

# Besoins en recherche pour améliorer la sécurité sanitaire des aliments en Afrique

## Research needs to improve food safety in Africa

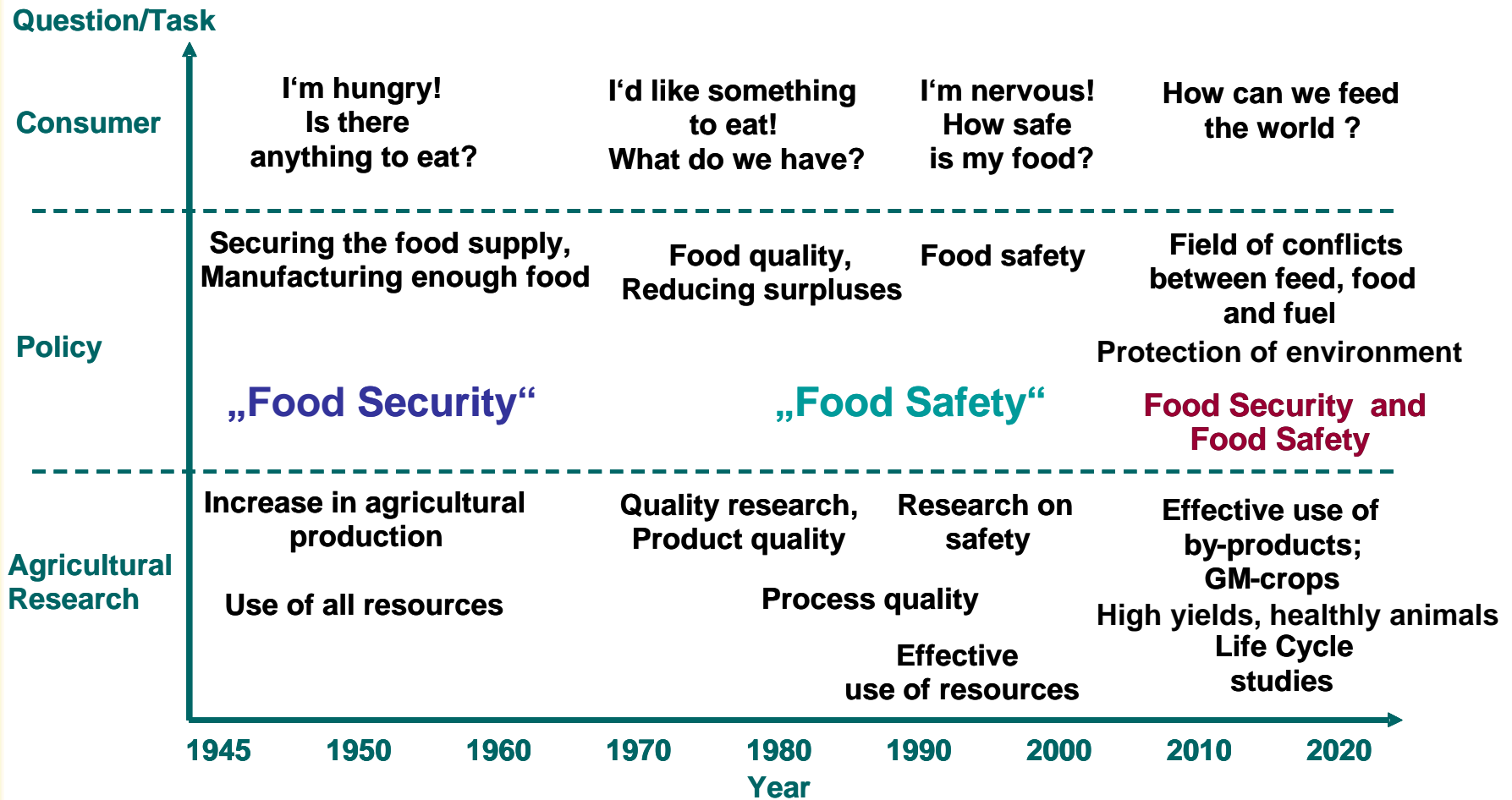
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# Center international research agronomical for the development

- Departement: PERSYST
- Research unit: QUALISUD
- Team:
  - Food safety: contaminant (mycotoxins, PAH,..;)
  - Traceability (molecular tool)

# Dominating questions of society as well as tasks of policy and agricultural research after the 2<sup>nd</sup> World War in Europe, presently and in future



Food shall not include :

- (a) feed
- (b) live animals unless they are prepared for placing on the market for human consumption
- (c) plants prior to harvesting
- (d) medicinal products
- (e) cosmetics
- (f) tobacco and tobacco products
- (g) narcotic or psychotropic substances
- (h) **residues and contaminants**



