6th International Workshop on Total Diet Studies

Meeting Introduction and Objectives

10 October 2022

Monitoring nutrition and food safety (MNF)

Department of Nutrition and Food Safety (NFS)

World Health Organization

20 JAHRE

BfR

Bundesinstitut für Risikobewertung

The WHO Nutrition and Food Safety Department

The NFS Vision

A world free from all forms of malnutrition and foodborne diseases, within safe and supportive societies and healthy environments

The NFS Mission

Work with Member States and partners to prioritize, plan, implement, monitor and regularly evaluate multisectoral efforts to ensure universal access to effective nutrition actions, safe food and healthy diets, through strengthening health systems and building forward better food systems which recognize the interdependence of the health of humans, animals and the wider environment

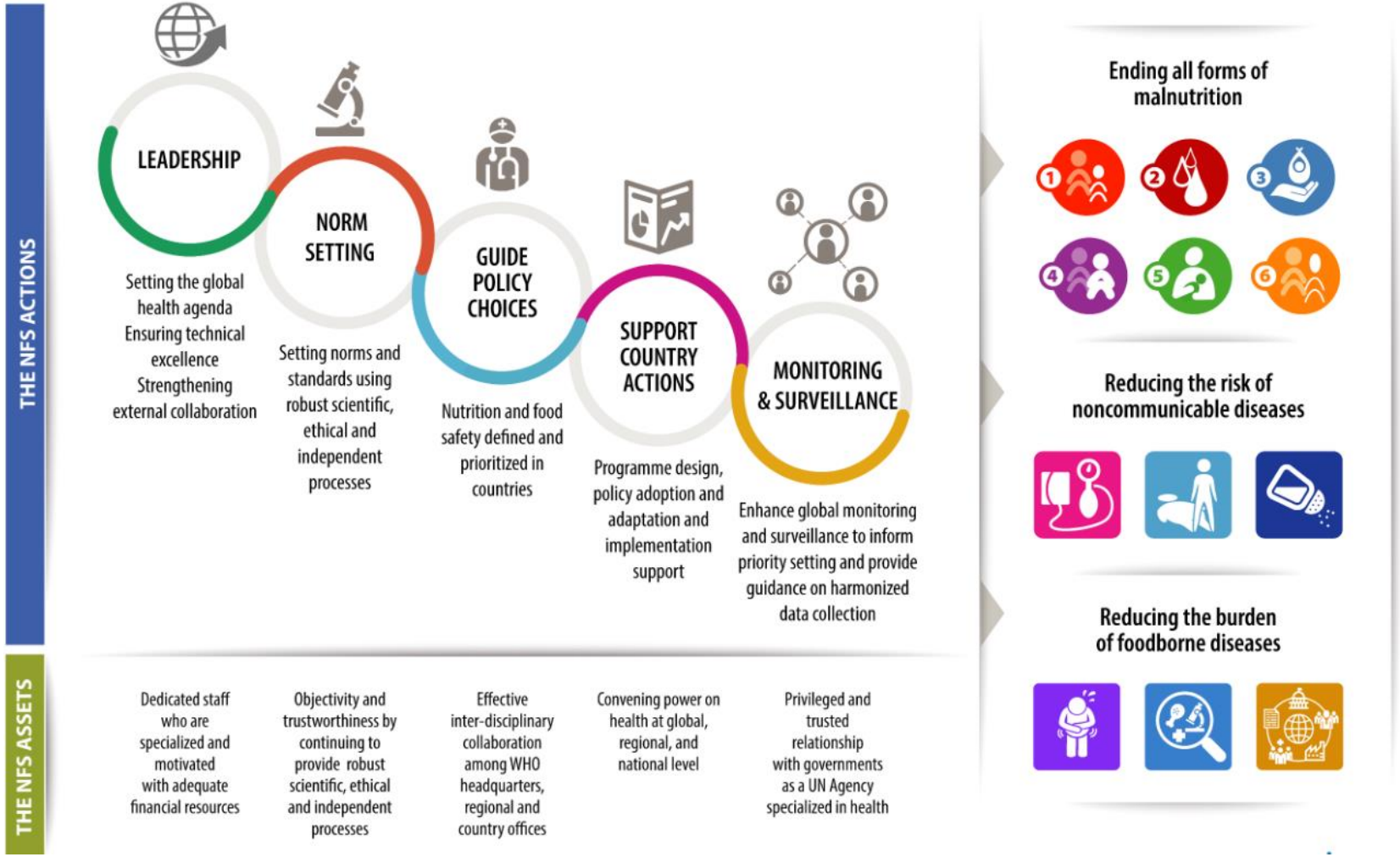
SUSTAINABLE DEVELOPMENT GOALS

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

The WHO Nutrition and Food Safety Department



World Health Organization

20 JAHRE

BfR
Bundesinstitut für Risikobewertung

Welcome to the 6th International Workshop on Total Diet Studies

Between 1999 (Kansas City) and 2015 (Seoul), WHO and its partners organized 5 International Workshops on a Total Diet Studies…

The 6th iteration was due to take place in March 2022…

..and here we are!

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Previous WHO Officers involved in International Workshops on Total Diet Studies

Now enjoying a well-earned retirement

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

GEMS/Food programme

Sharing data and methods to support scientific advice

A database to collect data to:

- help the Codex Alimentarius and scientific bodies assessing risk,
- setting food safety standards and
- estimating the burden of foodborne diseases.

1. Food consumption data from 42 countries
2. More than 8 million analytical results for contaminants and pesticides from Member States and private sector
3. A roster of exposure experts to develop international exposure assessment methodologies
4. A network of institutions to share good practices about food chemicals monitoring and food consumption survey

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Dietary exposure estimates

Basic equation:

$$\text{Dietary Exposure} = \text{Food consumption} \times \text{Food chemical concentration}$$

Adjusted for body weight

Food consumption data

Need to consider:

- Purpose of assessment?
- Type of food consumption data needed?
- Type of data available?

Lifetime dietary exposure assessment

Chemicals with very long half-life

Chemicals accumulating in the body

Adverse effects occurring after very long exposure (several years)

Dietary exposure to dioxins and PCB (half-life around 40 years)

