



Development of methodologies to be used for assessing exposure to multiple pesticides

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Chemical mixtures: challenges for research and risk assessment
10/11 December 2013

- 2006 **EFSA's 7th Scientific Colloquium** - Cumulative Risk Assessment of Pesticides to Human Health: The Way Forward
<http://www.efsa.europa.eu/en/supporting/pub/117e.htm>
- 2008 **Scientific Opinion to evaluate the suitability of existing methodologies** and, if appropriate, the identification of new approaches to assess cumulative and synergistic risks from pesticides to human health with a view to set MRLs for those pesticides in the frame of Regulation (EC) 396/2005
<http://www.efsa.europa.eu/en/efsajournal/pub/705.htm>
- 2009 **Scientific Opinion for a selected group of pesticides from the triazole group** to test possible methodologies to assess cumulative effects from exposure through food from these pesticides on human health
<http://www.efsa.europa.eu/en/efsajournal/pub/1167.htm>

2012 Guidance on the use of **probabilistic methodology** for modelling **dietary exposure** to pesticide residues

<http://www.efsa.europa.eu/en/efsajournal/pub/2839.htm>

2013 Scientific Opinion on the identification of **pesticides to be included in cumulative assessment groups** on the basis of their toxicological profile

<http://www.efsa.europa.eu/en/efsajournal/pub/3293.htm>

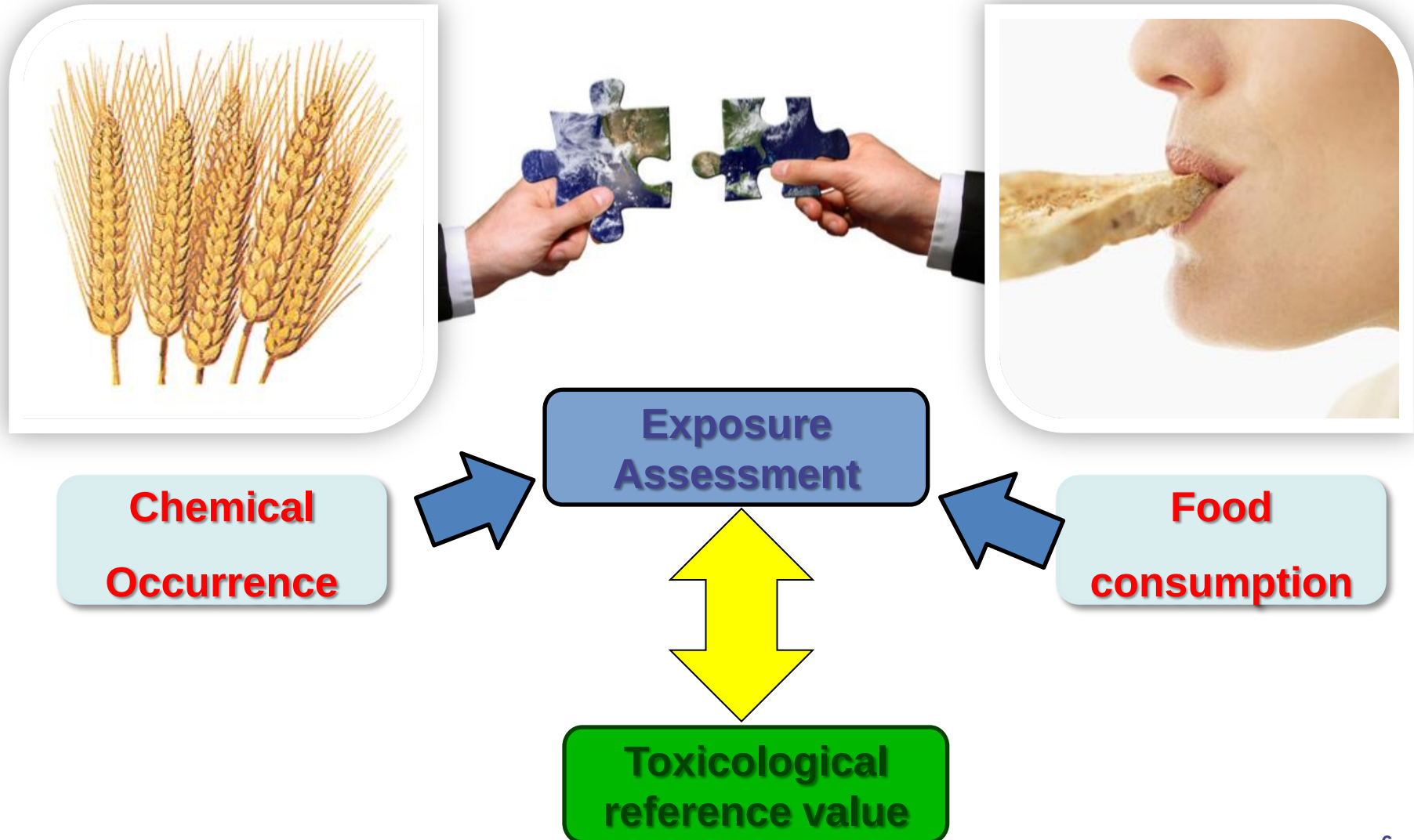
(Published on EFSA Website for public consultation – closed on 30 September)

- Evaluation of **comments** received during the **public consultation** on the Scientific Opinion on cumulative assessment groups (CAGs)
- Preparation of Scientific Opinion on the relevance of **dissimilar mode of action** and its appropriate application for cumulative risk assessment of pesticides residues in food
- Outsourced project on collection of data relevant for cumulative risk assessment (until end of 2015)
- Technical Meeting with stakeholders on cumulative risk assessment, 11 February 2014, EFSA, Parma
 - aiming at information of and exchange with stakeholders