## Contaminants

- **Heavy metals or anorganic contaminants (e.g. Pb, Hg, Cd, As...)**
- **Natural constituents of plants /feeds (ex. cyanide...)**
- **Microbes and products from microbes (ex mycotoxins)**
- **Man made contaminants (anthropogenic contaminants, ex acrylamide)**
- **Contaminants from industry, traffic, households etc (ex dioxine)**
- **Fertilizer, manure**
- **Veterinary drugs**

# PATHOGENIC AGENTS

## Bacteria

*Salmonella serovars,*

*Campylobacter,*

*Escherichia coli,*

*Vibrio parahaemolyticus,*

....

*Shigella,*

*Aeromonas hydrophilla,*

*Vibrio cholera,*

*Vibrio vulnificus,*

## Virus

Norwalk virus

Astrovirus

Human Calcivirus

Hepatitis A virus

Rotavirus

Enteric Coronavirus

Enteric Adenovirus

Hepatitis E

## Parasites

*Cryptosporidium parvum*

*Giardia lamblia*

*Ascaris*

*Taenia*

*Cyclospora*

*Endamoeba coli*

*Toxoplasma gondii*

## Animal poisons

Consumption of shells and fish, which contain toxic dinoflagelles (algae), the tetradoxin from fish

## Chemical

Pesticides, herbicides, heavy metals,  
antibiotics

*Bacillus cereus*

Enterotoxin

*Clostridium perfringens*

Toxin

*Clostridium botulinum*

Botulinic toxin

*E. coli* O157:H7

Enterotoxin

Staphylococcal

Enterotoxin

Toxinogenic Fungi

Mycotoxins : Aflatoxins,  
Fumonisin, Ochratoxins...



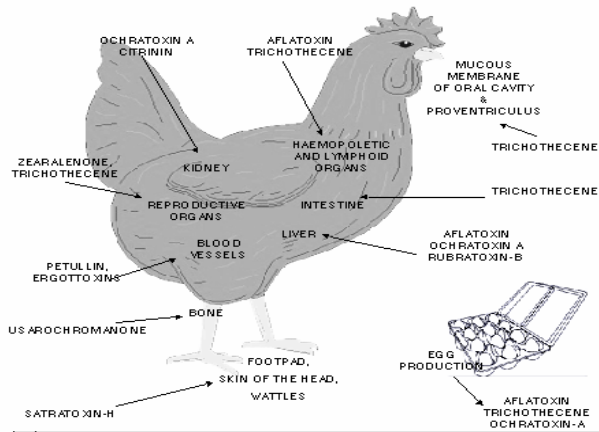
# Mycotoxins

- Secondary metabolites produced by fungi of various genera on agricultural products, after harvest or during transportation or storage,
- Toxic :neurotoxic, carcinogenic, nephrotoxic...
- Mycotoxin production is influenced by intrinsic (water activity, pH, redox potential) or extrinsic factors (relative humidity, temperature, availability of oxygen).
- Toxic for human and animal