Dietary exposure to radionuclides after the Fukishima nuclear accident

Apparent food consumption data

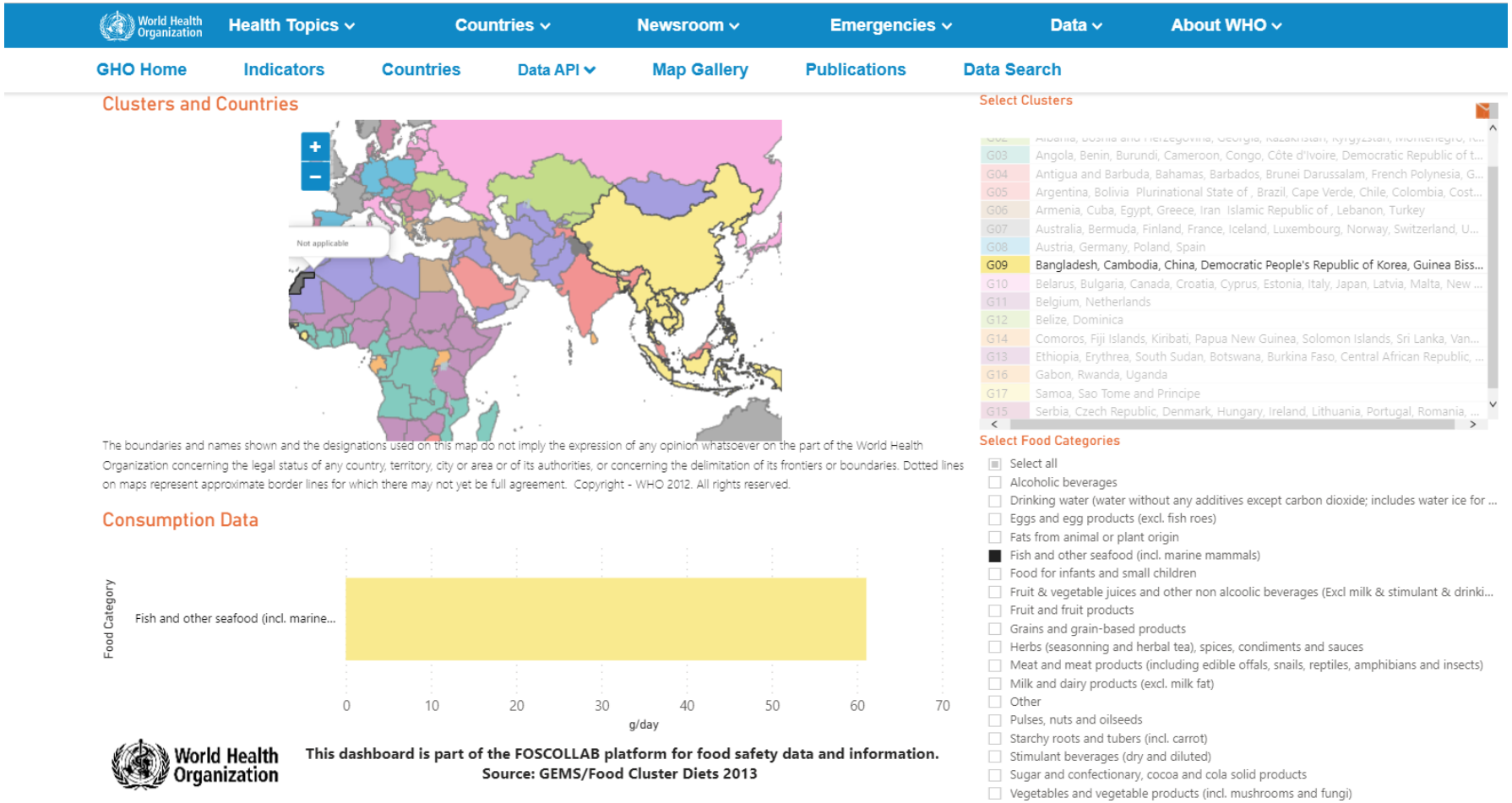
Total amount of food available per year and per individual for the whole population (per capita data)

$$= \frac{\text{Food stocks + Food imports – Food exports – Food loss \& waste}}{\text{Total population}}$$

Data submitted by Member States to FAO

17 WHO GEMS/Food cluster diets

Apparent food consumption data



World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Shorter than lifetime dietary exposure assessment

Chemicals with chronic adverse effects (Acceptable Daily Intake)

Adverse effects occurring typically after exposure of several months

Dietary exposure of children to methylmercury

Dietary exposure to arsenic and skin cancer

Individual quantitative food consumption data

Surveys suitable for chronic assessments have the following characteristics :

- Based on 24-hour recalls or food records
- At least 2 non-consecutive days
- Individuals are characterized by their age, sex and body weight
- Ideally, the survey should be nationally representative

Example of deterministic dietary exposure assessment

$$\text{Dietary Exposure} = \sum \text{Mean food consumption} \times \text{Mean or median food chemical concentration}$$

FAO/WHO Chronic Individual Food Consumption summary statistics (CIFOCOss)

Food consumption data – summary statistics available from 42 countries:

20 EU countries + UK

8 countries in Asia (Bangladesh, China, India, Republic of Korea, Lao People's Democratic Republic, Malaysia, Pakistan and Philippines)

7 countries in Africa (Burkina Faso, Democratic Republic of Congo, Ethiopia, Kenya, Mozambique, Uganda, and Zambia)

6 countries in Americas (Argentina, Bolivia, Brazil, Guatemala, Mexico, and USA.