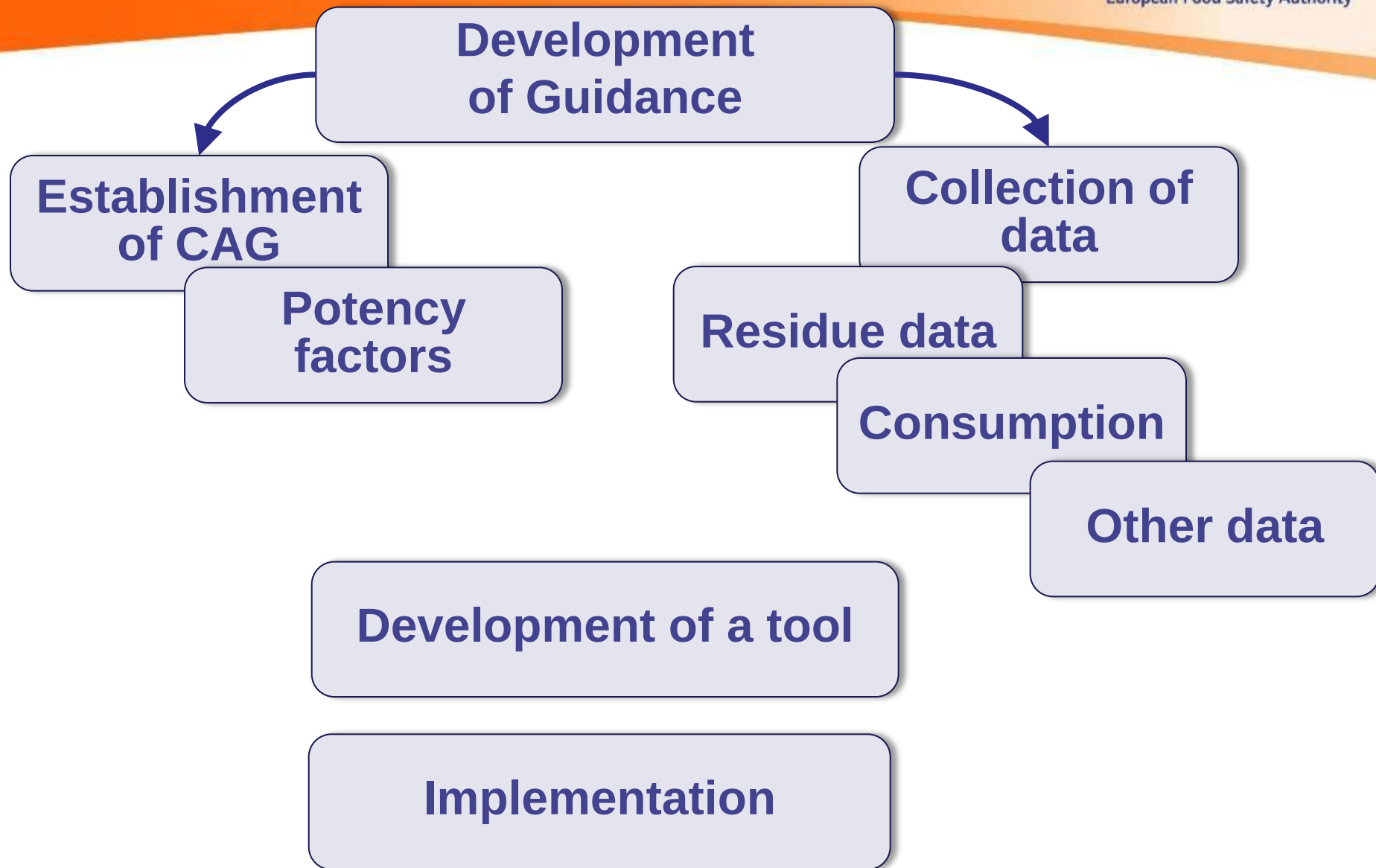
Other activities of EFSA related to Cumulative Risk Assessment

- Development of **new format for reporting monitoring data** on pesticide residues (SSD – Standard Sample Descriptor)
- Increased quantity and **quality of monitoring data**
- Establishment of the **comprehensive food consumption data**
- Development of **EFSA PROFile** (Pesticide Residue Overview File) to collect data in the framework of the MRL review in a structured format
- Development of **EFSA PRIMo** (Pesticide Residue Intake Model)
- **Indicative cumulative risk assessment for OP pesticides and carbamates** using PRIMo (deterministic approach) (see 2010 EU Report on Pesticide Residues)

Dietary risk assessment



Cumulative risk assessment: work packages



Toxicological data

Where are we today?

287 active substances were screened

Cumulative assessment groups (CAGs)

CAG level 1

- ✓ Nervous system (68 substances)
- ✓ Thyroid system (113 substances)
- Liver
- Kidney
- Adrenal gland
- Eyes
- Developmental/reproductive toxicity

Cumulative assessment groups (CAGs)

CAG level 2: Common specific phenomenological effect
(**acute effects**)

- Functional effects on motor division:
 - **45 pesticides**
- Functional effects on sensory division:
 - **21 pesticides**
- Functional effects on autonomic division:
 - **29 pesticides**
- Neurochemical endpoints:
 - **15 pesticides**

Cumulative assessment groups (CAGs)

CAG level 2: Common specific phenomenological effect
(chronic effects)

- Functional effects on motor division:
 - **53 pesticides**
- Functional effects on sensory division:
 - **22 pesticides**
- Functional effects on autonomic division:
 - **24 pesticides**
- Neurochemical endpoints:
 - **15 pesticides**
- Neuropathological effects:
 - **21 pesticides**

Cumulative assessment groups (CAGs)

CAG level 2: Common specific phenomenological effect
(chronic effects)

- Effects on parafollicular cells or the calcitonin system:
 - 25 pesticides
- Substances affecting follicular cells and/or thyroid hormone (T3/T4) system
 - 98 pesticides

- Assessment of the remaining 5 CAGs (level 1)
- Assessment of non-approved substances ?
(check first their relevance in terms of exposure,
based on occurrence data)
- Assessment of metabolites ?
(check first the relevance – metabolism studies)

Occurrence data

Where are we today?

