International Scientific Conference on “Global commodity chains from a risk assessment perspective”, 27-29 May, Berlin 2024

New developments in Risk-benefit assessment

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Outline

- Why Risk-benefit assessment (RBA)?
- What is RBA?
- Which questions can RBA answer?
- Current developments
- Opportunities

Global burden of disease due to dietary risk factors

Dietary risk factors

Leading behavioral risk factor for global mortality among women and second leading for men

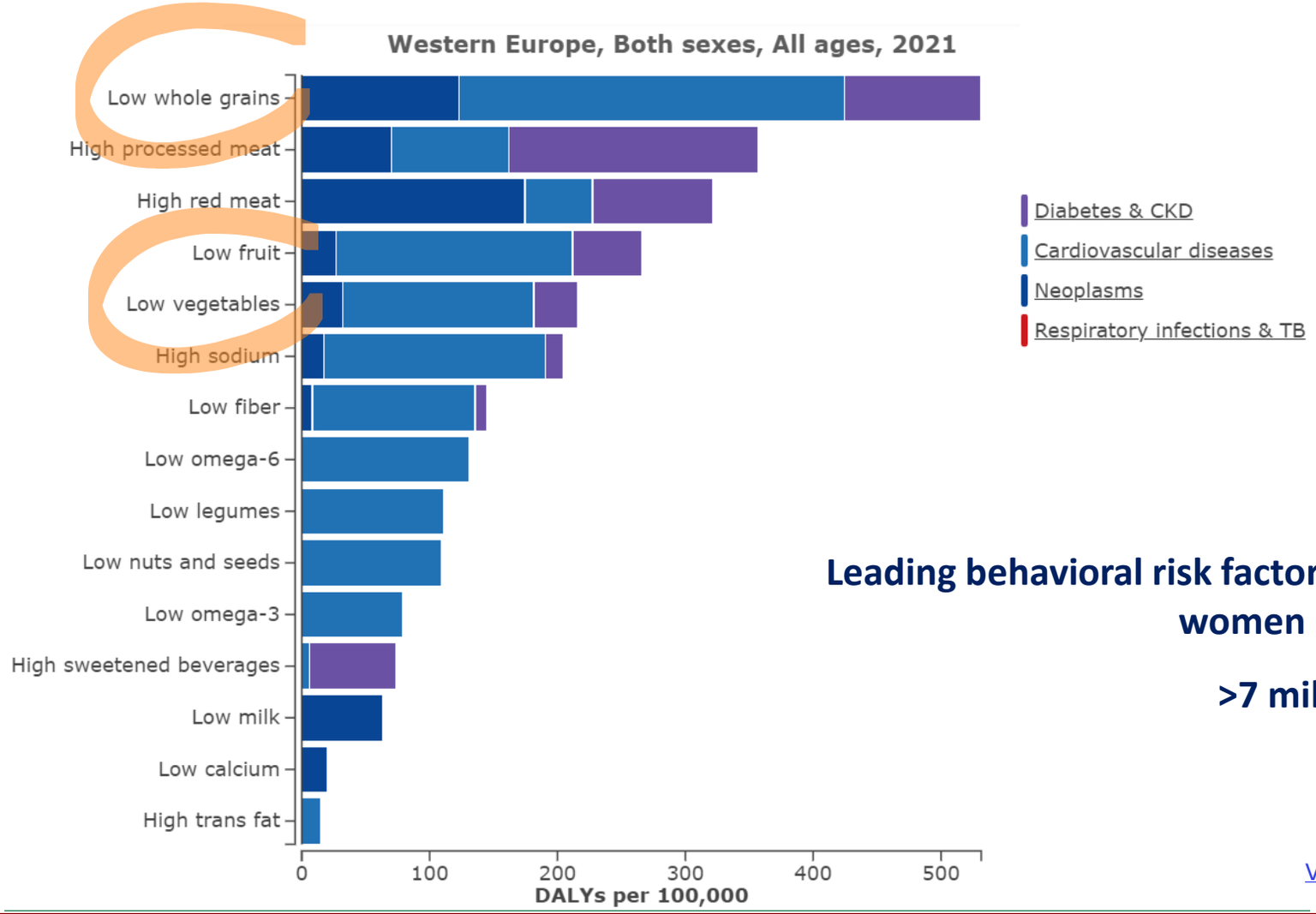
>7 million deaths globally in 2021

Source: GBD Study, IHME

VizHub - GBD Results (healthdata.org)

