WORKSHOP ON DATA COLLECTION AND ANALYSIS FOR CODEX PROCEEDINGS

Importance of Food Consumption Data for Food Decision-Making

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Learning Objectives

At the end of this session, Participants will:

1.Understand the importance of food consumption data in food regulatory decision-making.

2.Learn how food consumption data is used in dietary exposure assessment.

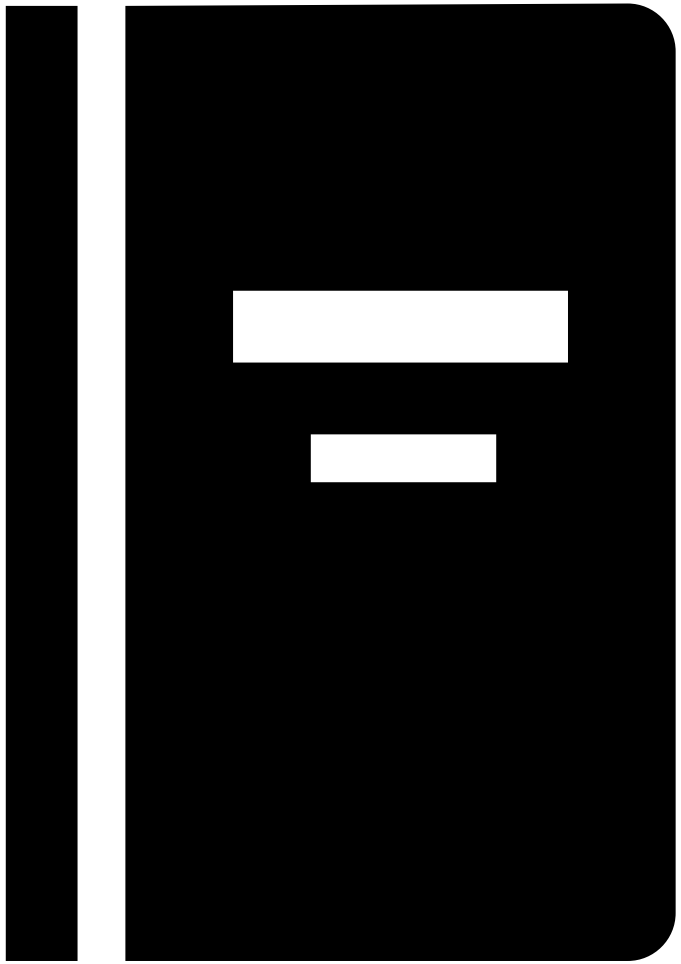
3.Explore different types and sources of food consumption data and their relative strengths and limitations.

4.Gain familiarity with tools and methodologies used to collect and analyze food consumption data.

5.Become familiar with the the Arab Food Consumption Initiative

Agenda

1. Introduction:
2. What Does a Regulator Do?
3. Risk Analysis Paradigm
4. Dietary Exposure Assessment
5. Types of Food Consumption Data
6. Main Collection Methods
7. Applications and Use Cases
8. Food Consumption Data in Arab Countries
9. Arab Food Consumption Initiative
10. Discussion and Next Steps



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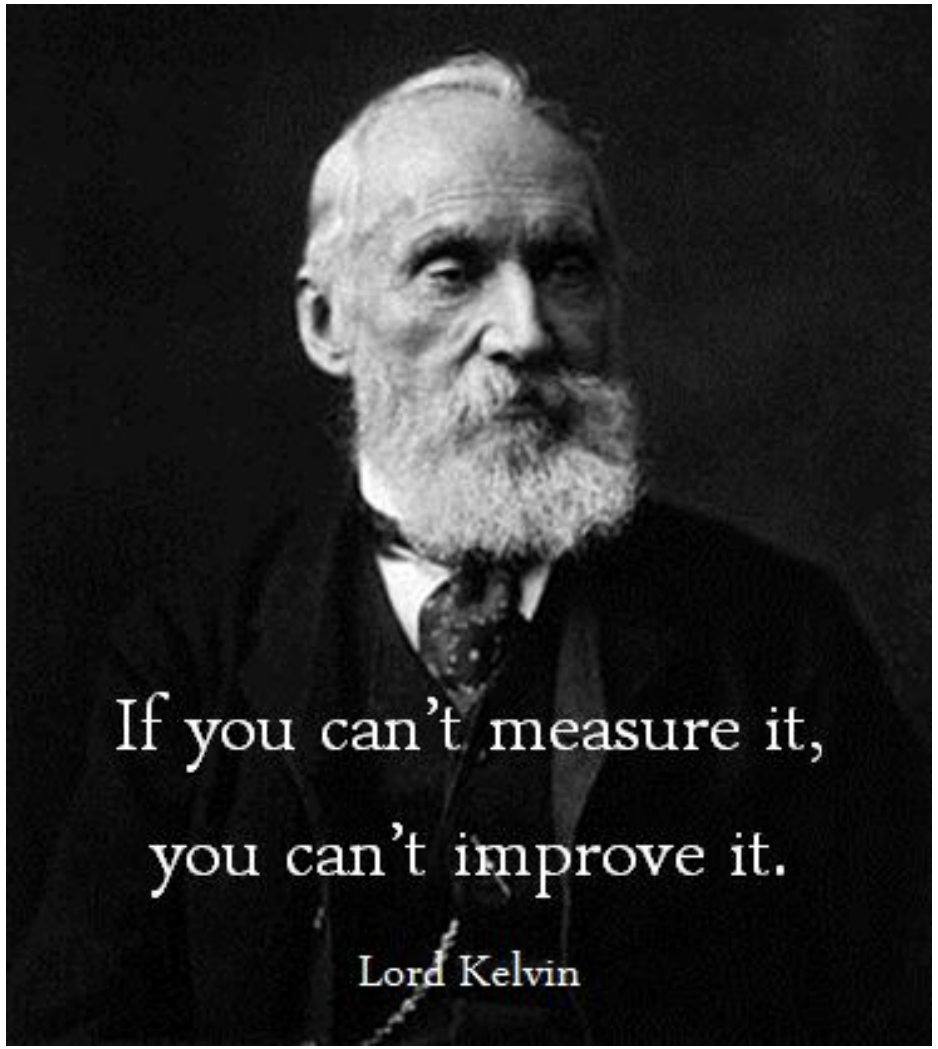

