management systems, with/without 3rd party certification
- Combines recognized key food safety elements:
  - **System management** (ISO 9001 approach)
  - **Interactive communication** along the food chains
  - **Prerequisite programs** and the **HACCP plan** through extended hazard analysis
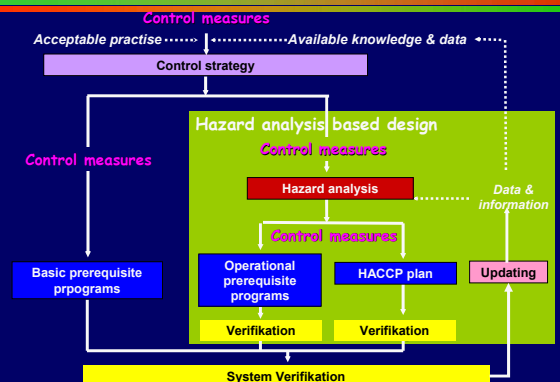
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# Target groups for ISO 22000

**Scope: All types of organizations within the food chains (advanced, less advanced, with/without CCPs)**

National legislation based upon Codex HACCP Guidelines

ISO 22000

- Willing & capable
- Willing, but not (yet) capable
- Not willing, not capable

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# Why does industry need ISO 22000 ?

- ISO 9001 does not specifically deal with food safety and does not address stringency (unspecific)
- Too many local standards ($\Rightarrow$ confusing)
- Need for a harmonized auditable approach (documentation ability)
- Desire for system improvements
- Desire for improving food safety management
  - Better planning, less post-process verification
  - Management of the food chain continuum (ICM)
  - More efficient and dynamic hazard control
  - Systematic management of prerequisite programs

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# Categorization of control measures

**Control measures**

*Acceptable practise* ......... | ............. *Available knowledge & data* .....

**Control strategy**

**Hazard analysis based design**

*Control measures*

**Control measures**

*Control measures*

**Hazard analysis**

*Data & information*

*Control measures*

**Basic prerequisite prpograms**

**Operational prerequisite programs**

**HACCP plan**

**Updating**

**Verifikation**

**Verifikation**

**System Verifikation**

## Questions to guide categorization of PRP measures

- Is the control measure intended to control one or more **specific** hazards?
- Is the effect of other control measures against (a) hazard(s) **dependant on the functioning** of this particular control measure?
- Is **close monitoring** required to document that the functioning of the control measures is reliable?
- Can the effect of the control measure against the hazards be **validated ?**

**Infra-structure & maintenance programmes**

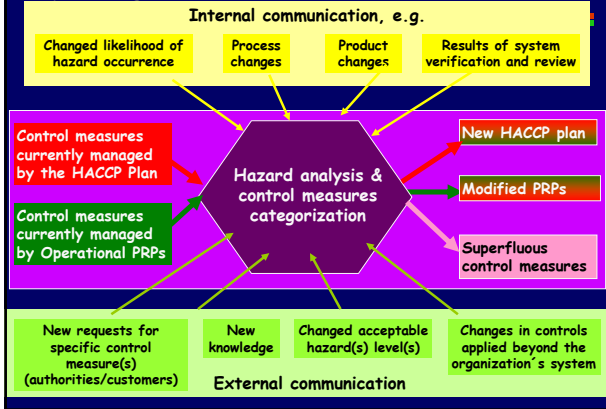**Hazard analysis based control through Operational PRPs and/or the HACCP plan**

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## Factors determining categorization of selected and validated control measures

- **Effect** on hazards relative to applied intensity
- Feasibility for **monitoring in time** for correction
- Likelihood of hazard **occurrence**
- **Severity** of adverse health effects from the hazard
- **Location relative** to other control measures
- **Synergistic effects**
- Likelihood of **operational failure**
- Likelihood of **re-occurrence** after application

**The HACCP Plan ?**

**Operational Prerequisite Programs ?**

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## Updating of control measure combinations

**Internal communication, e.g.**

| Changed likelihood of hazard occurrence | Process changes | Product changes | Results of system verification and review |

**Control measures currently managed by the HACCP Plan**

**Control measures currently managed by Operational PRPs**

**Hazard analysis & control measures categorization**

**New HACCP plan**

**Modified PRPs**

**Superfluous control measures**

| New requests for specific control measure(s) (authorities/customers) | New knowledge | Changed acceptable hazard(s) level(s) | Changes in controls applied beyond the organization´s system |

**External communication**

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## ISO 22000 vs. traditional CoPs

| ISO 22000 | BRC, IFS, GMP+ & CoP |
|---|---|
| Targeted the whole food chain | Selected segments |
| System specifically designed to the individiual business (type, size, location in food chain) | Same requirements to all types of business |
| Provides the framework and methodology to document food safety | Contains exhaustive lists which are anticipated to achieve food safety |
| Hazard analysis subject to constant evaluation | Hazard analysis not chjallenges, the focus is on whether it has been carried out |
| System efficiency (reliability) is documented (verification & validation) | Focus on various policies and procedures – but not whether they are effective |
| Internal & external communication | Not addressed |

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Thank you!