



Workshop on Guiding Public Health Policy in Areas  
of Scientific Uncertainty, University of Ottawa, July  
11-13, 2005

## Food Safety & Genetically Modified Food (GM Food)

Peter Karim Ben Embarek

Department of Food Safety, Zoonosis and Foodborne Diseases

World Health Organization (WHO), Geneva, Switzerland



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# Content



- **I) Genetically modified foods : A short overview**
- **II) Assessing the safety of food**
- **III) GM foods : Balancing science, fears and uncertainty**

# Global transgenic crop area

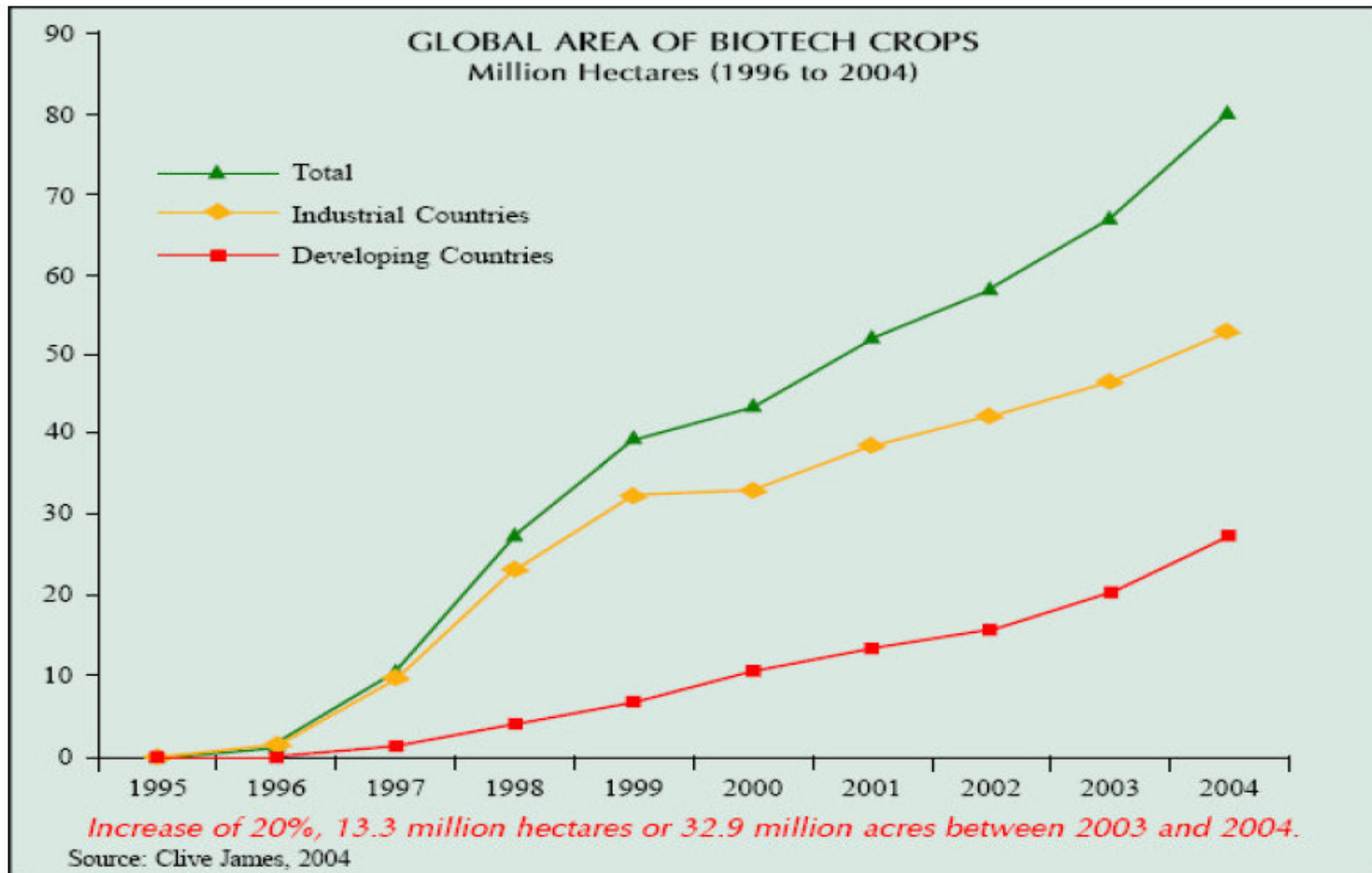


Country	Global area transgenic crops ( <b>million ha.</b> )			
	2001		2004	
USA	<b>35.7</b>	68%	<b>47.6</b>	59%
Argentina	<b>11.8</b>	23%	<b>16,2</b>	20%
Canada	<b>3.2</b>	7%	<b>5.4</b>	6%
Brazil	-	-	<b>5.0</b>	6%
China	<b>1.5</b>	1%	<b>3.7</b>	5%
Paraguay	-	-	<b>1.2</b>	2%
South Africa	<b>0.2</b>	0.5%	<b>0.5</b>	1%
<b>Total</b>	<b>52.6</b>	100%	<b>79.6</b>	99%

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## Global transgenic crop growth (million hectares) 1996-2004



# GM crops



## In 2004 :

- herbicide tolerant soybean, maize and cotton : 72 % of global GM plantings
- Insect resistant BT crops : 20 %
- “stacked genes” with both features : 8 %
- virus resistant fruits and vegetables still very small.