If you can't measure it,
you can't improve it.
Lord Kelvin

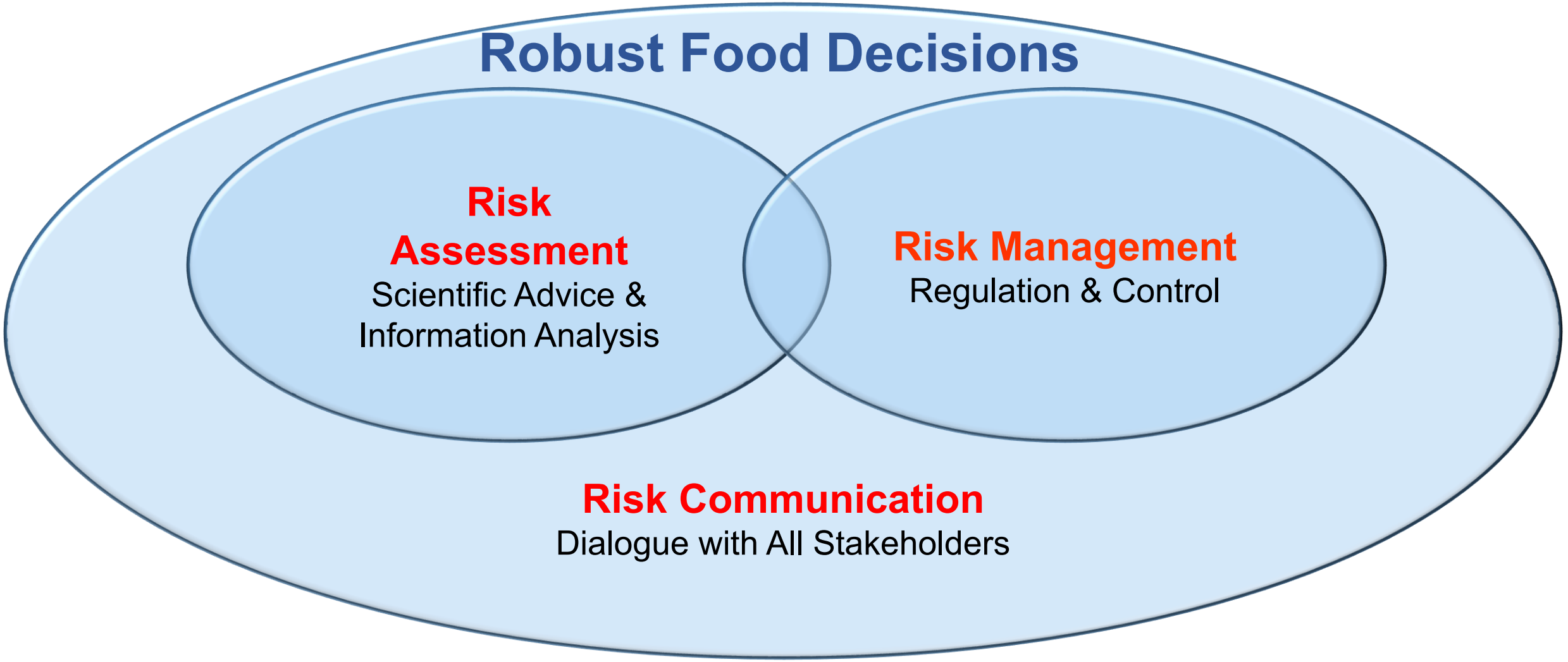
What Does a Regulator Do ?