Monitoring data

- Since 2009 the monitoring results are reported at detailed level (individual determinations) using the SSD format, including a lot of background information
- Residue definition for enforcement
- 27 EU MS + NO, IC
- ca. 70.000 samples/year
- ca. 15 to 20 Mio determinations/year



EU- coordinated Monitoring Programme

Ca. 12.000
samples

In 3 yr. cycle
covers 30-40
food
commodities

Ca. 180
pesticides

National Monitoring Programmes

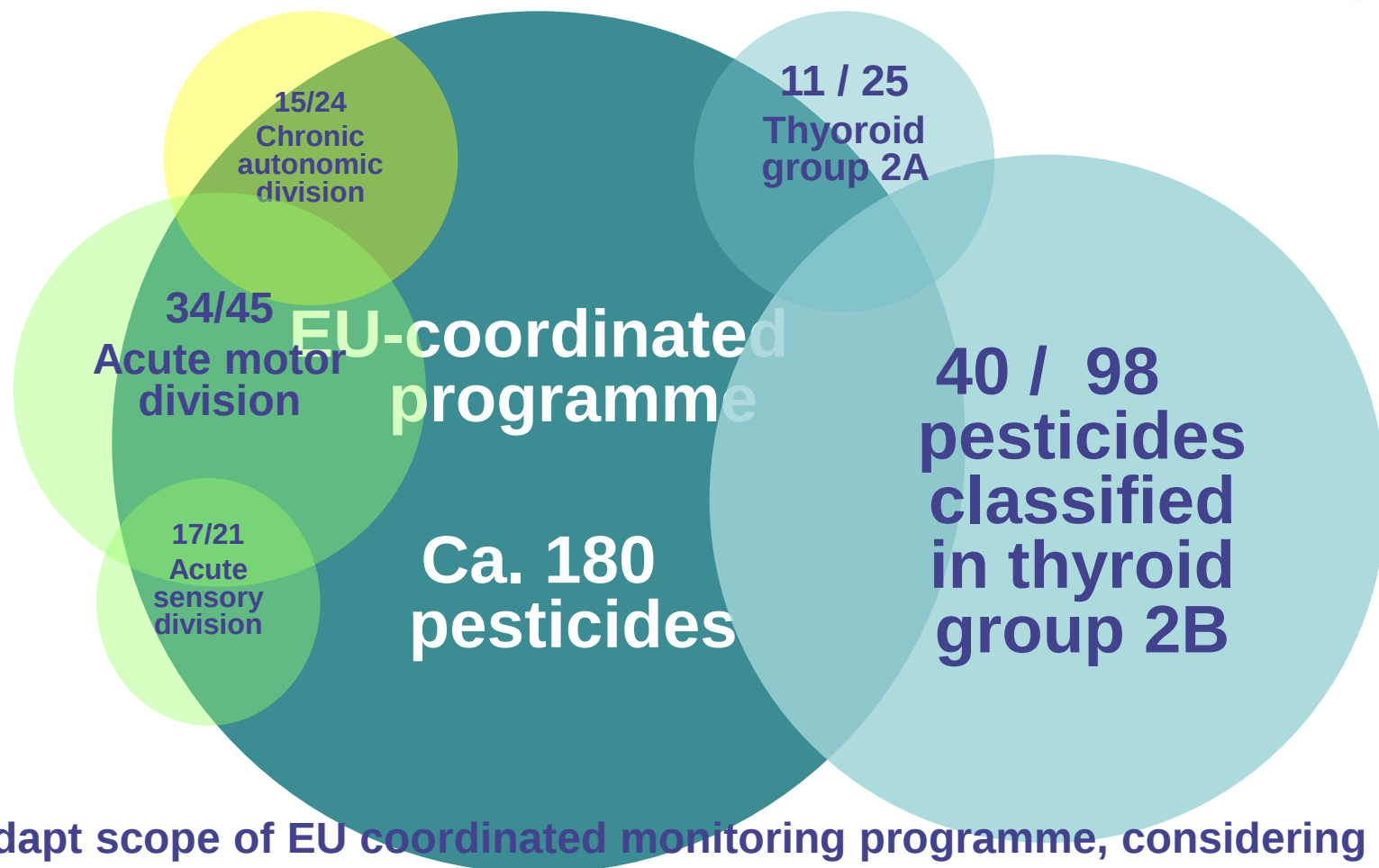
Ca. 300 different commodities
(range from 12-170)

Less representative
(geographical distribution)

Many commodities less than 10 samples

More than 900 different pesticides
(range from 60-840)

Ca. 5 %
Enforcement
samples



Need to adapt scope of EU coordinated monitoring programme, considering the potency of the active substance and the likelihoods to find measurable residues (“significant contributors”)

Cumulative exposure

Monitoring data

EU coordinated programme

National control programmes

Supervised field trials

reflecting realistic worst case situation for critical GAPs

STMRs / HRs for RAC, sometimes for edible portion

Data reflecting residue definition for risk assessment and enforcement (parent compound and metabolites where relevant)

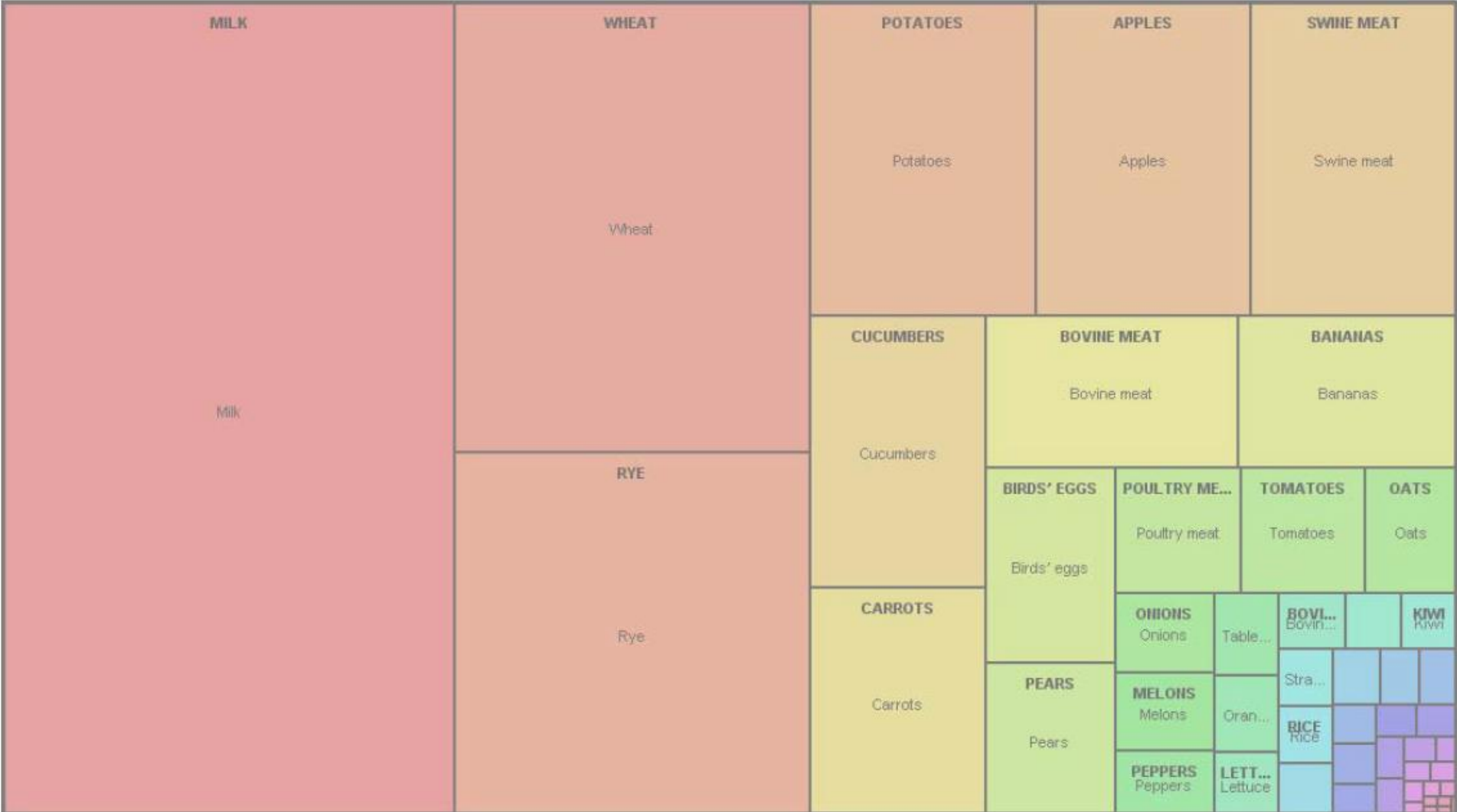
- Outdoor NEU / SEU / Third countries
- Indoor conditions