VizHub - GBD Compare (healthdata.org)/

Global burden of disease due to dietary risk factors



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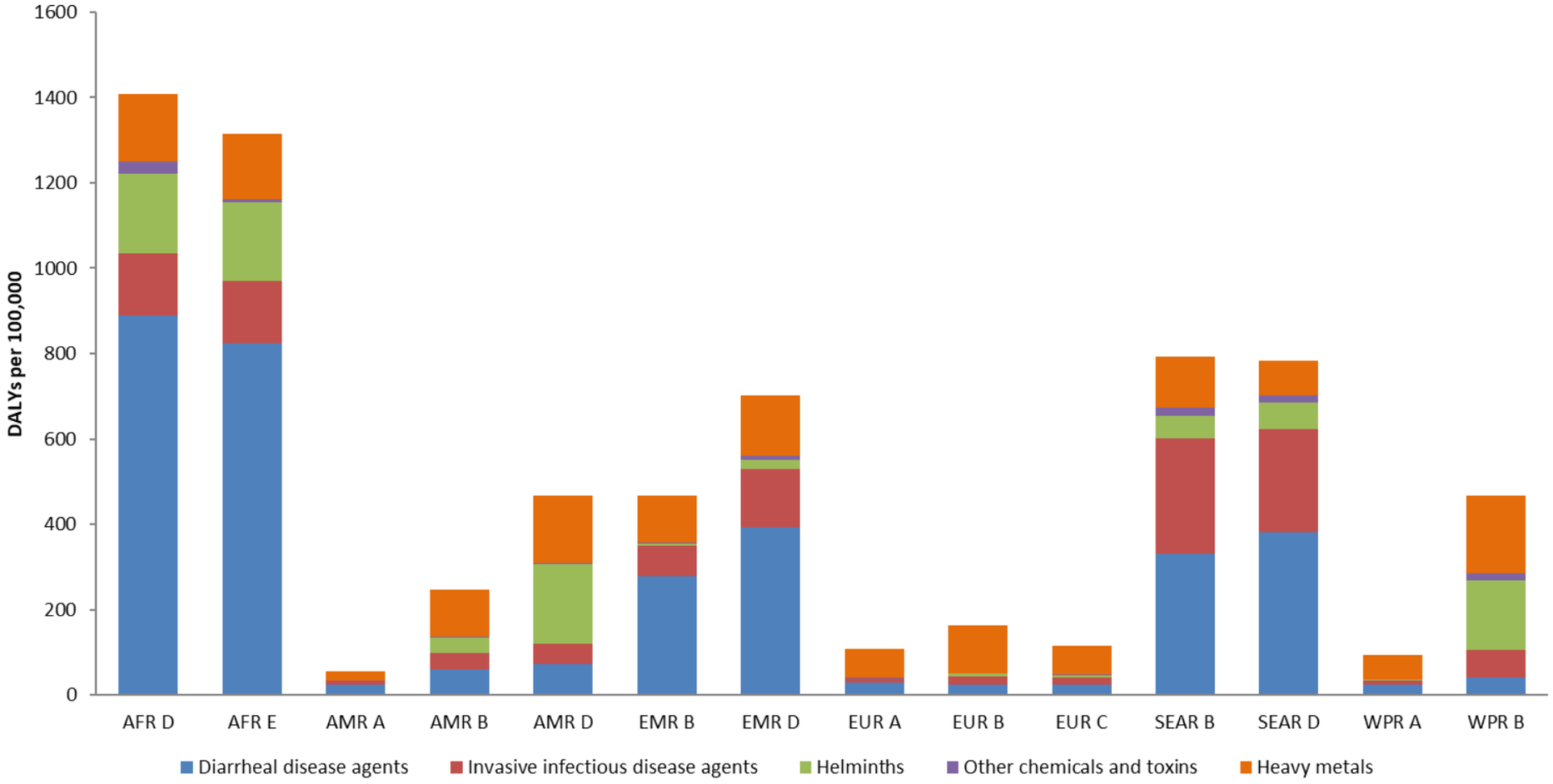
[The Danish Official Dietary Guidelines - Ministry of Food, Agriculture and Fisheries of Denmark (fvm.dk)]