Primary Risk Manager:

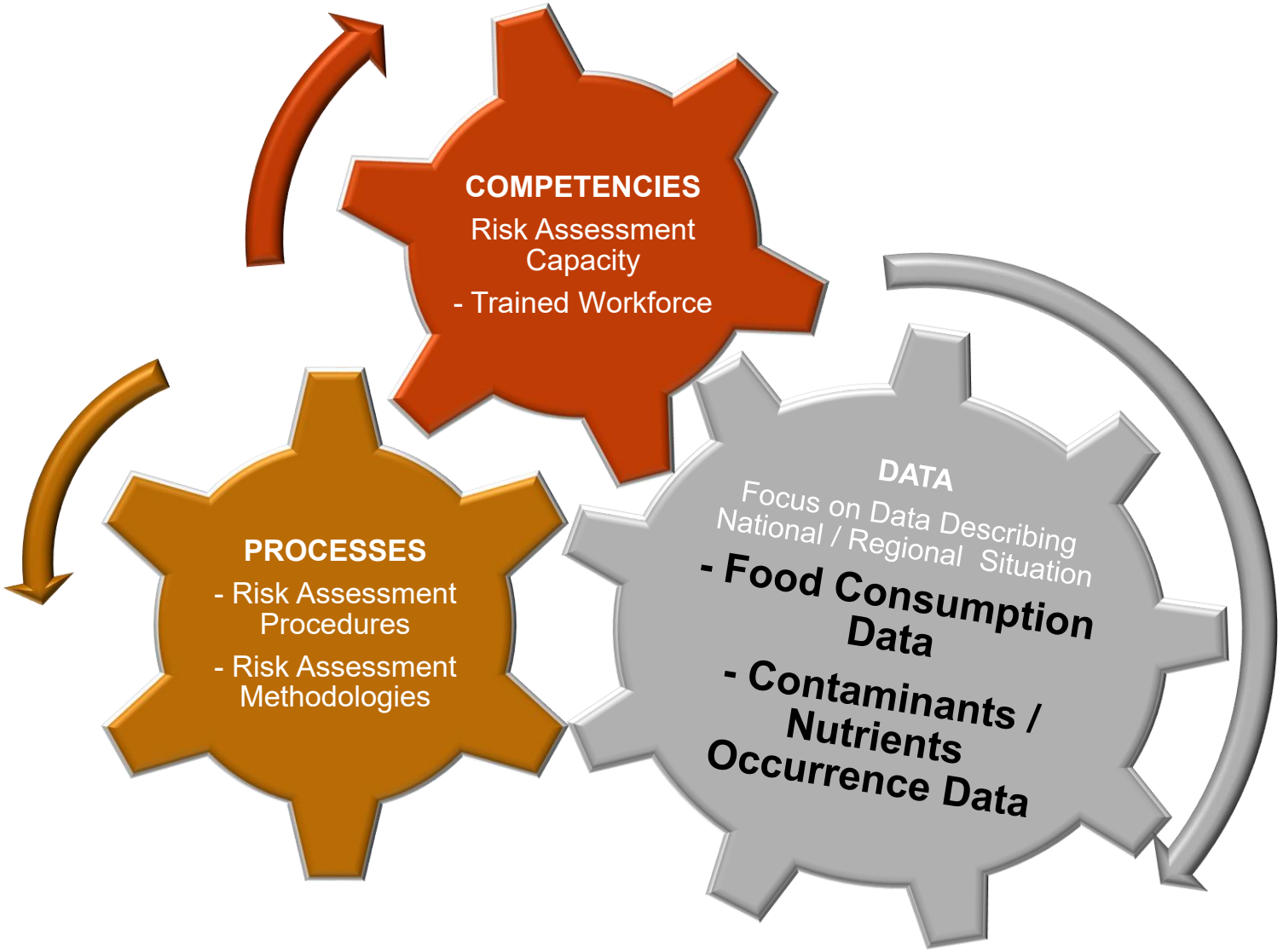
- ❑ Provides Direction and Guidance for Risk Management Approach
  - Regulatory Measures
  - Non-regulatory Measures

- ❑ Robust decisions call for a **structured, evidence-based and documented approach**