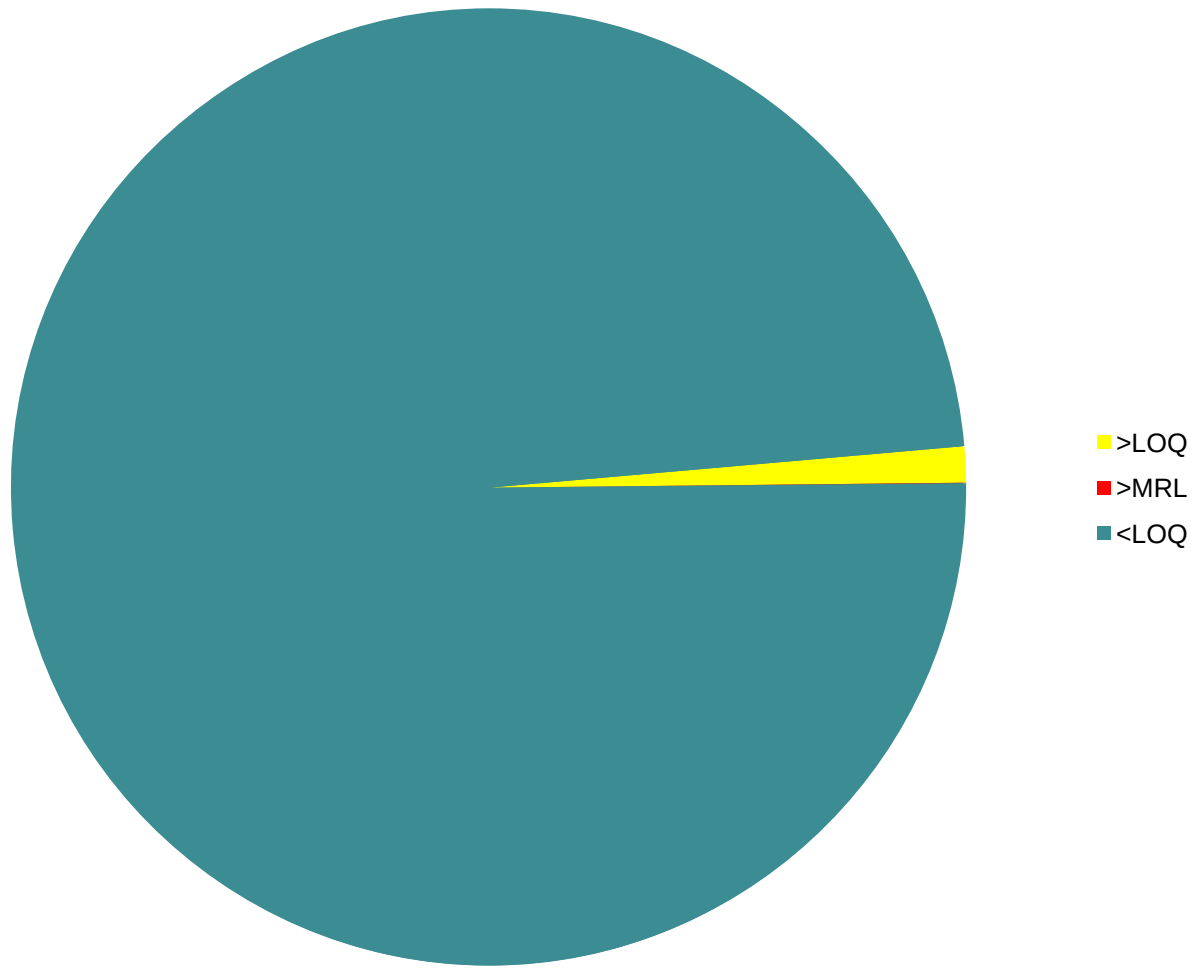
Monitoring data – Food types

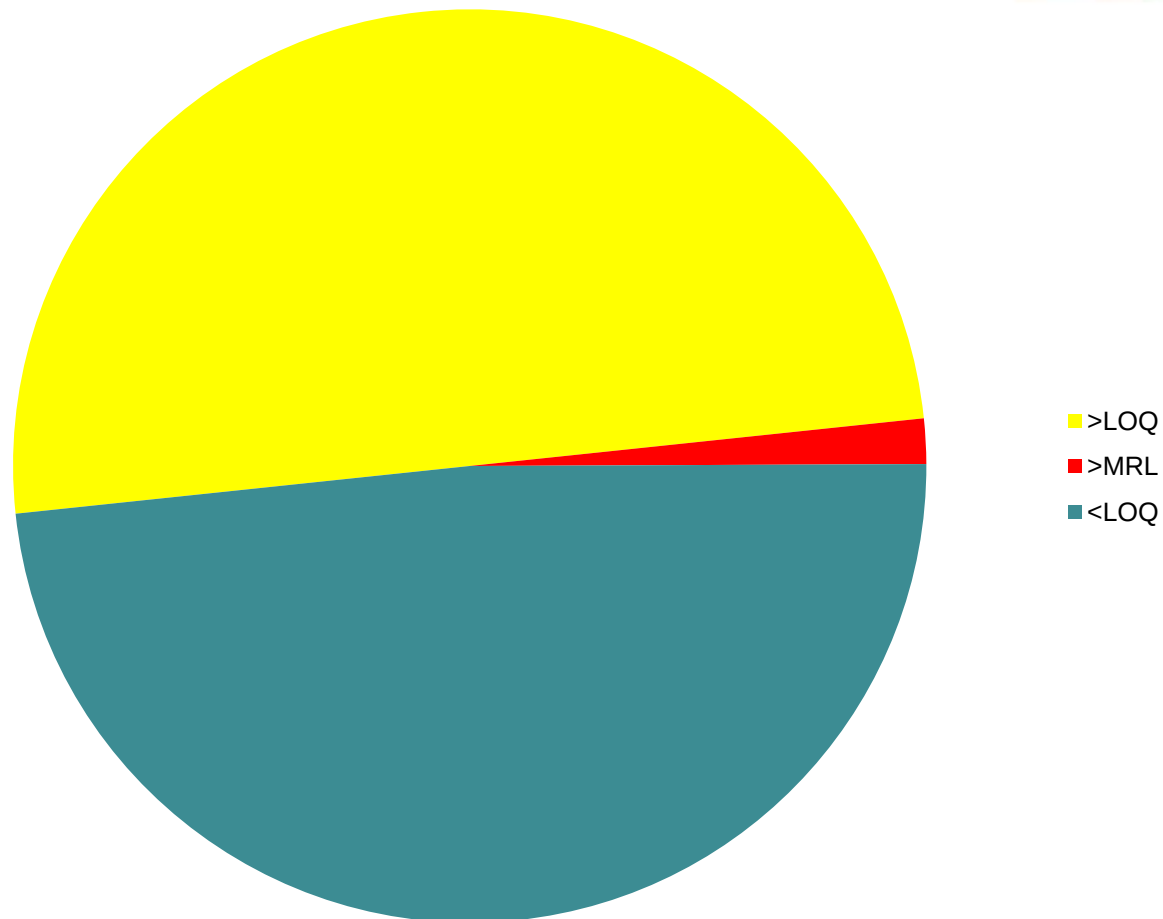
Number of samples per commodity (EU coord. + national programmes)

APPLES Apples	TABLE GRAPES Table grapes	LETTUCE Lettuce	MANDARINS Mandarins	SPINACH Spinach	CATTLE MILK ... Cattle milk and mi...	BABY FOOD Baby food	BANANAS Bananas	PLUMS Plums				
				LEMONS Lemons	COURGETT... Courgettes	ONIONS Onions	HONEY Honey	AUBERGI... Aubergines	HEAD CA... Head cab...	CEREA... Cereal b...		
TOMATOES Tomatoes	ORANGES Oranges	STRAWBERRIES Strawberries	WINE GRAPES Wine grapes	POULTRY ME... Poultry meat	ASPARA... Asparagus	MELONS Melons	SWINE FAT Swine fat	CULTIVA... Cultivated...	SPRING ... Spring oni...	RASPBE... Raspberri...		
				PEACHES Peaches	SWINE LI... Swine liver	LENTIL... Lentils, d...	RYE Rye	MANG... Mangoes	LAMB'... Lamb's ...	TEA LE... Tea lea...	BROC... Broccoli	
POTATOES Potatoes	PEARS Pears	CUCUMBERS Cucumbers	BEANS (WITH PODS) Beans (with pods)	OLIVES (OIL ... Olives (oil prod...	CAULIFL... Cauliflower	POULTR... Poultry li...	CELERY Celery	MAIZE Maize	PEAS... Peas ...	Garlic Garlic	Pump... Pump...	BOVI... Bovl...
				CHERRIES Cherries	SWINE M... Swine m...	PINEAP... Pineapples	MILK ... Milk an...	BEAN... Bean...	PEAN... Pean...	FEHN... Fenher	BLUE... Blueb...	
WHEAT Wheat	PEPPERS Peppers	CARROTS Carrots	RICE Rice	KIWI Kiwi	CURRAN... Currants ...	CHICKE... Chicken ...	RADIS... Radish...	Cele... Cele...			Barl... Barl...	Oats Oats
				GRAPEFRUIT Grapefruit	LEEK Leek	BOVIN... Bovine...						
				APRICOTS Apricots	LEEK Leek	BLAC... Blackb...	Bovi... Bovi...	Okra Okra	Basil Basil	Wild... Wild...	Yams Yams	
				SCAROLE Scarole	POUL... Poultry...	Chin... Chin...						