# Food containing Mycotoxins

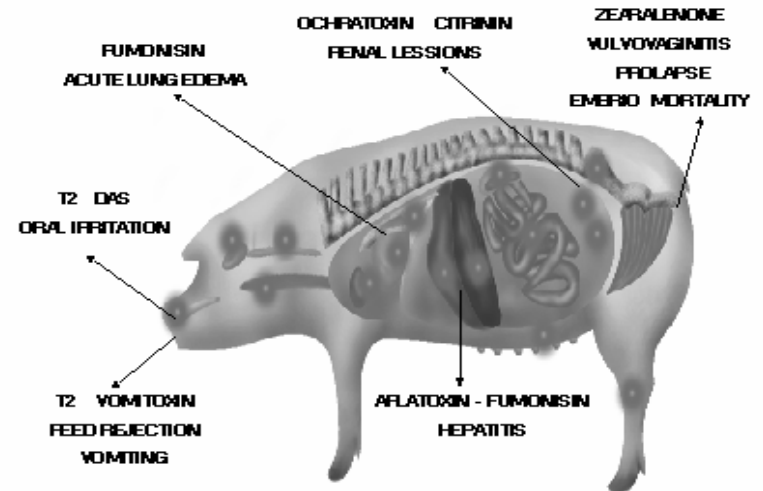
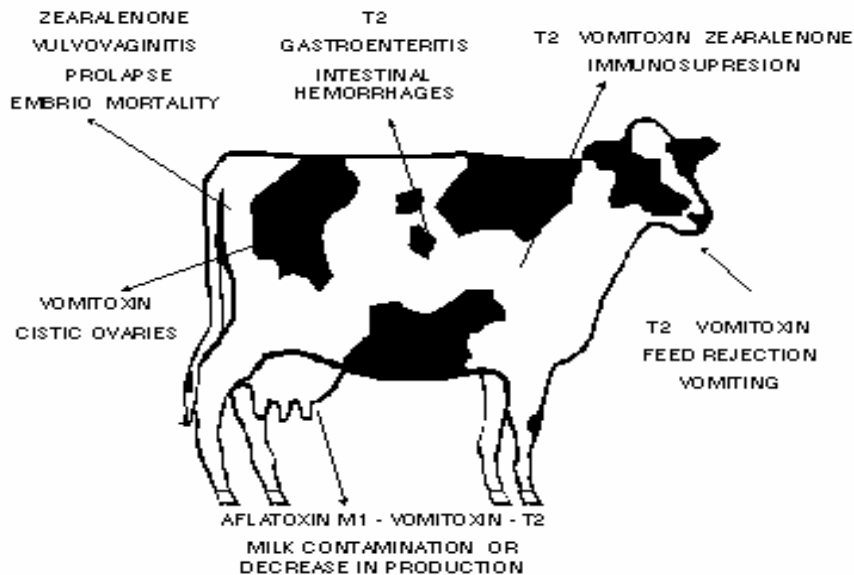
| <b>Mycotoxin</b>       | <b>Organism</b>   | <b>Foods</b>                             |
|------------------------|---|--|
| <i>Aflatoxin</i>       | <i>A. flavus, A. paraciticus</i>                                | Corn,peanuts,cottonseed, etc.            |
| <i>Citrisin</i>        | <i>Penicillium citrinum</i>                                     | Wheat,barley,peanuts                     |
| <i>Ochratoxin A</i>    | <i>A. ochraceus, R. veridicatum, R. cyolopium</i>               | Corn,barley,wheat, peanuts               |
| <i>Patulin</i>         | <i>A. clavatus, R. patuluns</i>                                 | Silage, apples                           |
| <i>Penicillic acid</i> | <i>A. clavatus, R. puberulum</i>                                | Corn, beans                              |
| <i>Alternariol</i>     | <i>Alternaria tenuis, A. dauci</i>                              | Weathered grain, sorghum, pecan pickouts |
| <i>Zearalenone</i>     | <i>Fusarium roseum, E. moniliforme, F. nivale, E. oxysporum</i> | Corn, sorghum, wheat                     |
| <i>Fumonisin</i>       | <i>Fusarium</i>   | Corn                                     |

# cirad Mycotoxin residues in animal



## Some mycotoxin may form residues in animal products, e.g.:

- Aflatoxin B1: eggs, liver, muscle, kidney
- Aflatoxin M1: milk
- Ochratoxin A: liver, kidney, sausages
- Zearalenone: liver, muscle



## **ANIMAL**

- **Loss of nutrients**
- **Lower acceptance and Reduced feed intake**
- **Toxins (Myco-, Ecto-, Endotoxins)**
- **Lower quality**
- **Intoxications**
- **Intestinal dysbioses**
- **Infections**