Risk Analysis Paradigm Provides Structure



Pre-requisites for Applying Food Risk Analysis



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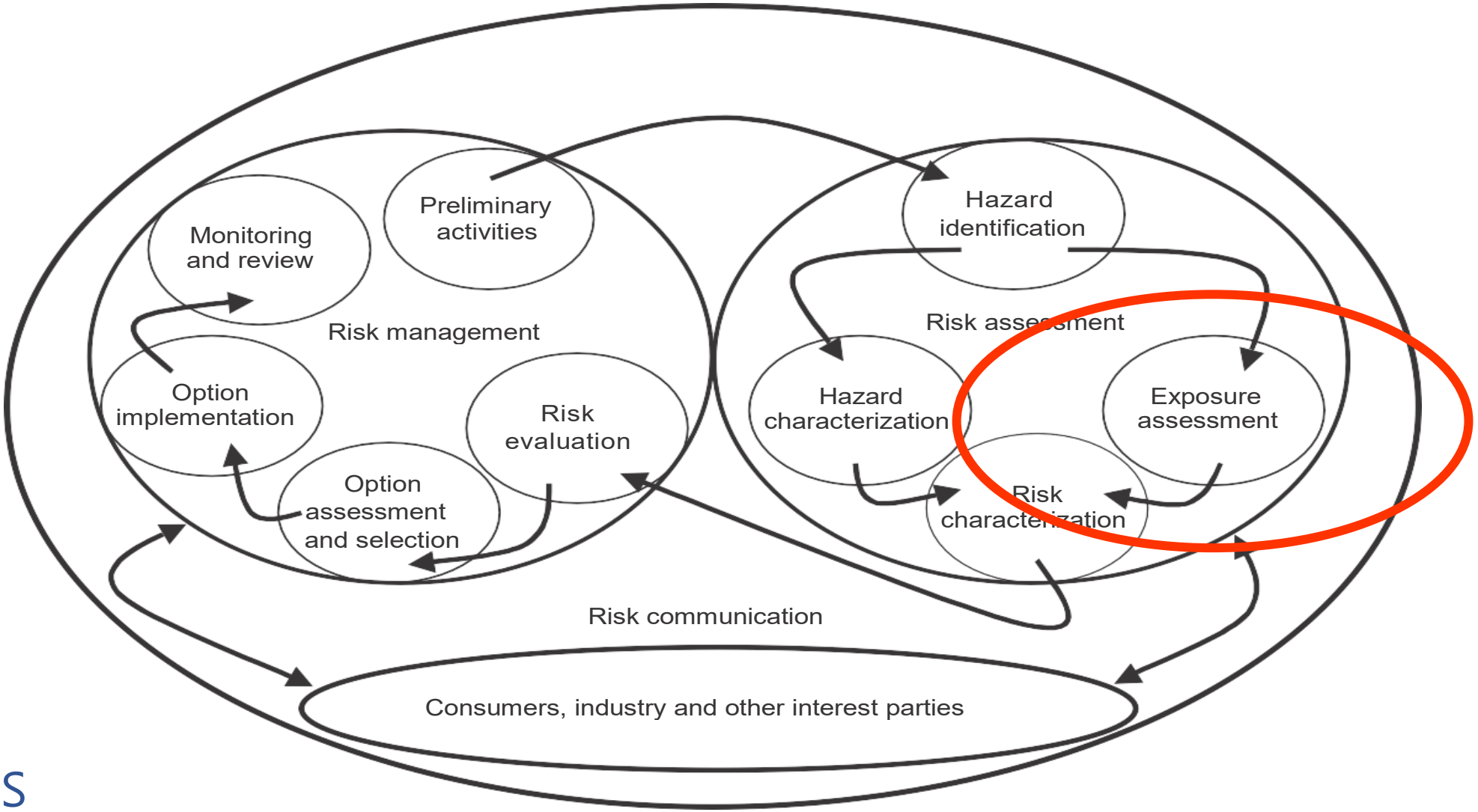
Risk Analysis → Robust Food (Regulatory) Decisions

Continued Reliance on Risk Analysis for Food (Regulatory) Decision-Making



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Dietary Intakes/Dietary Exposure Assessment

Occurrence of Food Chemicals

Food consumption

Dietary exposure (µg/kg bw.day) = concentration (µg/g) x food consumption (g/kg bw.day)

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Dietary Intakes/Exposure Assessment

Amount brought by each food		Amount Consumed (g/day)	X	Occurrence data (µg/g)	Body weight (kg)		Intake / Exposure (µg/kg/day)
Overall Diet	=	141,9	X	0,0093	/ 65	=	0,020
	=	198,4	X	0,0009	/ 65	=	0,003
	=	191,5	X	0,0076	/ 65	=	0,022
	=	541,4	X	0,0025	/ 65	=	0,021
	=	315,0	X	0,0007	/ 65	=	0,003
					Total	=	0,070 (µg/kg/day)