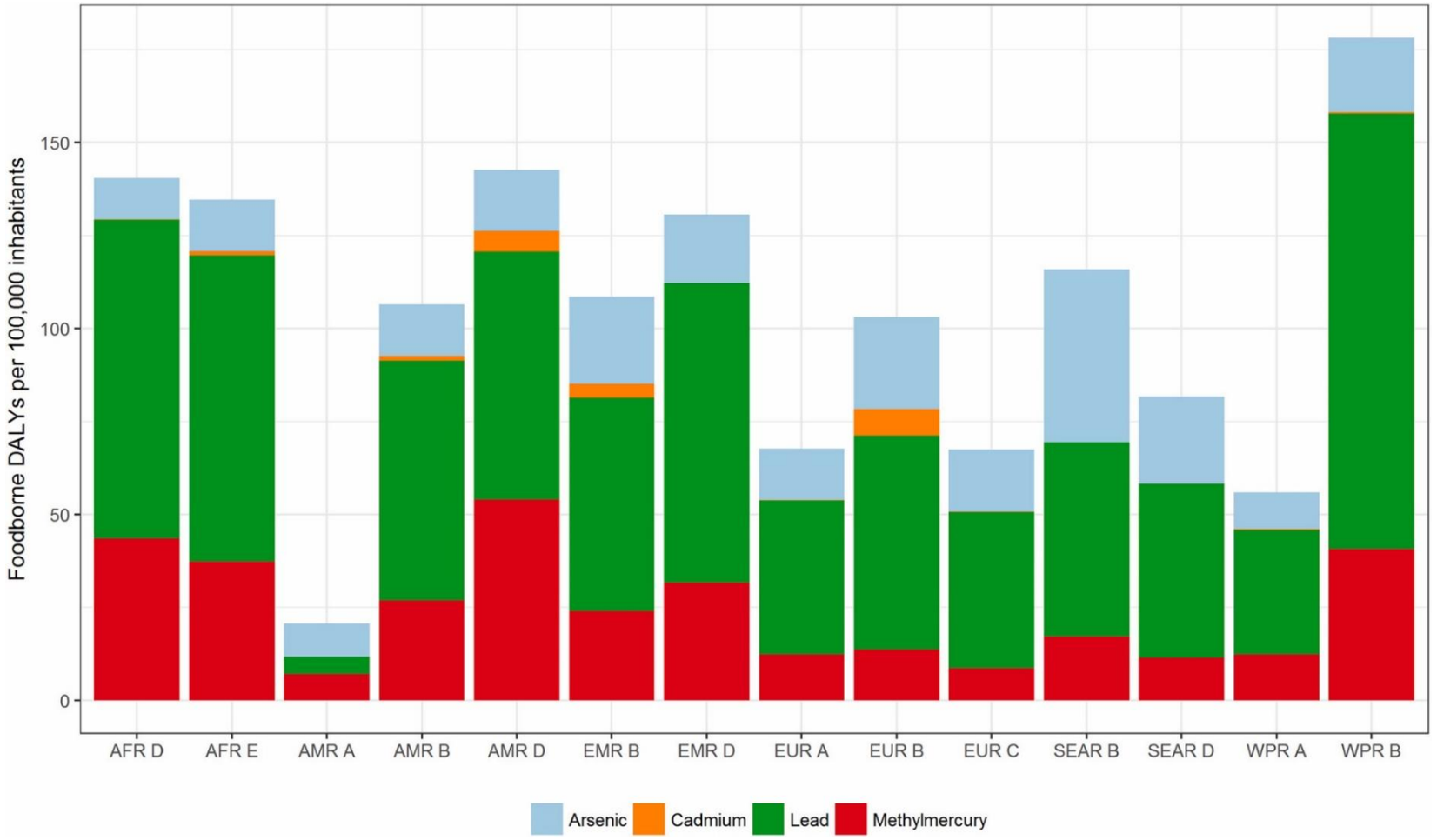
Global burden of foodborne diseases



WHO, 2015

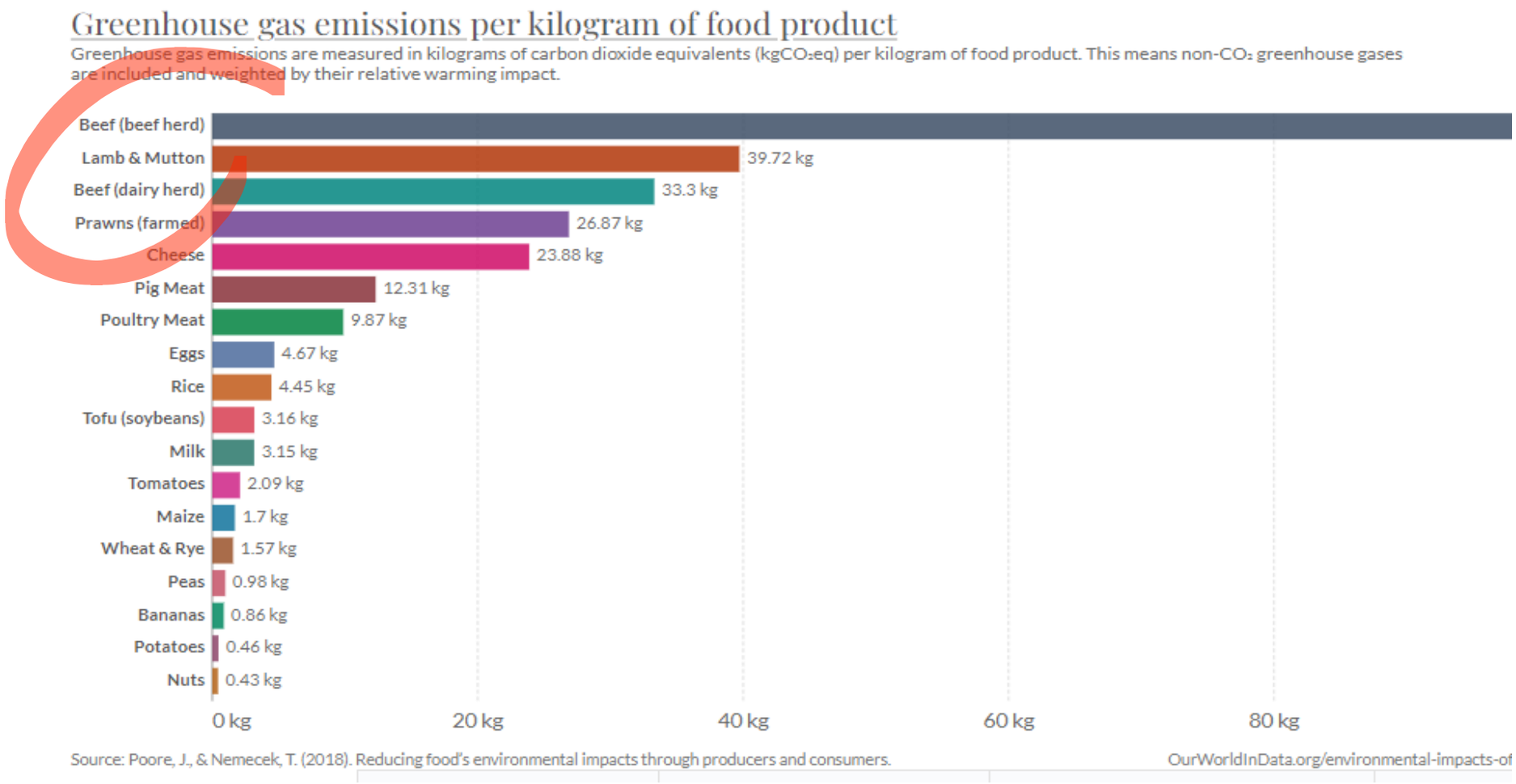
Gibb et al., 2019

