

# Health Impact of Iodine and Advantages of Agronomic Biofortification

14 December 2016:

U-Ghent: Creating nutrient-rich foods through agronomic biofortification

**Dr Katja Hora**

WIA Technical and Communications Committee



- ◉ International Non-Profit Organisation, established in 2015
- ◉ Effective members: Producers, processors, formulators, distributors or end users of iodine and iodine derivatives in relevant industry bodies.
- ◉ One of WIA's missions:

4. To help to ensure optimal iodine intake to prevent IDD globally



## NUTRITION

- Essential for human and animal health, as a constituent of thyroid hormones
- A beneficial element in plant nutrition



## HEALTHCARE

- Dietary supplements
- Iodine containing tablets in case of nuclear disaster
- Contrast media for diagnostic imaging
- Biocides



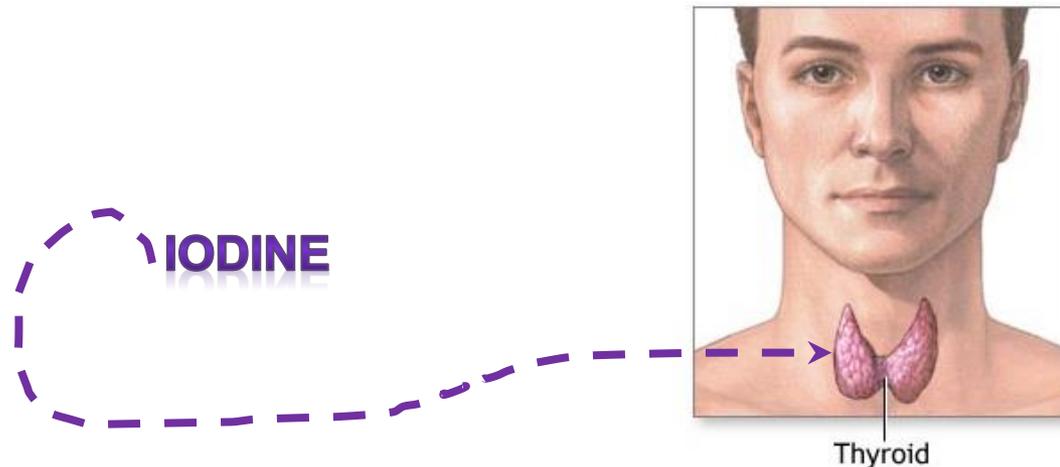
## INDUSTRY

- Catalyst in chemical synthesis
- Photography, LCD polarizing films
- Synthesis of polymers
- Heat stabilisation of nylon
- Production of colorants and dyes



# Iodine essential for thyroid function

- Thyroid hormones contain iodine
- Thyroid hormones regulate growth and energy metabolism
- Lack of iodine in the fetus disturbs brain development and growth particularly in the first trimester of pregnancy



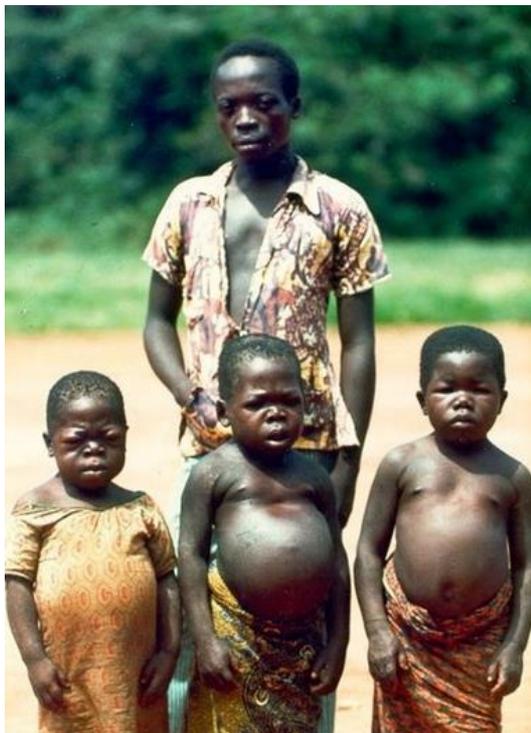
# Adult daily required intake = 150 $\mu\text{g}$ I