We are what we Eat






Stepwise Approach For Dietary Intakes/Dietary Exposure Assessments

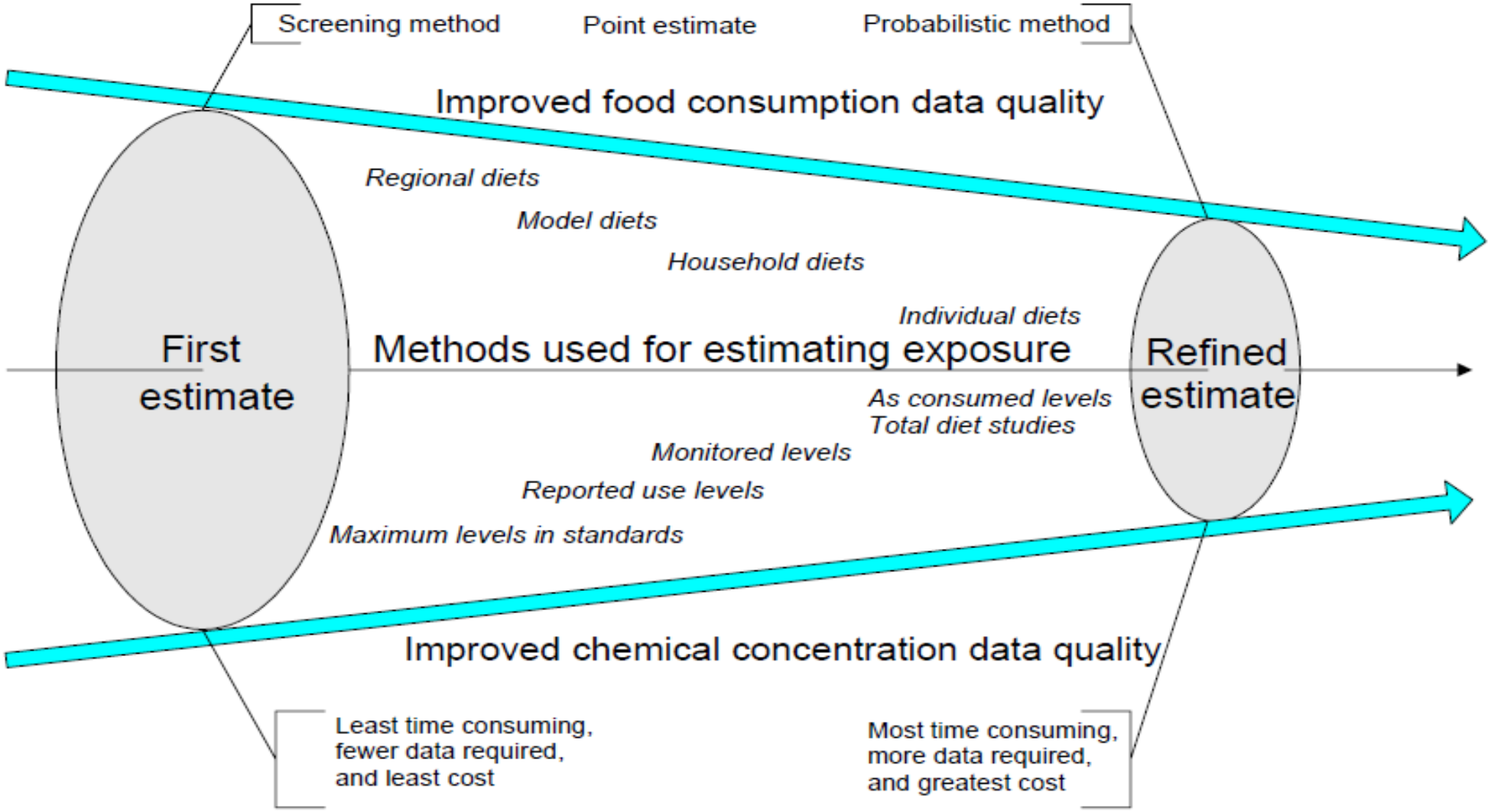

Figure 1 Stepwise approach to obtaining realistic dietary exposure assessments
Note: Data and methods selected from the right-hand side of the diagram are likely to result in a more realistic dietary exposure estimate or "refined estimate"; however, it may not be the "refined estimate" in terms of the "most appropriate" one to suit the purpose of a specific dietary modelling exercise

DATA SHOULD ENABLE TO

- Qualify the types of foods consumed in a given area / by a given population / sub-population
- Identify food products, ingredients, methods of preparation, **quantities**
- **Preferred approaches:** Individual Based methods (versus Household based approaches)
- **Should help capture differences in consumption patterns:**
  - Age / gender driven
  - Urban / Rural / cultural
- Efforts were made to standardize the approach e.g., the EU Menu methodology

Overview: Types of Food Consumption Data – Pros and Cons

Methods	Data	Consumption Estimates	Food Chain Level	Drawbacks
Population-based methods	❑ Food Balance Sheets ▪ Total food available for consumption as a physical residual in the market. ▪ Total supply = total demand ❑ Time scale: year	❑ Median, mean	❑ Raw, semiprocessed products	❑ No information on distribution of consumption ❑ No information on individual exposure and subgroups at risk ❑ High level of uncertainty
Household-based methods: Always available, generated on a regular basis by national institute of statistics	❑ Purchase or expenditures records ▪ Values and quantities of food purchased, own produced and received at household level ❑ Large sample size ❑ Time scale: weeks	❑ Mean ❑ High Percentile	❑ Raw, semiprocessed and processed products	❑ No intra-household distribution ❑ Not individual food intakes ❑ Food eaten outside home difficult to capture
Individual-based methods	❑ Food record survey ❑ 24-hour recall survey ❑ Food frequency questionnaire ❑ Meal-based diet history survey ❑ Food habit questionnaire ➢ Small sample size ➢ Time scale: days	❑ Mean ❑ High percentile	❑ Raw, semiprocessed and processed products	❑ Expensive, time and resource consuming ❑ Susceptible of under- or over reporting

Main Methods of Food Consumption Data Collection

Method	Type	Description	Strengths	Limitations	Used by
24-Hour Dietary Recall (24HR)	Individual	Respondent recalls all foods/drinks consumed in the past 24 hours. Often interviewer-administered.	Detailed data; reflects actual intake; flexible for different cultures	Relies on memory; day-to-day variation; under-/overreporting	WHO GIFT, NHANES, EFSA
Food Frequency Questionnaire (FFQ)	Individual	Respondents report how often (frequency) specific foods are consumed over a longer reference period (e.g., month, year).	Useful for long-term intake patterns; easy to administer	Less precise; limited to listed foods; relies on memory	Epidemiological studies, WHO/FAO
Weighed Food Records (WFR)	Individual	All foods weighed and recorded before consumption over a certain period (1–7 days).	Most accurate; ideal for nutrient intake	Very resource-intensive; changes normal eating behavior	Research studies, validation work
Estimated Food Records / Diaries	Individual	Respondents estimate and record all food/drinks consumed over multiple days.	Good balance of detail and practicality	Estimates may be inaccurate; high burden on participants	WHO GIFT, EFSA (select studies)
Household Consumption and Expenditure Surveys (HCES)	Household	Records household-level food acquisition or consumption (often over 7–14 days).	Widely available; useful for national estimates	Not individual-level; excludes food consumed outside home	FAO, World Bank, National Statistics
Duplicate Diet Method	Individual	Participant collects identical portions of all consumed food for laboratory analysis.	Best for chemical exposure assessment	Very costly; burdensome; small sample sizes	Used in food safety risk assessments (e.g., contaminants)
Direct Observation	Individual	Observer documents food consumed (e.g., in schools, hospitals).	Reduces reporting bias; contextual insight	Limited to controlled settings; time-intensive	Nutrition interventions, school feeding programs
Food Balance Sheets (FBS)	National	Calculates per capita food availability based on national supply data.	Useful for trends and policy planning	Does not reflect actual consumption or waste	FAO, national governments
24HR with Repeat Days (Multiple-pass method)	Individual	Multiple 24HRs conducted on non-consecutive days to capture variability.	Improves accuracy of habitual intake	More expensive and time-consuming	WHO GIFT, EFSA, NHANES