Global burden of foodborne diseases



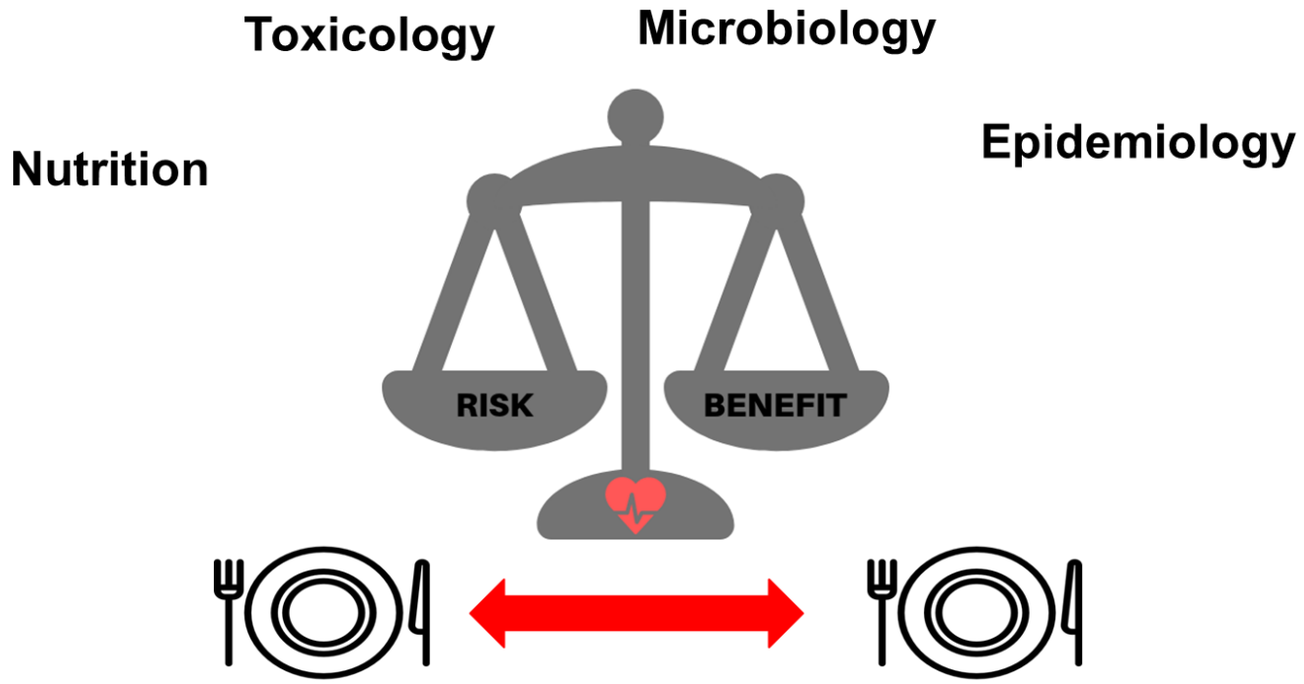
Gibb et al., 2019

Food systems, health and the environment



Risk-benefit Assessment of foods

Quantitative comparison of **human health risks** and **benefits** of foods and food compounds based on a **common scale of measurement**