Food intake: relevance of food in the diet

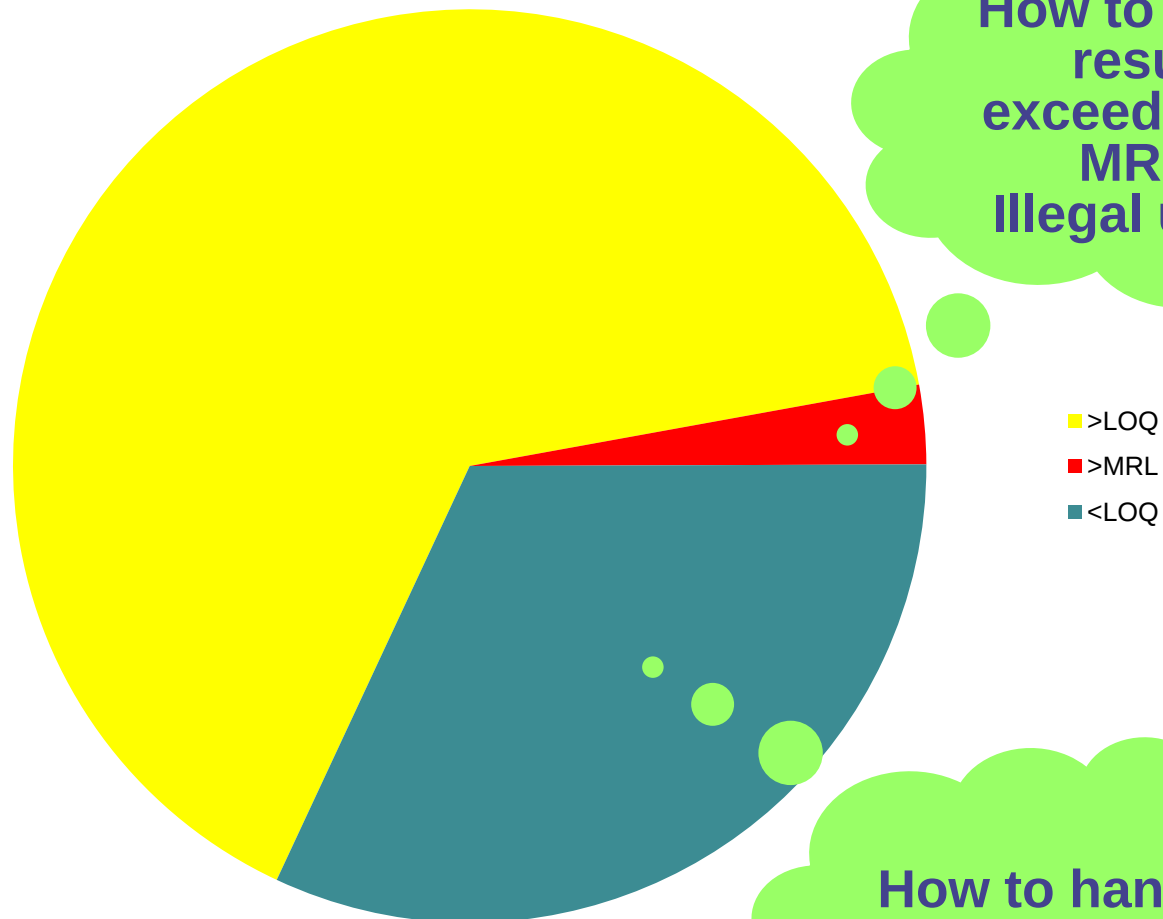






All commodities covered by EU coordinated programme

Monitoring data results: sample level



How to handle
results
exceeding the
MRL ?
Illegal uses ?

How to handle
non-detects?

Strawberries

Monitoring data results: MS/sample level

What to do for cases where approval has changed ?

Refinement

■ >LOQ

■ >MRL

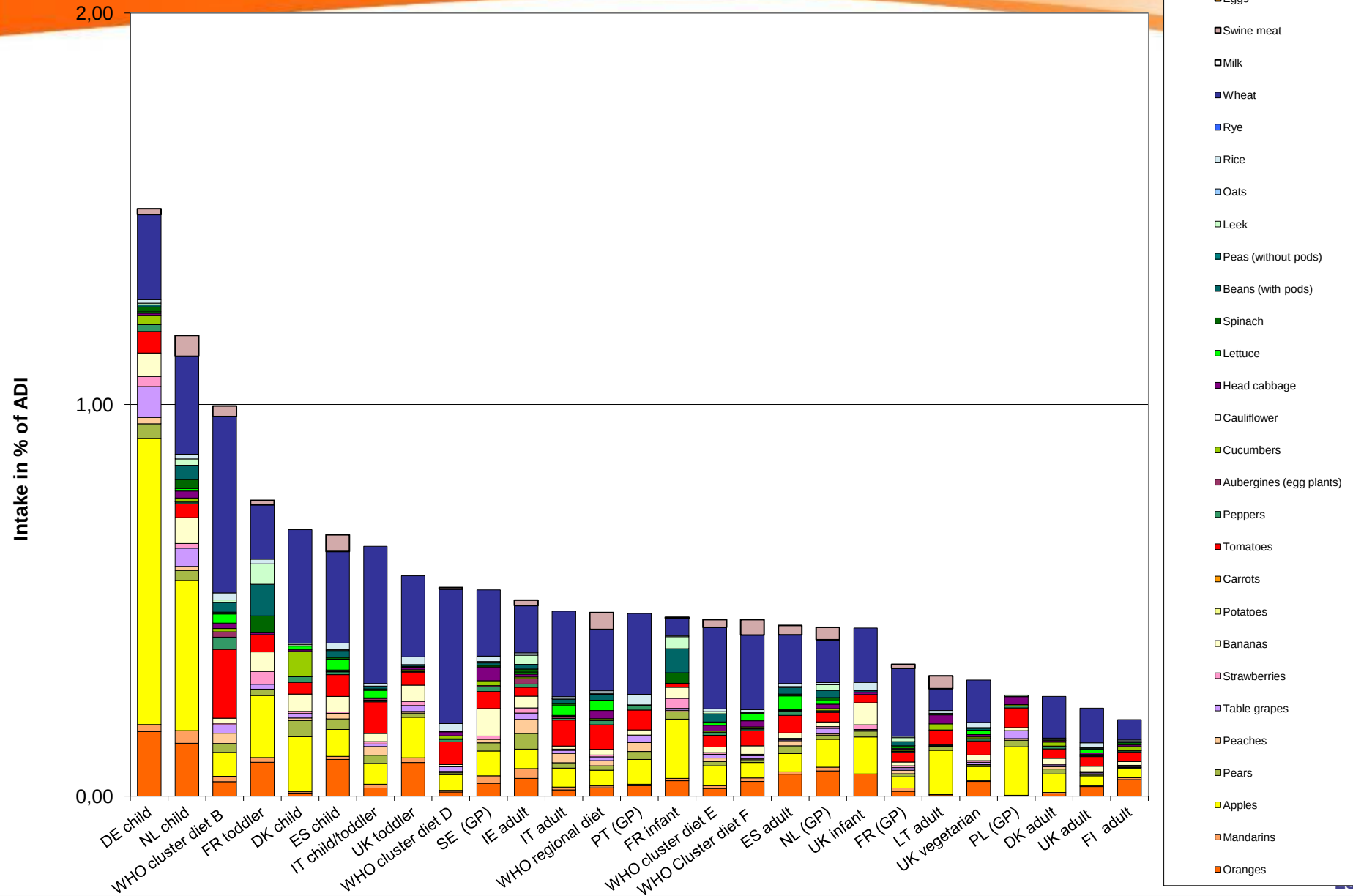
■ <LOQ

Refinement

Is the product authorised in MS A for this crop?
Percentage crop treated?

How to handle non-detects?