Common Applications by Use Case

Application	Preferred Methods
Nutrient intake assessment	24HR (repeated), FFQ, WFR
Exposure to food contaminants or additives	**24HR, Duplicate Diet, GEMS/Food data**
Public health nutrition surveillance	24HR, FFQ, HCES
Food security and policy planning	HCES, Food Balance Sheets
Codex-related risk assessments	24HR + occurrence data (e.g., from GEMS/Food)
National dietary guidelines	24HR, FFQ, HCES

Attempts to standardize Methodology

The EU Menu methodology:

Recommends the use of:

- ✓ food diaries for children
- ✓ 2 x 24 hr recall for adolescents and adults :
  - using a dietary survey software tool to assist with the data entry and accompanied preferably by at least one face-to-face interview (nutritionist) to ensure comprehensive reporting by the respondent.
- ✓ Data collected should include **details on foods, beverages** and supplements consumed, **recipes**, food descriptors, portions consumed, preparation/processing method, place of consumption, time of consumption etc...

Most Regions of the World

❑ Lack Data Supporting:

- Level and patterns of consumption of food products : Critical for exposure assessment
- Data in relation with occurrence of contaminants in food

❑ Geography Matters:

- Food availability / patterns of food production & patterns of food consumption are changing with significant impact on risk characterization

Key food consumption databases and resources

Source/Platform	Organization	Type of Data	Coverage	Main Uses
GIFT (Global Individual Food Consumption Tool)	**WHO**	Individual-level, disaggregated (by sex, age, food group)	LMICs (Low- and Middle-Income Countries)	Nutrient intake, dietary exposure
FAOSTAT – Food Balance Sheets	**FAO**	National food availability (per capita)	245 countries/territories	Macro-level food supply, trends
EFSA Comprehensive Database	**EFSA**	Individual-level dietary survey data, FoodEx2 classification	EU countries	Risk assessment, chemical exposure modeling
WWEIA – NHANES	**USDA/CDC**	Detailed individual 24h recalls, supplements	United States	Nutrition monitoring, diet-health studies
NLiS (Nutrition Landscape Information System)	**WHO**	Aggregated nutrition and diet indicators	Global	Health/nutrition policy, SDG monitoring
GEMS/Food	**WHO/UNEP**	Food contamination + consumption data (harmonized)	Global	Exposure assessment, risk management
INFOODS	**FAO**	Nutrient composition of foods	Global and regional datasets	Nutrient intake assessment, food composition
ASEAN Food Consumption & Composition	**ASEAN/FAO**	Regional intake & composition data	Southeast Asia	Policy, health and food development

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INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY

WHO ILO UNEP

Environmental Health Criteria 240

Principles and Methods for the Risk Assessment of Chemicals in Food

Chapter 6
DIETARY EXPOSURE ASSESSMENT OF CHEMICALS IN FOOD

A joint publication of the Food and Agriculture Organization of the United Nations and the World Health Organization