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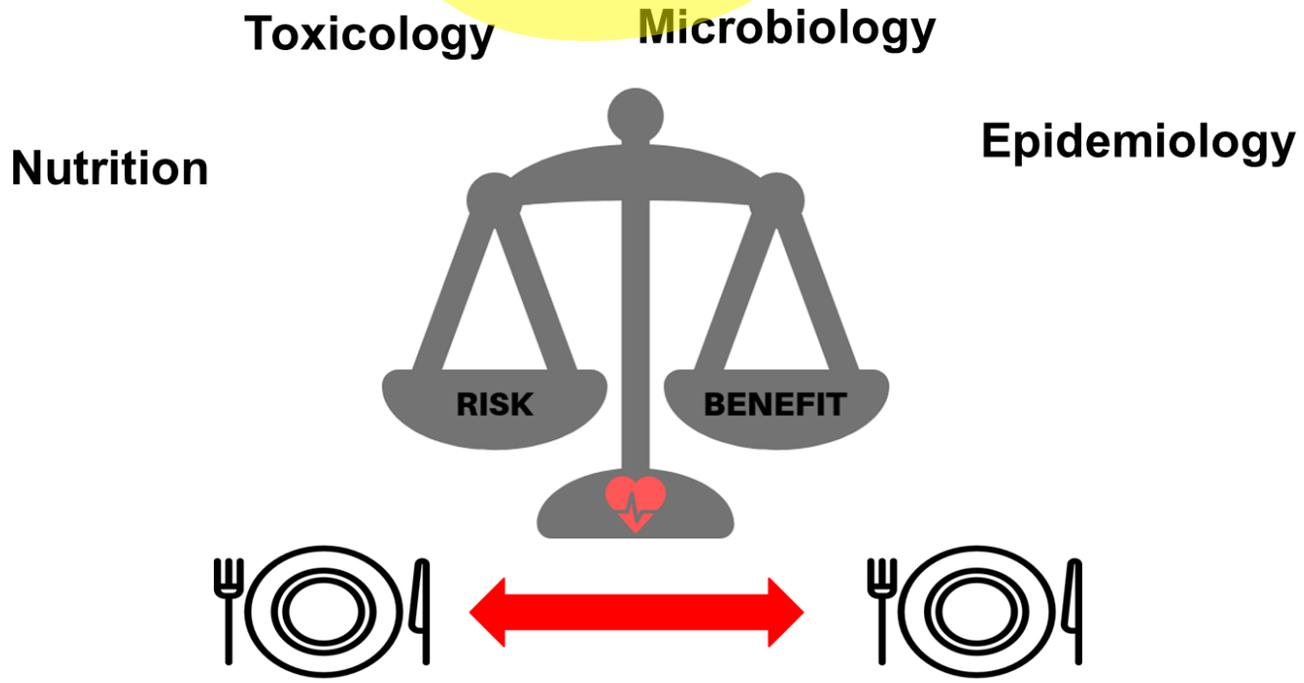
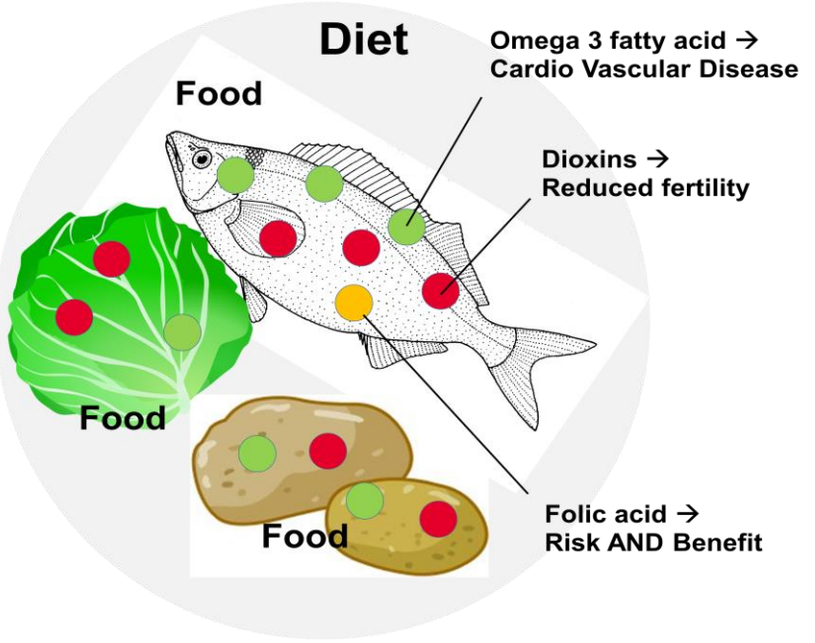


Risk-benefit Assessment of Foods

- **Tool that builds on risk assessment methodologies and can consider**
  - Several contaminants and nutrients
  - Several foods (if needed)
  - Several **health effects**