Detailed level of food categorization (about 500 items mapped with FoodEx2)

Distribution parameters: **mean, standard deviation, high and low percentiles for consumer groups**

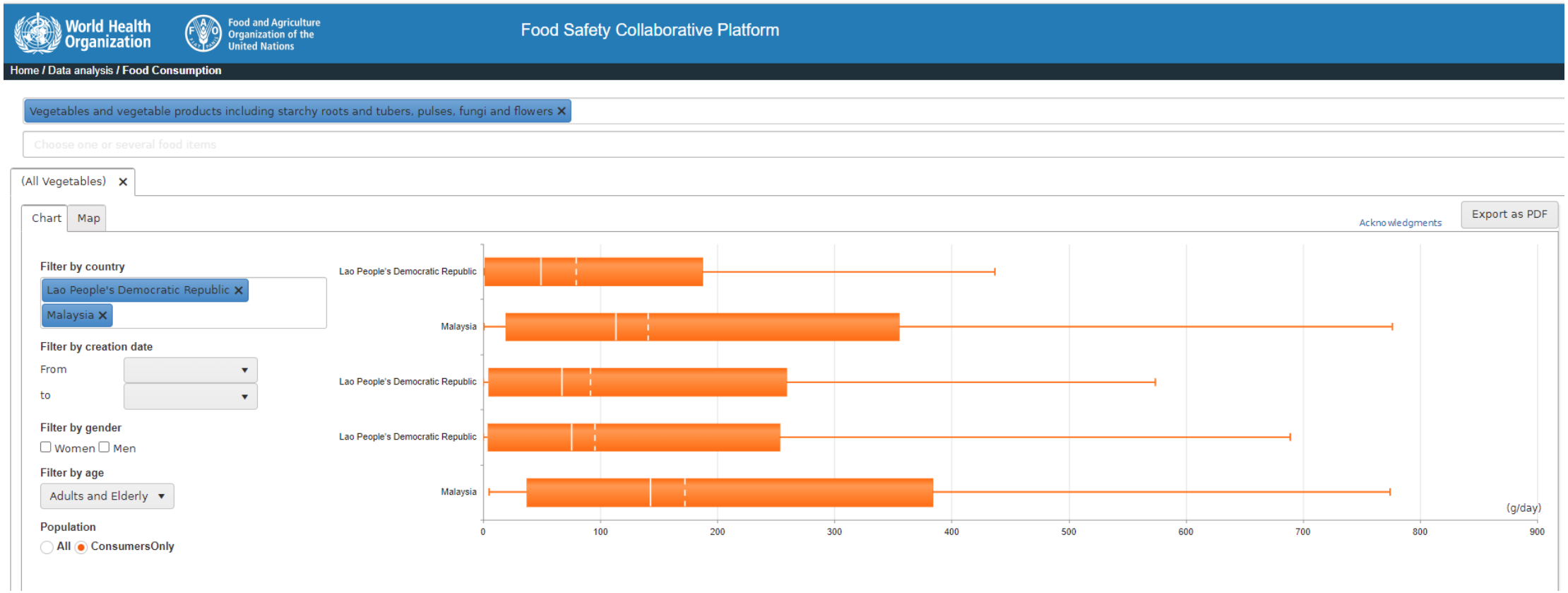
http://apps.who.int/foscollab/

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

FAO/WHO CIFOCOss visualization



Probabilistic dietary exposure assessment

- For chemicals with either acute or chronic effects
- Resource intensive: to be performed if the deterministic approach is showing an exceedance of the Health Based Guidance Values (i.e., ARfD for acute risk and ADI for chronic risk)
- The raw food consumption data should be available for each food consumed by each individual
- Individual monitoring data on chemical occurrence should be available

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Probabilistic dietary exposure assessment