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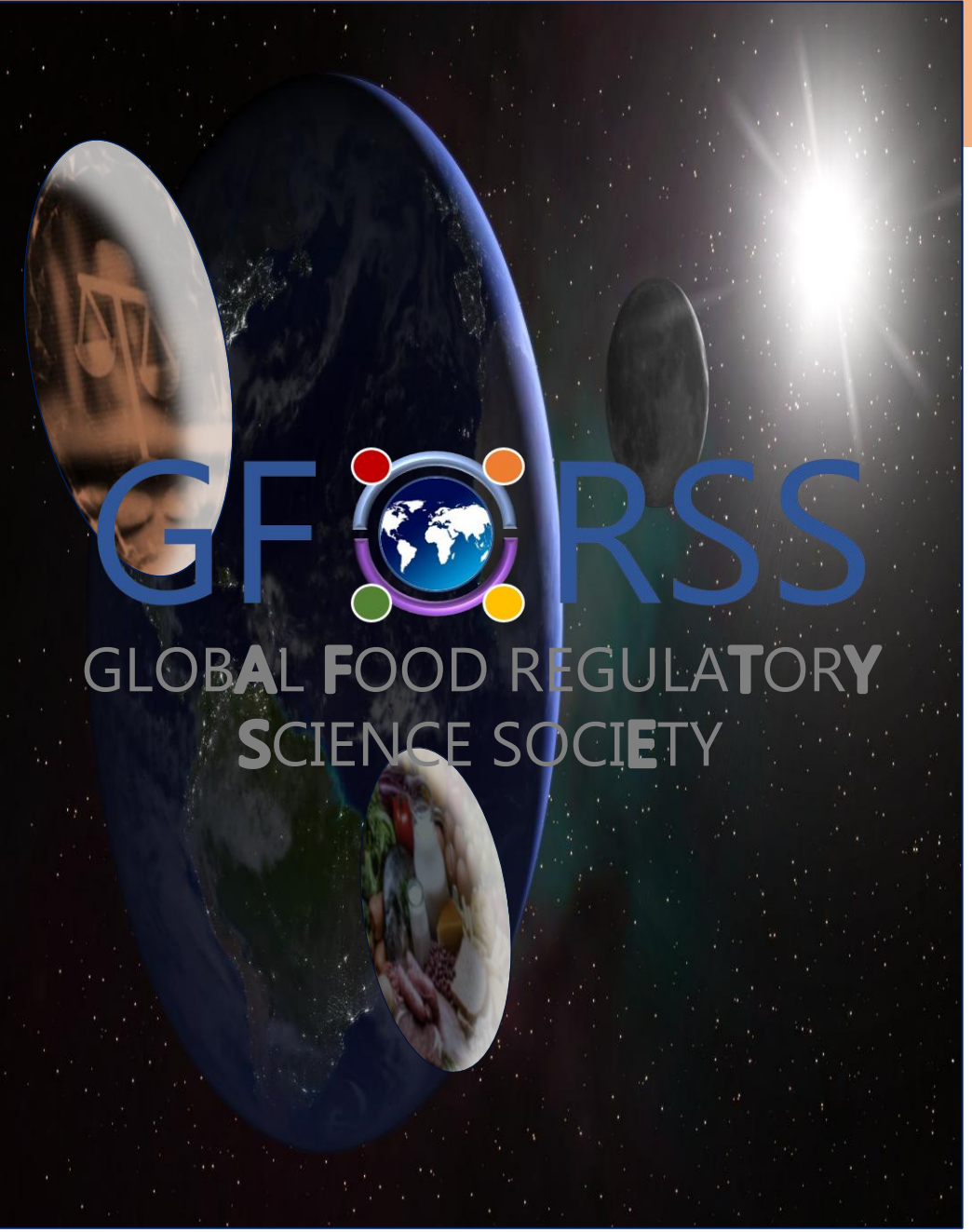

ARAB CODEX INITIATIVE

المبادرة العربية للدستور الغذائي

Need for Concerted Action…

Introducing the Arab Food Consumption Initiative

Collaborative Initiative – Under Arab Codex

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ARAB FOOD CONSUMPTION DATA INITIATIVE

Supporting Representative Exposure Assessments in the Arab Region

FIRST EXPERT MEETING

of the Arab Food Consumption Data Network

23 February 2024 • St-Regis Marsa Arabia, Doha, State of Qatar

Objectives of the Arab Food Consumption Data Initiative

- ✓ ***Create reliable repositories*** *for food consumption data representative of the Arab region, including country-related data, for use by food regulatory authorities and their stakeholders for exposure assessment purposes.*

- ✓ ***Develop agreed-upon methodologies*** *of food consumption data collection that can be used consistently by Arab food risk assessment authorities to implement food consumption surveys in their respective jurisdictions.*

- ✓ ***Develop and maintain the set of enabling tools****, including Information and Communication Technologies (ICT) that support the consistent deployment of food consumption data collection in the Arab region e.g., applications of data collection, applications for data analysis, etc.*

Objectives of the Arab Food Consumption Data Initiative

- ✓ ***Develop training material and capacity building programs*** *to disseminate knowledge and support the adoption of consistent / harmonized methodologies and tools supporting food consumption data collection in the Arab region.*

- ✓ ***Develop and maintain a network of experts*** *that support the sustainable management of food consumption data, for risk assessment use in the Arab region.*

Initial Mapping of Arab Food Consumption Data Available

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- **Saudi Arabia**:
  - National Multi-stage survey SHIS – 10,000 + participants – age 15 higher (89% response rate) - Summer 2013 – Diet history Approach
  - Possible other sources for local and traditional data (FFQ approach)
  - Dietary intake of school children and infant – 839 participants – 0-6 years
- **Bahrein**: 2002 National Nutrition Survey 2300 + Individuals – 19 yrs and over – 24 Hr recall + FFQ
- **Oman** :Survey on frequency of consumption / qualitative study
- **Morocco**: National studies – frequency of consumption – qualitative studies /
- **Iraq**: 2011 data – 6-12 yr old – 24hr recall and FFQ – 570 individuals ?