Strawberries from Member State A



- Which food commodities need to be considered?
- Which occurrence data should be used ?
 - **Monitoring data**
 - *EU coordinated programme*
 - *National monitoring programmes*
 - **Supervised field trials**
- How to fill the gaps for pesticides not sufficiently covered by the monitoring programmes
- How to trim the data ?
 - **Non-detects?**
 - **MRL exceedences?**
 - **Conversion factors for risk assessment ?**

- Data trimming – replacement/complement occurrence data
- Identify need for further data collection
 - **Authorisation status**
 - **% crop treatment**
 - **Processing data**
- Transparent handling of data, documentation of manipulation
- Identify limitations of available data, uncertainty of estimations

EFSA comprehensive food consumption database

Dietary surveys	32
Member States	22
Number of subjects	66,492
Number of different foods	63,495
Number of different FoodEx codes	1,504
Number of consumption records	6,309,489

The Comprehensive Database will be updated in 2014 with the addition of 10 new surveys. A Call for proposals is currently out for the 2014 update.

Examples of differences in survey methodology:

- **24 h dietary recall vs. food record**
- **broad survey period, from 1997 (Estonia) to 2009 (Spain)**
- **from 1 to 7 days per subject**
- **individual vs. household sample unit**
- **from 28% to 98% response rate**
- **week end days not evenly represented in 6 surveys**
- **seasonality not fully covered in 10 surveys (only one season represented in 4 surveys)**
- **body weight and height measured or estimated**
- **food classification**

Comprehensive food consumption data:

Age classes

Age class	Age range	Number of surveys	Number of countries
Infants	0 - 12 months	2	2
Toddlers	12 - 36 months	8	8
Children	3 - 10 years	16	14
Adolescents	10 - 18 years	14	12
Adults	18 - 65 years	21	20
Elderly	65 - 75 years	9	9
Very elderly	> 75 years	8	8
Total		78 diets	22 MS

Do the consumption data match with the occurrence data ?

Number of different FoodEx codes: 1,504

- Unprocessed food
- Processed food
- Composite food

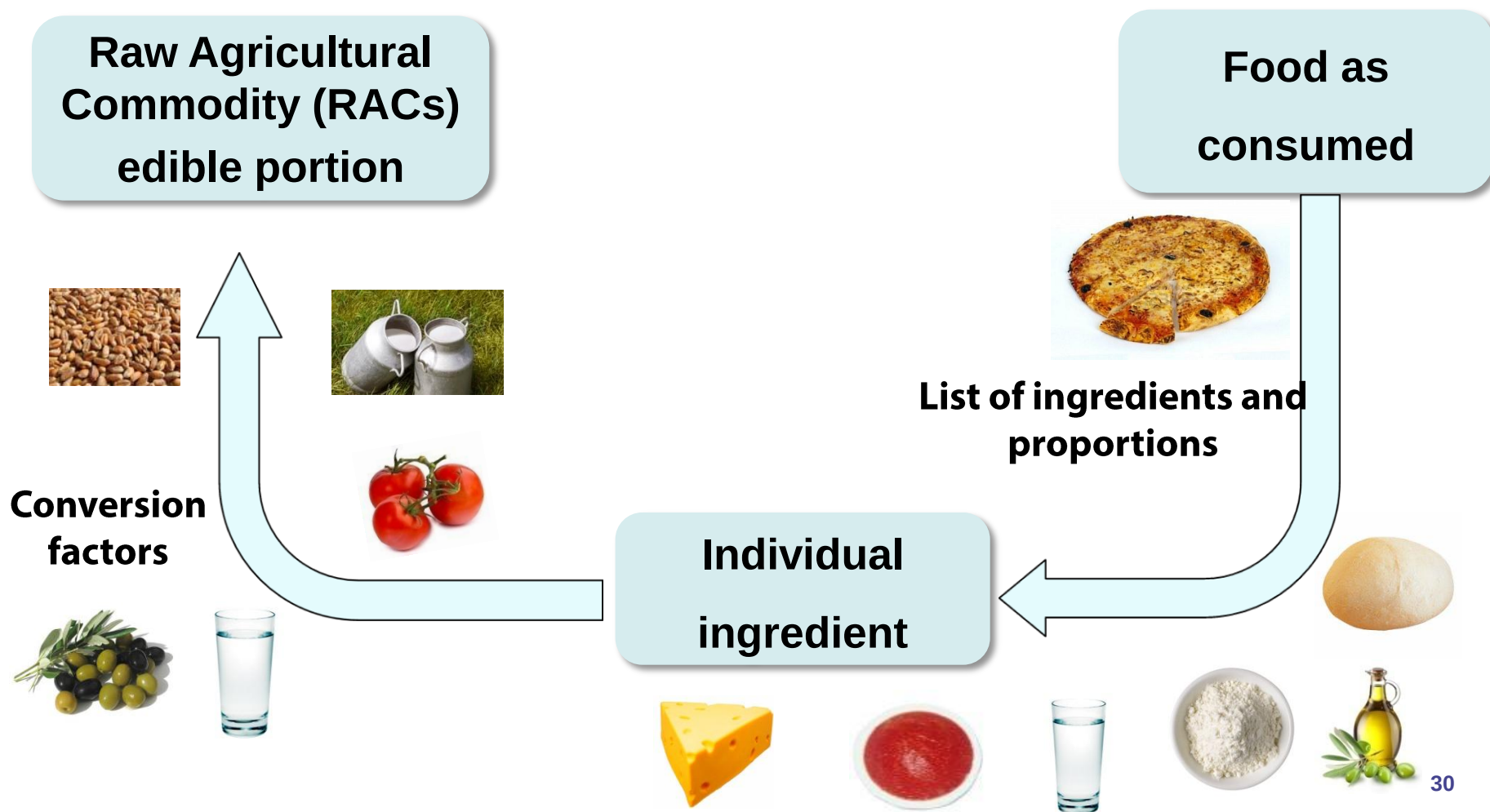
edible portion



Number of commodities for which monitoring data are available: ca. 300

- Mainly unprocessed food
- Results reported for commodity as described in Annex I of Regulation (EC) No 396/2005 (e.g. orange with peel)

Food as consumed vs. RACs



- **EFSA has the right to use raw individual food consumption data for carrying out risk assessments and other scientific analyses within the activities related to EFSA's mandate.**
- **A formal authorization from the data provider must be requested for any other use of the data.**