- Thyroid gland stocks iodine (20-80 mg)
- Daily body turnover of iodine for healthy thyroid function -> 100-199  $\mu\text{g}$  I/L urine excreted daily
- Pregnant and nursing women need 1,5 x more iodine: intake of 220-270  $\mu\text{g}$  I/day



# IDD are visible when severe.

- Goitre is a swelling of the thyroid gland in the throat
- Cretinism and mental retardation of children of severely iodine deficient mothers



Animal with an abnormally large thyroid gland (goiter) (photo Susan Schoenian)



Goitre due to  
iodine  
deficiency

# Mild iodine deficiency is not visible: Lower IQ and hypothyroidism

- **Mild** iodine deficiency in the mother during the first trimester of pregnancy:
  - Smaller children -> less productive adults
  - Less intelligent children (up to 15 IQ points loss): poor school performance
- Estimates cost to society: average cost of 1 IQ point lost:  
**4.200-20.000 € per IQ point per person/ lifetime**
- Mild iodine deficiency in adults leads to less active thyroid gland (hypothyroidism)
  - People with hypothyroidism become dull, listless and easily get tired



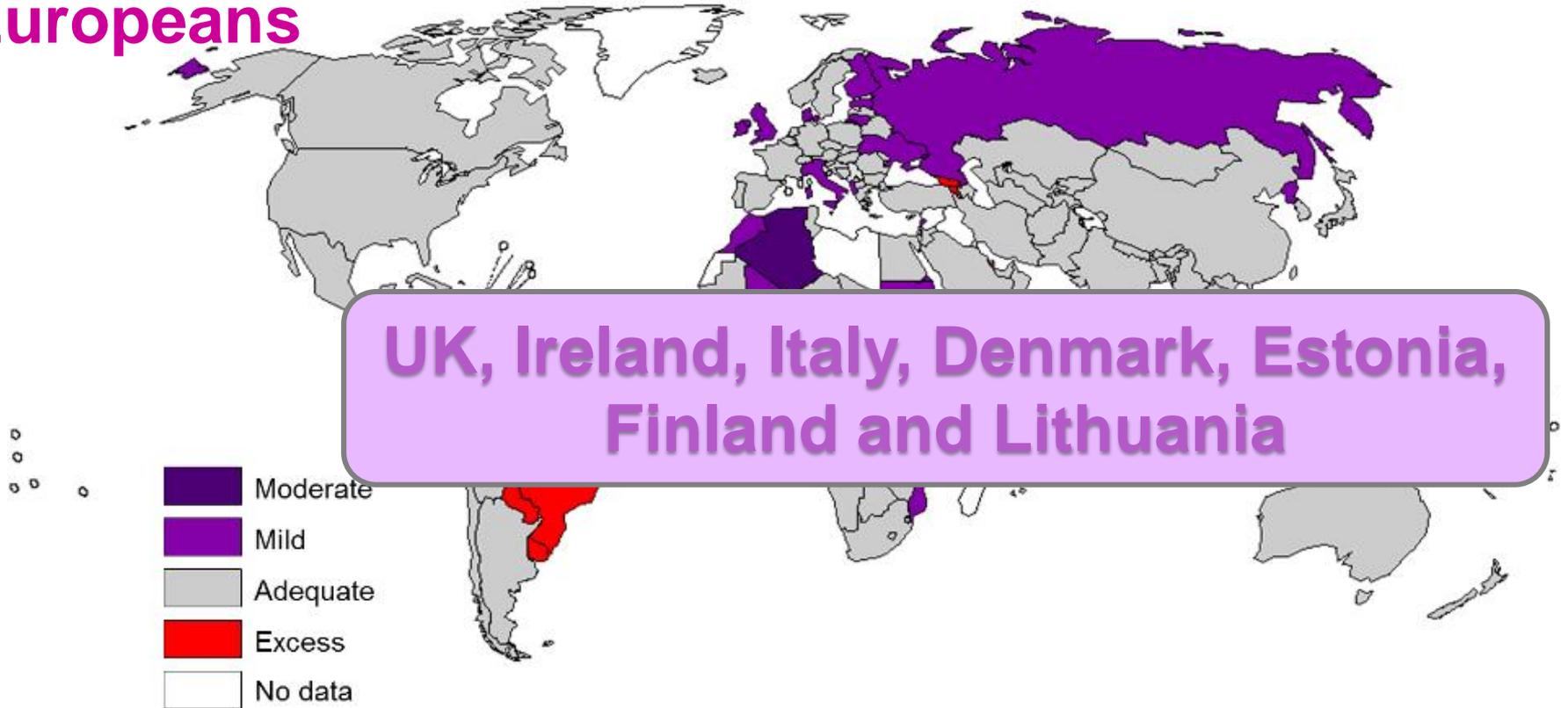
1. Is Iodine Deficiency still a problem

2. How is the problem perceived by the stakeholders, what solutions are now implemented, where are they successful and where not

3. What needs to be done to solve the problem

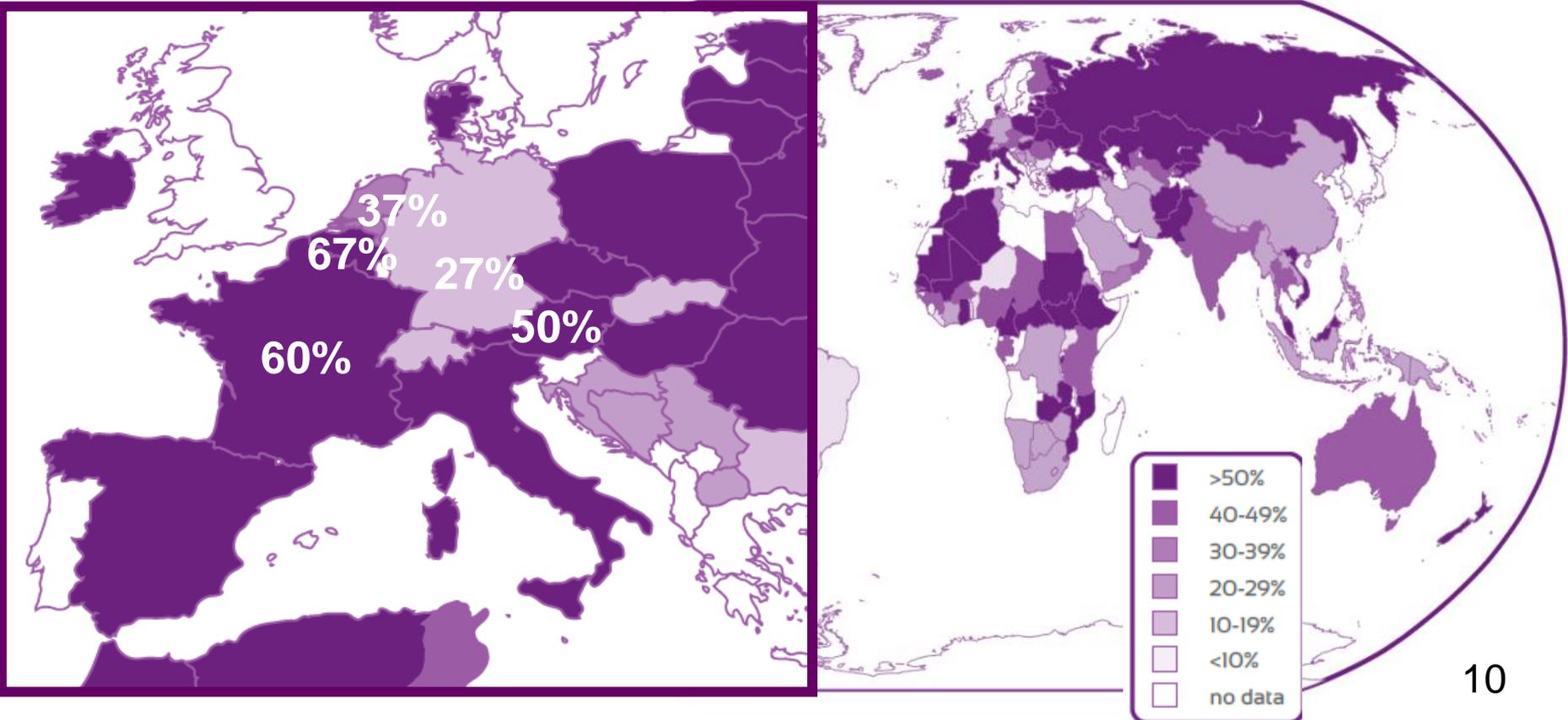
# Iodine status in Europe is adequate ? Perception based on Median UIC: YES