Daily consumed quantity of food *a* for an individual *i*

Concentration of pesticide s in food *a*

Exposure of an individual *i* to a pesticide *s*

$$E_{s,i} = \frac{\sum_{a=1}^{A_s} Q_{i,a} C_{s,a}}{bw_i}$$

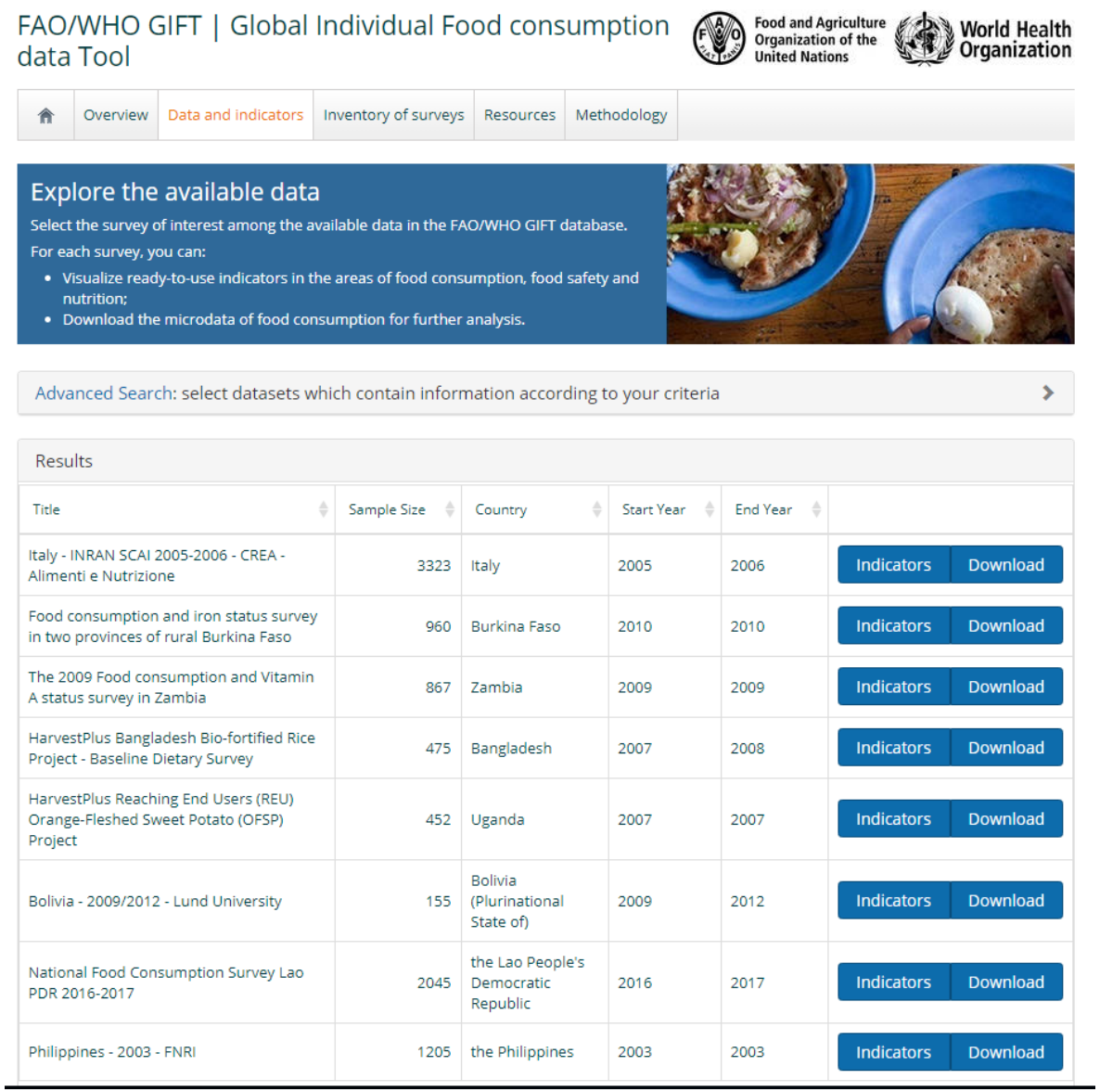
Body weight

FAO/WHO Global Individual Food consumption data Tool (GIFT)

Microdata available from 35 countries.