# Food safety - An international concern



## Developing countries (WHO, 2004)

- Diarrhoea (foodborne or waterborne): 1.8 million deaths per year

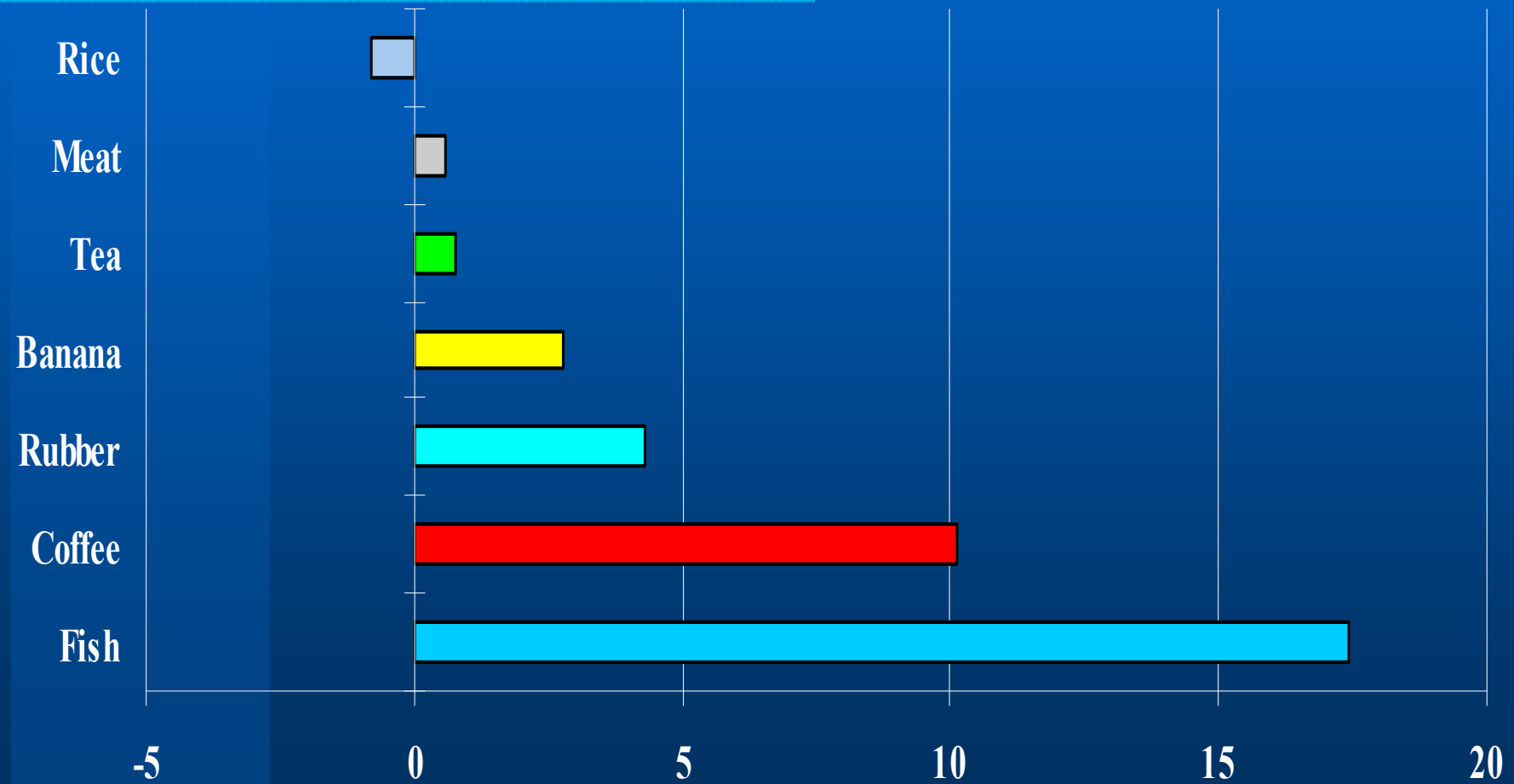
## Industrialized countries

- up to 30% of the population gets diseased
- up to 20 per million die

## World wide (draft WHO, 2005)

- 1.8 - 3.1 billions cases of foodborne diarrhea
- 53 - 124 million cases of foodborne salmonellosis

# Net exports by developing countries (US\$ million) 2000



Source: GLOBEFISH

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# Globalisation of Trade : “*The World on your Plate*”



**Chicken Kiev**

- Herb Butter**
  - Salted butter - Ireland
  - garlic puree - China, USA, Spain
  - garlic salt - China, USA, Spain
  - lemon - USA
  - parsley - France, UK
  - pepper - Indonesia
  - water - Ireland
- Chicken Breast:** Chicken - Ireland, Belgium  
UK, France etc.
- Batter:** Flour - Belgium, France  
Water - Ireland
- Bread Crumb:** Bread crumb - Ireland, UK  
Rape-seed oil - EU, Australia  
Eastern Europe