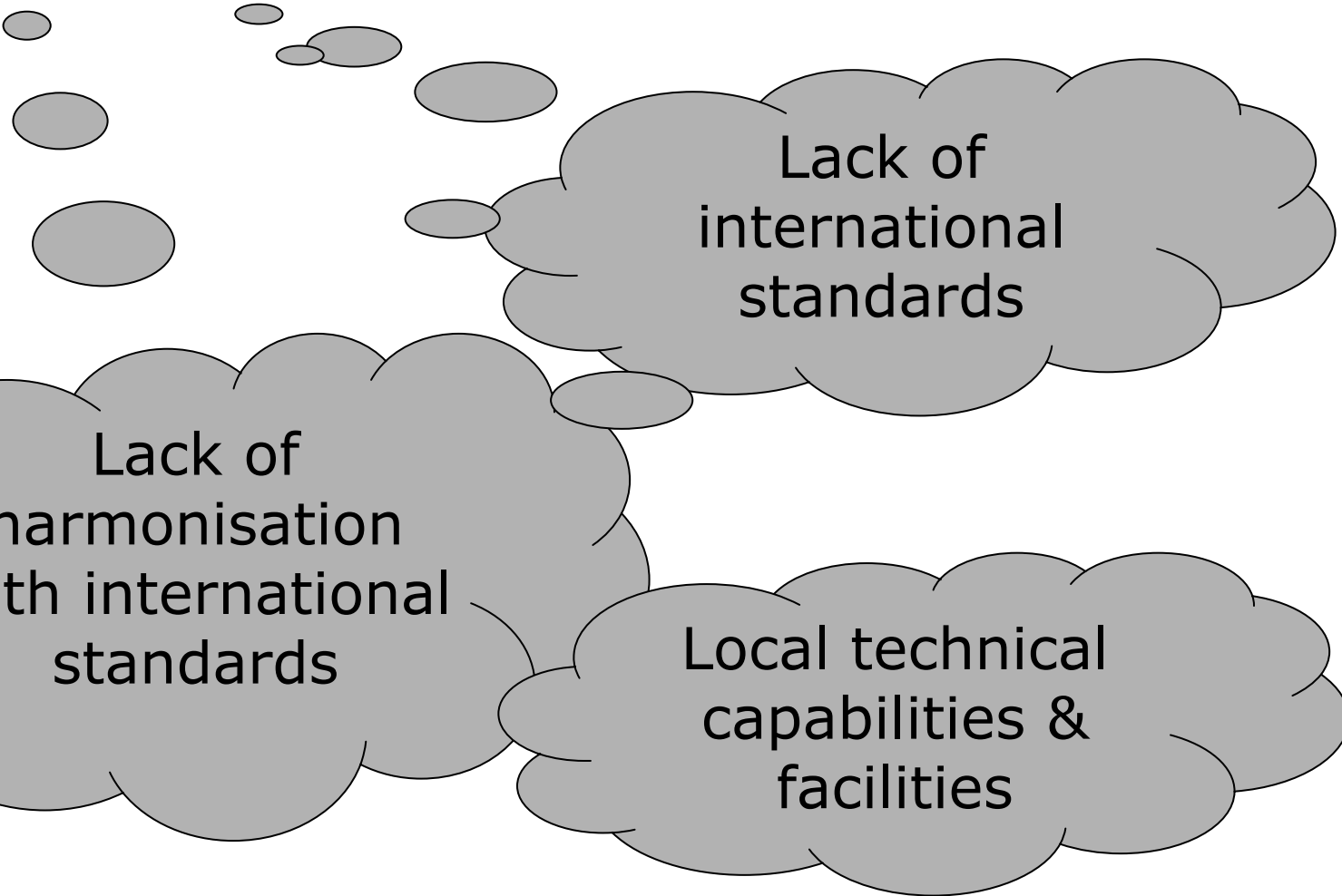
## **FOOD SAFETY**

- **Microbial contaminations and infections(e.g. Clostridia, Salmonella, *E. coli*)**
- **Higher toxins (mycotoxins)**

# In Europa

- International standards of health security of food
- Surveillance and monitoring of food intoxications
- A network of Expert and laboratories
- A rapid alert system
- .....

## But in Africa !



Lack of international standards

Lack of harmonisation with international standards

Local technical capabilities & facilities

# Project EDES

## Strengthening food safety systems in ACP

- The objective is to ensure that their exports are SPS-wise compliant with the SPS standards applicable to any foodstuff available on the European market.
- The EDES Program has been designed to assist ACP countries in adjusting to this and strengthening their national SPS systems so as to ensure and enlarge access into the EU



# Project EDES

## Strengthening food safety systems in ACP

- EDES Activities
  - Institutional capacity building with regard to food safety management systems
  - Strengthening of self-assessment capacities in the food value chains and food safety supervision by the public services
  - Reinforcement of technical and business management capacities of laboratories along accreditation principles
  - Enhancement of good production and processing practices of small producers/fishers/processors
  - Strengthening the capacities of 6000 local experts in training and technical assistance for delivery to food safety management stakeholders



## 3c.Ivoire

- Improvement of the food safety in Ivory Coast by the implementation of a policy planed between authorities and actors of the society and by the creation of the national committee of coordination of actions for the health security of food in Ivory Coast.

- **Main results expected:**
  - Legislative Balance sheet and evaluation of food safety and actual structures of control.
  - Tool of strategical and documentary surveys, creation of a quality-label, the prefiguration of an alert system.
  - Information and training of non-state actors, mainly professional organizations and consumers' associations.
  - Strengthening of national health risk evaluation by management of the food quality circulating on the national territory and the creation of expert committees that will become force of proposal for political subjects of food safety.

## Conclusion

- Efficient systems of regulation
- Conformity to the international standards of health security
- Rapid system alert
- Surveillance and monitoring of food born diseases
- A network of Expert and laboratories of public health and national agencies
- Sampling and improvement of analytical tools for the control and traceability of food and feed.
- Research project to improve food and feed safety. in some specific cases
- Training of all actors, form farm to consumer.

**Thank for your attention**