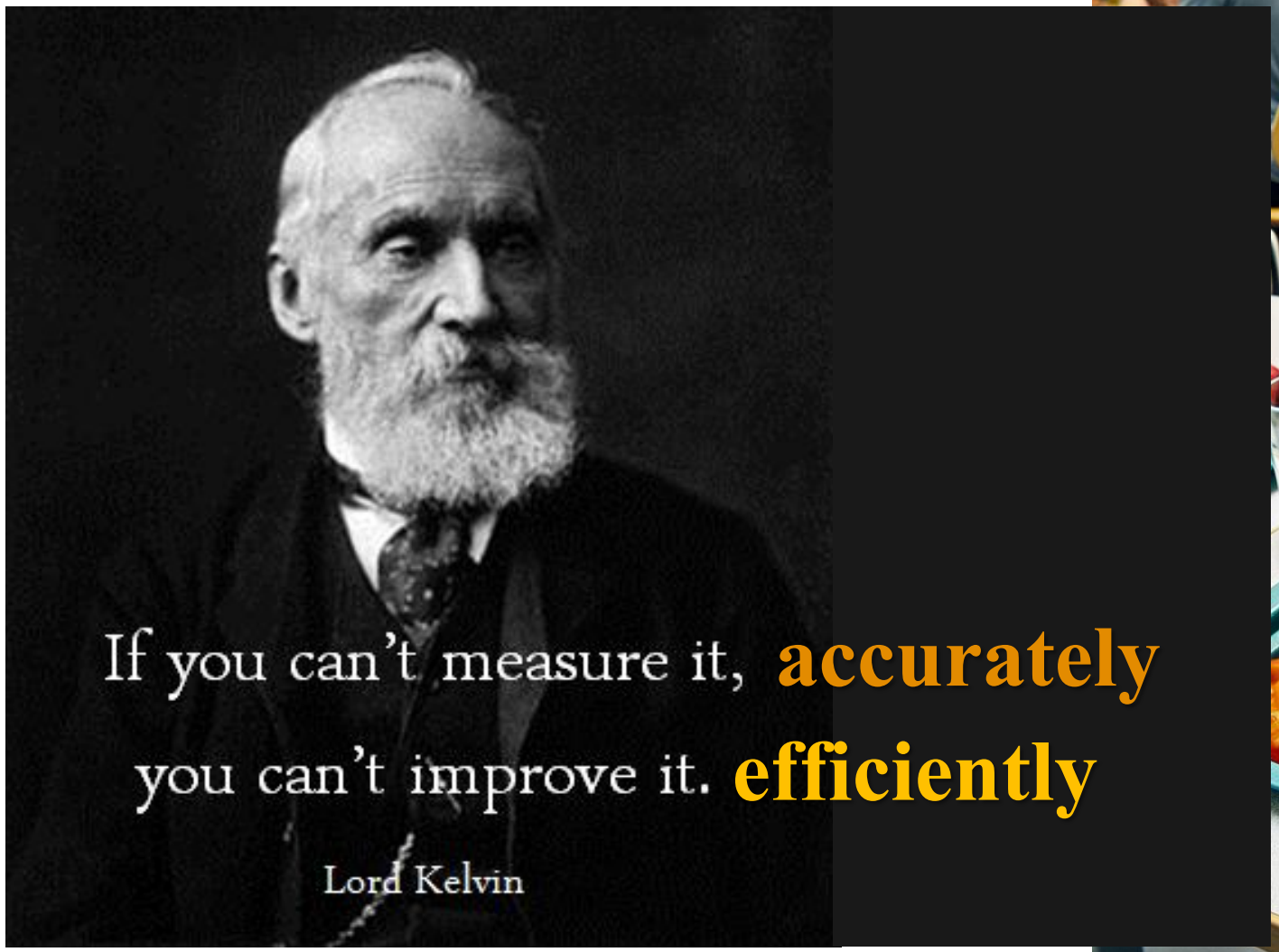
Initial Mapping of Arab Food Consumption Data Available

- **Qatar** : Qatar Biobank – Qualitative intake for specific food items - Nutrition group in MoPH –
  - New FFQ under design – targeting Qatari Traditional foods / Qatar citizens and residents (for more than 15 years) –
  - Infant formula study – Qatar University
- **UAE** : Survey 2017 – National Survey (Ministry of Health National Health) ? Method : FFQ
- **Lebanon**: Age 0-5 // validating for FFQ under 5 – 10-19 Yrs old Adults , Pregnant Women and elderly – Pending 6-9 Years old //
  - FFQ for time based products and for Rice and for spices and herbs
  - Milk intake
  - Children study – 2012 – 0-5 years old – 899 participants

Initial Mapping of Arab Food Consumption Data Available

- **Kuwait**: Annual Surveillance System – FFQs – based on adequacy of intake – older methodology
  - National Nutrition Survey – 2003 – National Kuwait Survey
  - Unpublished data – hospital recruitment / targeted recruitment
- **Palestine**: West Bank – First Palestinian National Health and Nutrition Survey – 2000 – 3602 participants – adults – 24 Hr recall –
  - West Bank – 2014 – Health Behaviour in School Aged children 1900 participants 11 16 Years old – 24 hr recall and validated a FFQ –
  - Daily Dietary Intake
  - Gaza Survey Representative the population – Adults – 24 Hr recall – 2 non-consecutive days - 3000 participants. 2021
- **Jordan**: 24 hour recall – Food consumption Survey – Household (not individual) 2000 participants - 2021 – FFQ and 24 hour recall (adults only)

A Collective Effort



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