Courtesy A. Reilly, FSAI, Ireland

**Science**



**Consumer Confidence**



**Trade**



**Politics**



**Public Health**

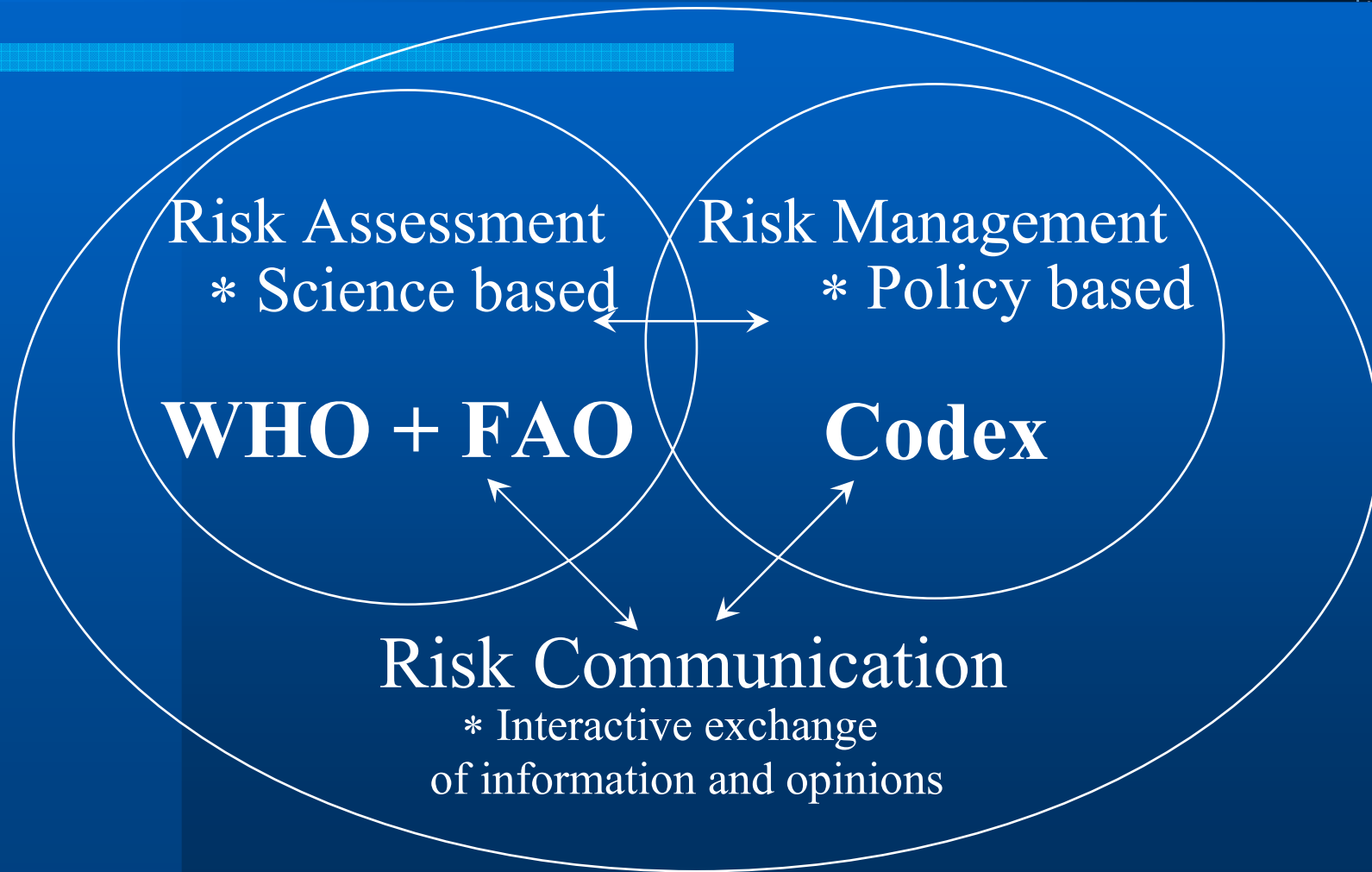


**Communication**



**Handling food risk**

# Risk Analysis



# Codex Alimentarius Commission



www.codexalimentarius.net

CODEX ALIMENTARIUS - Microsoft Internet Explorer provided by WHO

File Edit View Favorites Tools Help

Address <http://www.codexalimentarius.net/>

FAO/WHO Food Standards

ENGLISH | FRANÇAIS | ESPAÑOL

**CODEX** alimentarius

ABOUT CODEX MEETINGS AND EVENTS OFFICIAL STANDARDS

Forthcoming Codex Meetings  
Reports  
Archive Reports

*Welcome*

The Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations.

Warning: This is the only official website of the Codex Alimentarius Commission. Unofficial websites using similar domain names (URLs) exist. The information contained in unofficial websites is not guaranteed by the Codex Alimentarius Commission nor by FAO or WHO and in no way commits the Commission, FAO or WHO.

**Joint FAO/WHO Food Standards Programme  
Codex Alimentarius Commission**

**Twenty-seventh Session,  
International Conference Centre, Geneva (Switzerland),  
28 June - 3 July 2004**

**SIDE EVENTS**

**Executive Committee of the Codex Alimentarius  
Commission**

**RELATED CODEX LINKS**

- JECFA
- JMPR
- JEMRA
- Biotech assessment
- Expert consultations

**EXTERNAL LINKS**

- WTO
- OIE
- IPPC
- WHO

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# Everything you wanted to know about Codex but was afraid to ask



- **International food standards organization, established in 1962 by FAO and WHO**
- **Codex Secretariat located in Rome, hosted by FAO**
- **169 countries are member**
- **Active participation of NGOs without voting rights**
- **Codex standards formally recognized by WTO (SPS and TBT Agreements)**

# International harmonization FAO/WHO Codex Alimentarius



- **Establishment of international food safety standards**
  - protect the health of consumers
  - ensure fair practices in trade
- **Based on risk assessments from FAO/WHO (JECFA, JMPR, JEMRA, Ad hoc Consultations)**

# International harmonization FAO/WHO Codex Alimentarius



## ● Use of Precaution in food safety standards

Codex principles for risk analysis.....