**But: Deficient Median UIC in 7 countries: 28% of Europeans**



# Globally, 2 billion people still at risk of inadequate iodine intake from daily diet

- 30% Global prevalence of low iodine content of urine (UIC) in school aged children (SAC) (FAO 2013)
- In WHO European region: 44% prevalence of low UIC in SAC (IGN, 2015)



## EU Member States lack priority for pro-active iodine agenda

Inventory  
on behalf  
of WIA

There are few people involved and often it is hard to find out who owns the topic

In many countries there simply is no data to draw reliable conclusions on iodine status

Where iodine status is reported as sufficient, states or research indicate that there still are problems in sub-groups (pregnant women)

Iodisation of salt for household use is mandatory obligation only in a limited number of countries. USI is not universal.

# Subgroups at Risk: Increasing Evidence of ID in Women of Childbearing Age

Effect of inadequate iodine status in UK pregnant women on cognitive outcomes in their children: results from the Avon Longitudinal Study of Parents and Children (ALSPAC)



**UK**

*Sarah C Bath, Colin D Steer, Jean Golding, Pauline Emmett, Margaret P Rayman*

Fortification of Bread with Iodized Salt Corrected Iodine Deficiency in School-Aged Children, But Not in Their Mothers: A National Cross-Sectional Survey in Belgium

**BE**

Stefanie Vandevijvere,<sup>1</sup> Ahmed Bensouda Mourri,<sup>2</sup> Sihame Amsalkhir,<sup>2</sup> Freddy Avni,<sup>3</sup> Herman Van Oyen,<sup>1</sup> and Rodrigo Moreno-Reyes<sup>2</sup>