All data in GIFT are also in CIFOCOss except if based only on 1 survey day.

http://www.fao.org/gift-individual-food-consumption/en/



World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Limitations

Cluster diets

- food ‘availability’ not food consumed
- mean consumption data for whole population only
- no information for different age/sex groups
- limited data for minor commodities

Food consumption data from surveys

- representativeness of sample
- relies on memory of survey participant
- food consumption may be under- or over-reported
- availability of recent survey data
- chemical concentration data limited or inexistent available for some commodities

Key messages

- Determine the purpose of the dietary exposure assessment - guided by nature of HBGV
- Collect relevant information (residue definitions, food consumption and chemical concentration data)
- Choose the approach best suited to your purpose and the data available
- Be aware of assumptions, limitations and uncertainties
- Communicate with risk assessors and risk managers within and across agencies

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Total Diet Studies

The specificity of the TDS methodology is to rely on:

1. A representative portion of the diet of a certain population
2. Foods are prepared "as consumed"
3. Samples of food are pooled and then analyzed

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Total Diet Studies

Total Diet Studies (TDS) are tools to assess:

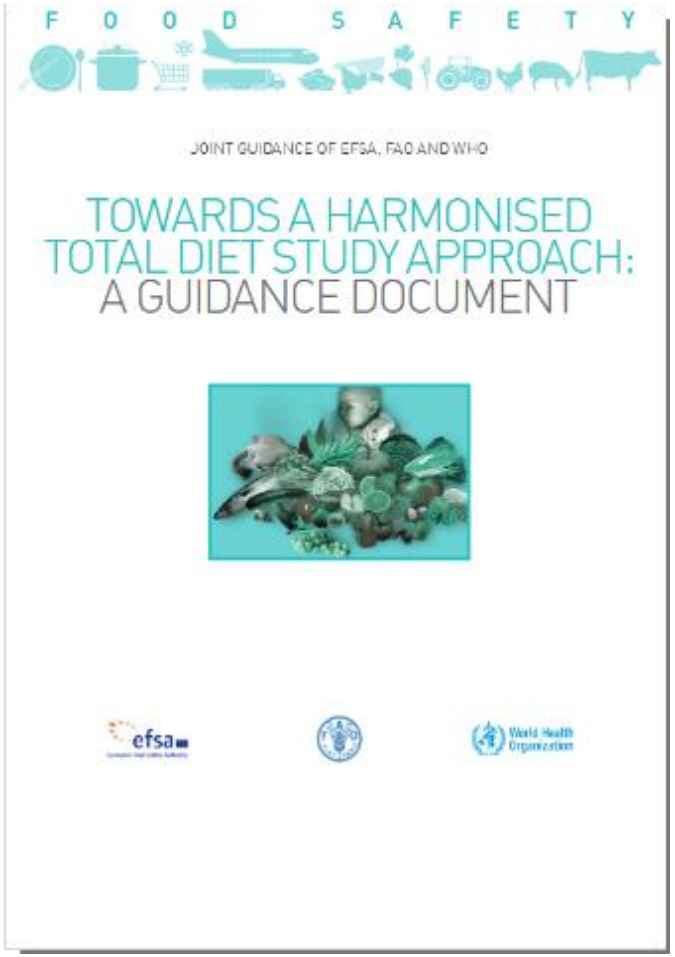
- the dietary intake of beneficial substances (nutrients)
- the exposure to harmful substances (hazards).