- Precaution is an inherent element of risk analysis. Many sources of uncertainty exist in the process of risk assessment and risk management of food hazards.
- The degree of uncertainty and variability in the available scientific information should be explicitly considered in the risk analysis. Where there is sufficient scientific evidence to allow Codex to proceed to elaborate a standard, the assumptions should reflect the degree of uncertainty and the characteristics of the hazard.

# FAO/WHO other Assessments



- Acrylamide : New hazard in a wide range of foods (French fries, coffee, bread, baked foods,...)  
Within 2 months, Expert consultation provided a rapid assessment and interim guidance on use of a balanced diet and limited consumption of high risk foods.

Large uncertainty, use of precaution in a rationale and balanced way

# FAO/WHO other Assessments



## – Avian influenza-food safety aspects :

Within 2 weeks, provided rapid assessment and guidance on food safety measures available.

Potential Large scale health impact, use of precaution by Governments based on a “gambling” analysis.

# *GM foods – Products and technology*



- public health could benefit from the potential of biotechnology,
  - increase in nutrient content of foods,
  - decreased allergenicity and
  - more efficient food production;
- need to examine potential negative effects on human health of consumption of GM food.

## Risk perception : Public GM food perception



- ◆ **Although health risk has often taken center-stage, public attitudes towards GM foods is not solely based on health risk considerations**
- ◆ **The differences between peoples perception of the use of gene-technology in medicine and in GM foods seem to indicate other factors at play**

# GM food perception



- The public is not for or against GMOs
  - Arguments both for and against
  - Aware of contradictions within these arguments
- **People do not demand ‘zero risk’**
  - aware that life is full of risks
  - aware of the need to balance risk and benefit
- The public react to the context in which GMOs are developed.

# The legal framework



## The WTO / SPS agreement

The SPS (Sanitary and PhytoSanitary) agreement provides international agreement on how sanitary rules should be applied in food trade

# SPS Agreement

## Annex A



**Sanitary/Phytosanitary Measures include all laws, decrees, regulations, requirements and procedures related to**

- end product criteria
- processes
- production methods
- testing
- inspection
- certification
- approval procedures
- quarantine treatments
- statistical methods
- sampling procedures
- risk assessment
- packaging
- labelling