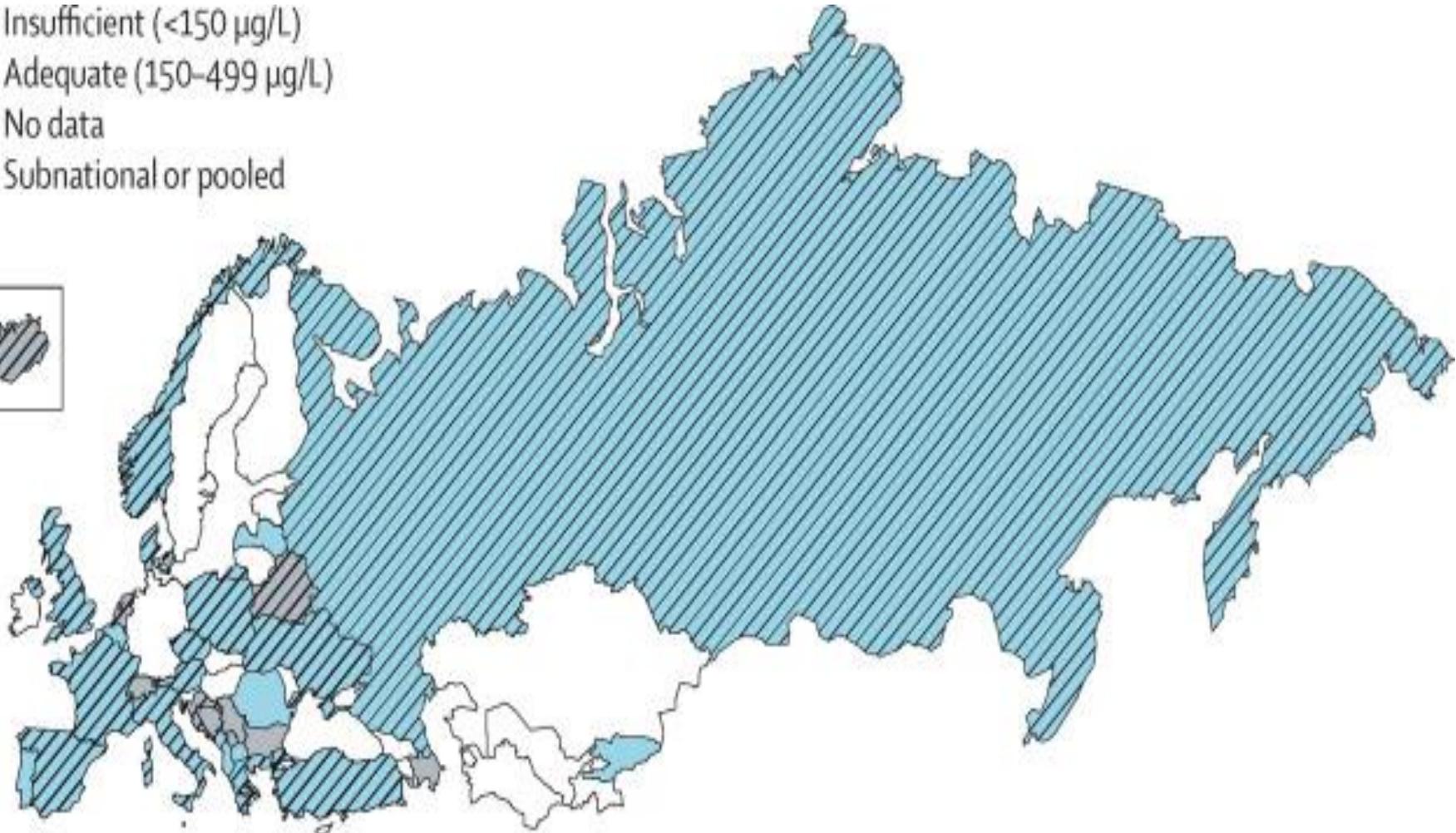
**Ethnic Differences in Maternal Thyroid Parameters during Pregnancy: The Generation R Study**

Tim I. M. Korevaar,\* Marco Medici,\* Yolanda B. de Rijke, Willy Visser, Sabine M. P. F. de Muinck Keizer-Schrama, Vincent W. V. Jaddoe, Albert Hofman, H. Alec Ross, W. Edward Visser, Herbert Hooijkaas, Eric A. P. Steegers, Henning Tiemeier, Jacoba J. Bongers-Schokking, Theo J. Visser, and Robin P. Peeters

**NL**

# Subgroups at Risk: Increasing Evidence of ID in Women of Childbearing Age

- Insufficient (<150 µg/L)
- Adequate (150–499 µg/L)
- No data
- Subnational or pooled



# Solutions and issues in optimisation of iodine Intake

- Salt supplementation:
  - Lower sodium consumption v.s. Iodine level in salt
- Pharma (supplements, vitamins):
  - Not always reaching groups that need it most.
  - Iodine content not always clearly defined (e.g. Seaweed supplements)
- Diet (milk, seafood):
  - Lacking consumers awareness on iodine content of food
  - Lack of personalized approach to account for individual variations in need for iodine and dietary habits (low bread diet, lactose intolerance, vegan diets)
- **Agronomic Biofortification**

4. To help ensure optimal iodine intake to prevent IDD globally

- Enhancing iodine content in vegetables and grains by application of plant nutrition rich in iodine
- Developing countries:
  - Agronomic biofortification can provide 20-30 % of RDA from consumption of locally grown wheat or rice
- Developed countries:
  - Achieving 15% of RDA in 100 g of fresh vegetables is feasible enabling health claims to be made -> Enabling consumer choice



**2017 November 15-17**  
**Italy, Pisa**

**SAVE THE DATE: 1st International WIA Conference**

**IODINE**  
**IN FOOD SYSTEMS**  
**AND HEALTH**