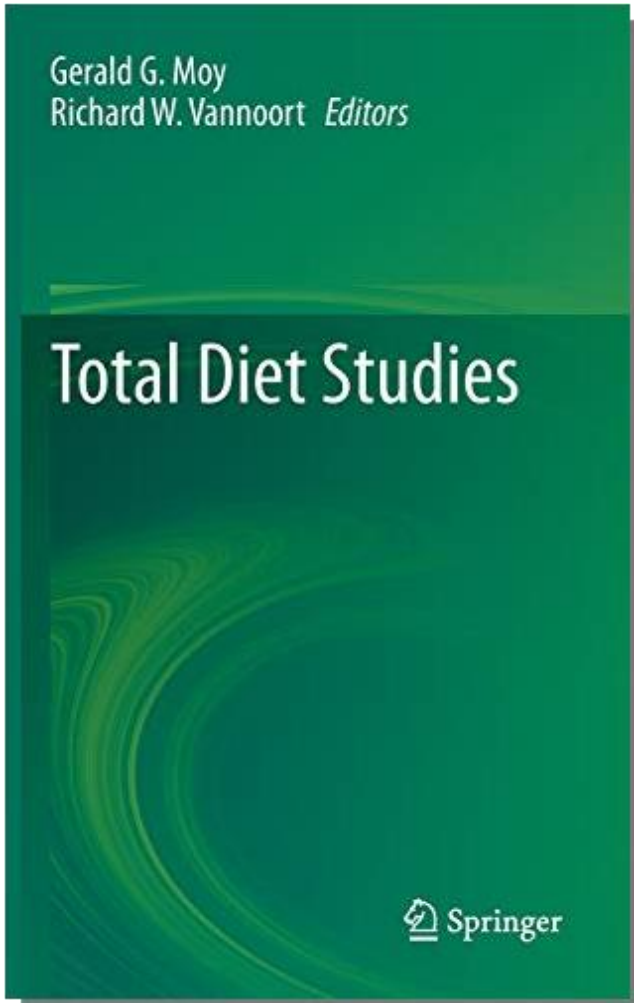
World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Important references





World Health Organization

20 JAHRE

BfR
Bundesinstitut für Risikobewertung

Monday, 10 October 2022 *Session 1, Chair: Matthias Greiner*

09:15–10:15 am **The role of TDS in the GEMS/Food programme, aims and objectives of the workshop**
Luc Ingenbleek, WHO, Geneva

10:15–10:30 am coffee break

10:30 am –11:15 am **BfR MEAL Study: the first German TDS**
Oliver Lindtner, Irmela Sarvan, BfR, Berlin

11:15 am –12:00 pm **Chinese total diet study and its application on dietary exposure assessment**
Yongning Wu, China National Center for Food Safety Risk Assessment (CFSA), Beijing (China)

12:00–01:45 pm lunch break

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Monday, 10 October 2022 *Session 2, Chair: Véronique Sirot*

01:45–02:30 pm **TDS in Portugal – challenges and results**

Elsa Vasco, Maria da Graça Dias., *National Health Institute Doutor Ricardo Jorge (INSA), Lisbon (Portugal)*

02:30–03:00 pm coffee break and poster session

03:00–03:45 pm **The Canadian Total Diet Study**

Robert Dabeka, Health Canada, Ottawa (Canada)

03:45–4:15 pm **Poster presentations**

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Tuesday, 11 October 2022 *Session 3, Chair: Jean-Charles Leblanc*

08:45–09:30 am **TDS in Australia** Keith Henderson, *Food Standards Australia New Zealand, Canberra (Australia)*

09:30–10:00 am coffee break

10:00–10:45 am **The first multi-centre Sub-Saharan Africa TDS: implementation and preliminary results**
Luc Ingenbleek, WHO, Geneva

10:45–11:30 am **The Italian national TDS: intake of nutrients and exposure to contaminants of the Italian population**
Francesco Cubadda, Italian National Institute of Health (ISS), Rome (Italy)

11:30 am –12:30 pm lunch break

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Tuesday, 11 October 2022 *Session 4, Chair: Robert Dabeka*

12:30 pm–01:15 pm **Total diet studies in France** *Véronique Sirot, ANSES, Maisons-Alfort (France)*

01:15–02:00 pm **TDS in the Republic of Korea: Progress in last 2 decades and a way forward**

Cho-il Kim, Seoul National University, Seoul (Republic of Korea)

02:30 pm–03:15 pm **U.S. Food and Drug Administration´s Total Diet Study**

Judith Spungen, Terry Councell, U.S. Food and Drug Administration (FDA), College Park (USA)

03:15 pm –03:35 pm **Methodology and design of the first total diet study in Riyadh, Saudi Arabia**

Lama Almaiman, Riyadh (Saudi Arabia)

World Health Organization

20 JAHRE

BfR Bundesinstitut für Risikobewertung

Thank you

Please reach out: ingenbleekl@who.int

World Health Organization

Thanks

WHO

20, Avenue Appia
1211 Geneva

Switzerland

World Health Organization