# SPS AGREEMENT

## Article 5



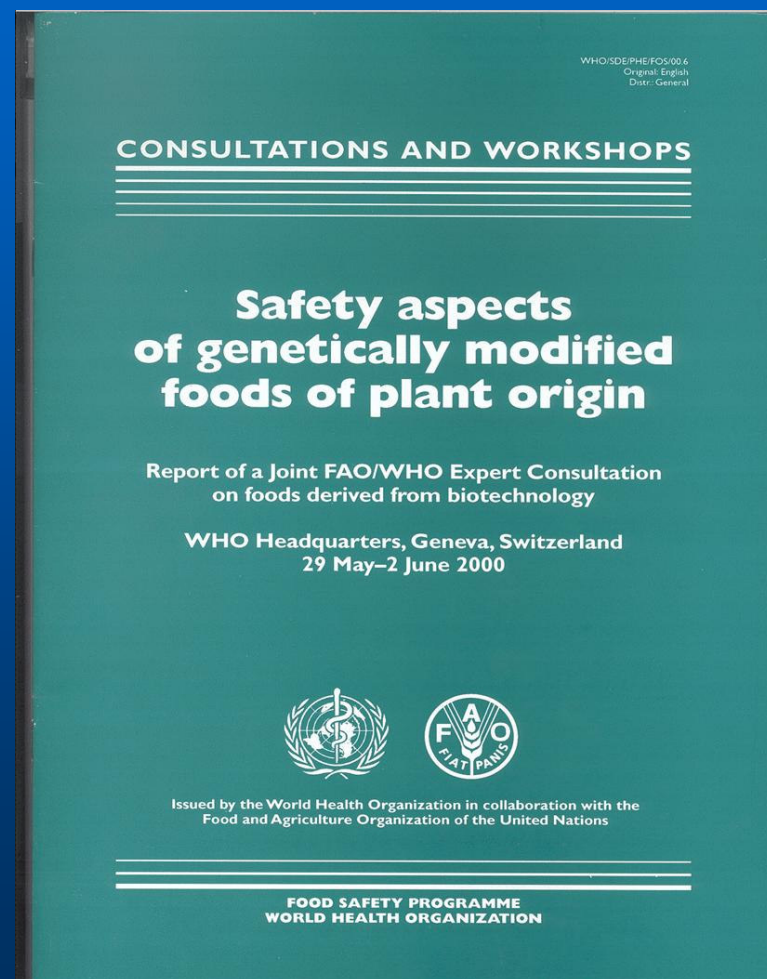
### *Risk Assessment*

SPS Measures are to be based on an assessment of the risks to Human, Animal and Plant life and health using internationally accepted Risk Assessment Techniques

# The legal framework : FAO/WHO work



**FAO and WHO  
initiated a new series  
of Expert  
Consultations on GM  
foods in 2000**



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# Joint FAO/WHO Expert Consultations



- **Safety Assessment of foods derived from genetically modified plants, June 2000**
- **Allergenicity of GM Foods, January 2001**
- **Safety Assessment of foods derived from genetically modified microorganisms, September 2001**
- **Safety Assessment of Foods derived from GM animals, including fish, November 2003**

# Codex - GM foods : Principles for Risk analysis



- direct effects (related to insert)  
    Premarket, case-by-case analysis
- unintended effects  
    use of, where appropriate, post-market monitoring

These principles were adopted by Codex June 2003

Codex referred to specifically in SPS/WTO agreement

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## *Case by case - Pre and Post*



- Different GM foods have different genes inserted in different ways, should be pre-market assessed on a case-by-case basis.
- Statements on safety of all GM foods do not reflect reality.
- Continuous use of risk assessments and, where appropriate, including post market monitoring, should form the basis for evaluating the safety of GM foods.
- In general, Codex risk analysis accepts the importance of other legitimate factors.

# Codex - GM foods : Principles for Risk analysis



- direct effects (related to insert)  
Premarket, case-by-case analysis
- **unintended effects**  
use of, where appropriate, post-market monitoring

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# Occurrence of Unintended Effects



- **“Predictable” effects based on information of the DNA insert**
- **“Unexpected” effects can stem from changes at insertion site**
  - **Statistically significant differences should be assessed for their biological significance**
  - **Potential occurrence of unintended effects is not specific to the use of GM techniques**

# Scope for Post-Market Monitoring



- **Control of presence of GM organisms or GM foods**
- **Surveillance of issues identified in the risk assessment**
- **Surveillance of nutritional issues detection of risks not identified in the risk assessment**
- **Tracing of detrimental environmental developments**
- **Enforcement of labelling regulations**

## *Uncertainties in Risk assessment*



- The debate on safety of GM foods includes the consideration of scientific uncertainties in the risk assessment.
- To reduce uncertainty, and to gain insights in potential benefits (e.g. related to nutrition), long term surveillance of consumer health in specific situations or post-market monitoring of food could be used.
- It is widely recognised that little is known about the long term effects of any food, making the identification of effects that might be unique to GM foods problematic.

## Conclusions :



- “GM foods currently available on the international market have passed risk assessments and are not likely to present risks for human health.”
- “It is clear that modern technologies must be thoroughly evaluated if they are to constitute a true improvement in the way food is produced. Such evaluations must be holistic and all-inclusive...”

*Biotech food Assessment  
traditionally covering only two areas*



- ◆ **Human health / safety**
  - ◆ (International: Codex Alimentarius)
  
- ◆ **Environmental safety**
  - ◆ (International: Cartagena Protocol)

## *Beyond safety assessments*

### *- the case for holistic evaluations:*



- modern technologies must be thoroughly evaluated to constitute a true improvement of food production and life
- evaluations should be holistic, i.e. not stop at the previously segmented systems of evaluation focusing solely on **human health** and **environmental effects**

## *What would holistic evaluations include:*



In addition to health and environmental safety, holistic evaluations of GM food would consider:

- benefits
- nutrition
- socio-economic aspects
- ethical aspects
- access and equity
- property rights

For further information :



Internet :

<http://www.who.int/foodsafety>

E.mail:

[benembarekp@who.int](mailto:benembarekp@who.int)