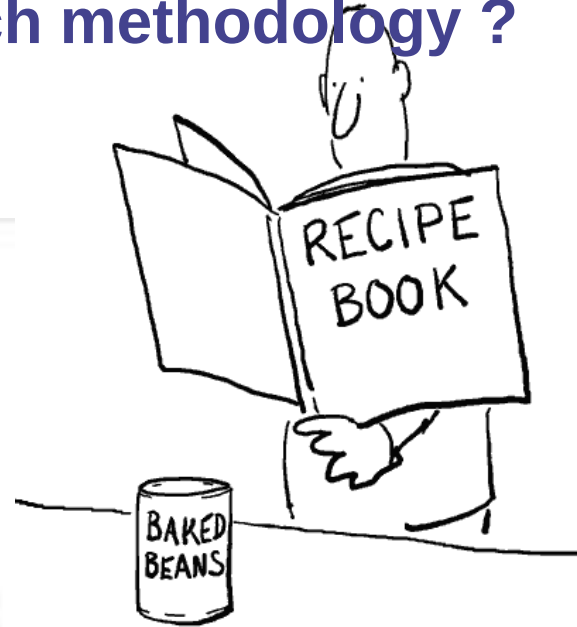
- Which are the representative diets to perform cumulative exposure assessments ?
 - Which age groups?
 - Which geographic regions?
 - Specific groups (e.g. vegetarians, breastfeeding women) ?
- Which recipe data to use for calculation of ingredients?
- Can we use a standard conversion model to derive food consumption expressed in edible portion of raw agricultural commodity for aggregation of the consumption data ?
- How to do refined calculations for processed food ?
- Legal questions: permission to use consumption data

Which tool should be used for the calculation ?

Which data to use ?



Which methodology ?



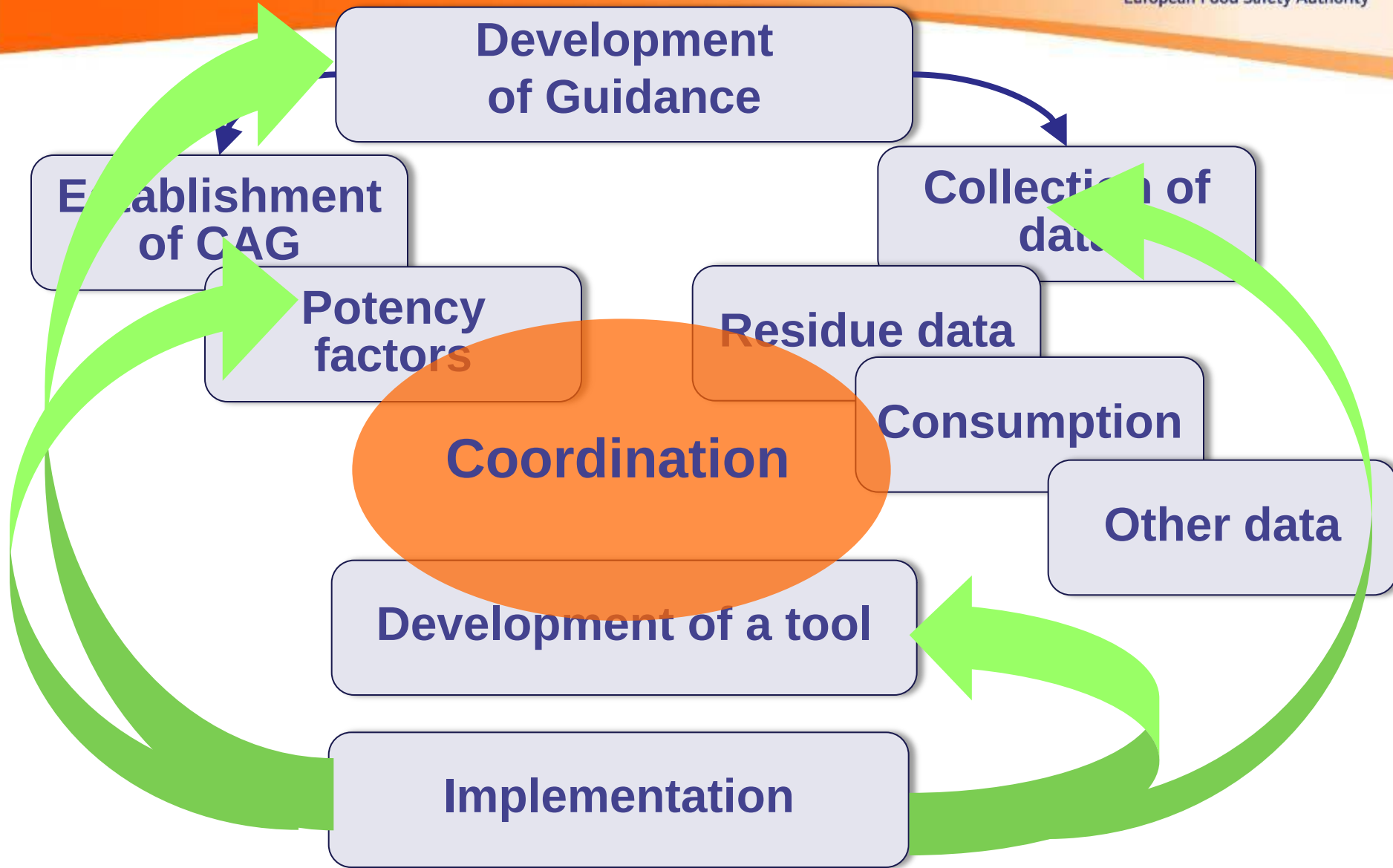
Which tool can be used?

Criteria

- Performance of the tool:
 - **Number of pesticides in CAG**
 - **Number of CAG**
 - **Number of diets**
 - **Number of commodities**
- Are the available tools capable to perform these calculations?
- Tool should be accessible for risk assessors and stakeholders
- Flexibility: possibility to adapt the tool for needs
- Clarity: documentation how the calculations are performed
- Costs



- Implementation of cumulative risk assessment is an iterative process
- Need to gain experience
- Identify the relevant questions that have to be solved
- Close dialogue with risk managers to address their needs
 - **Protection goal**
 - **Level of uncertainty**
- Need to be transparent how the calculations are performed ; uncertainties and limitations of calculation
- Regular evaluation of guidance implementation is needed



Too many cooks spoil the broth

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Thanks for your attention !