- Requires integrated and multi-disciplinary approach



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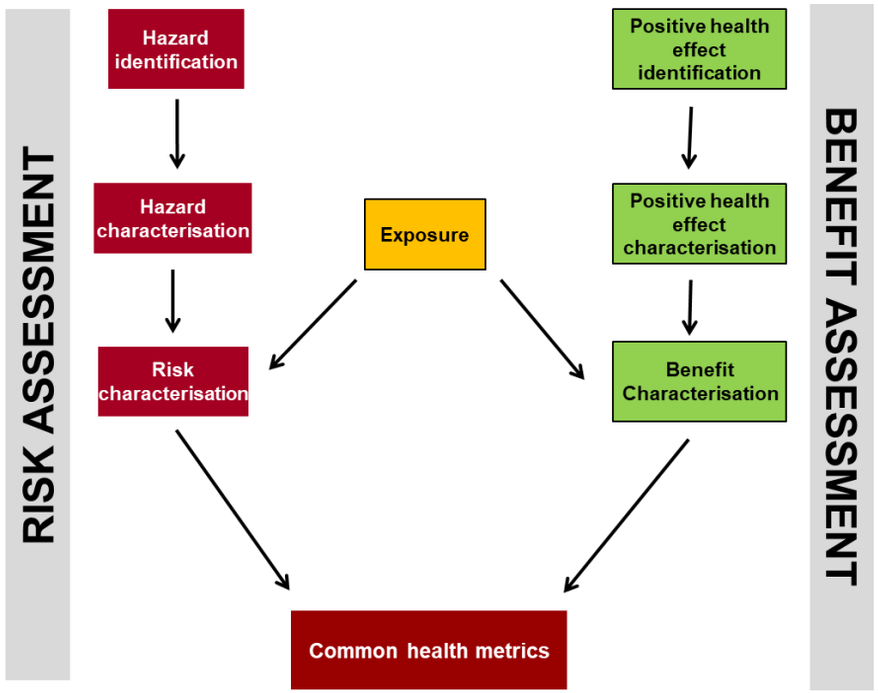


Which questions can RBA help answering?

- What's the health impact of eating up to **30 grams of nuts/**day?
- What's the health impact of decreasing **dairy consumption from 500g/day** to **250g/day?**
- What is the health impact of increasing iodine fortification of salt?
- What's the health impact of **substituing** some of our **meat** consumption **by insects**? Or by **pulses**?
- What is the health impact of **increasing fish** and **decreasing meat** consumption?




Photo cedits: Colourbox

Which questions can RBA help answering?

- What is the optimal fish consumption pattern that fulfils nutritional requirements and safe hazard exposure limits?
- (…) and food price constrains?
- **What are the integrated health and sustainability impacts of (specific) dietary transitions?**

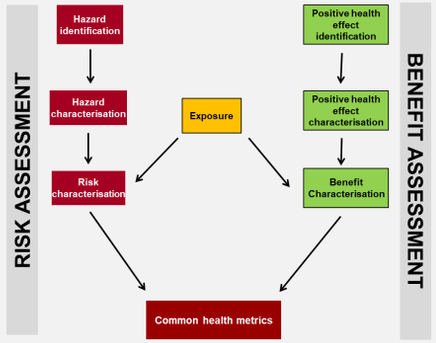


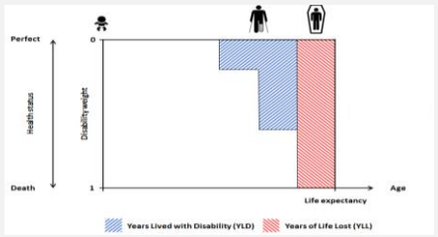

Photo cedits: Colourbox

Which methods have been used?

Health impact of current and future consumptions

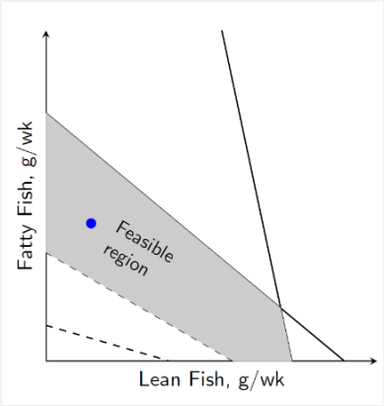
- RBA Framework, DALY





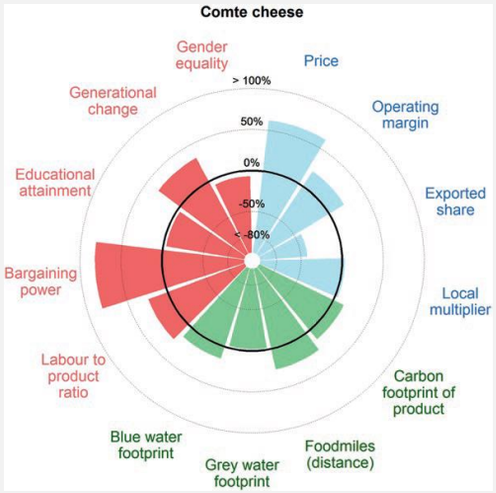
Optimized consumption patterns

- Linear or quadratic programming, optimization



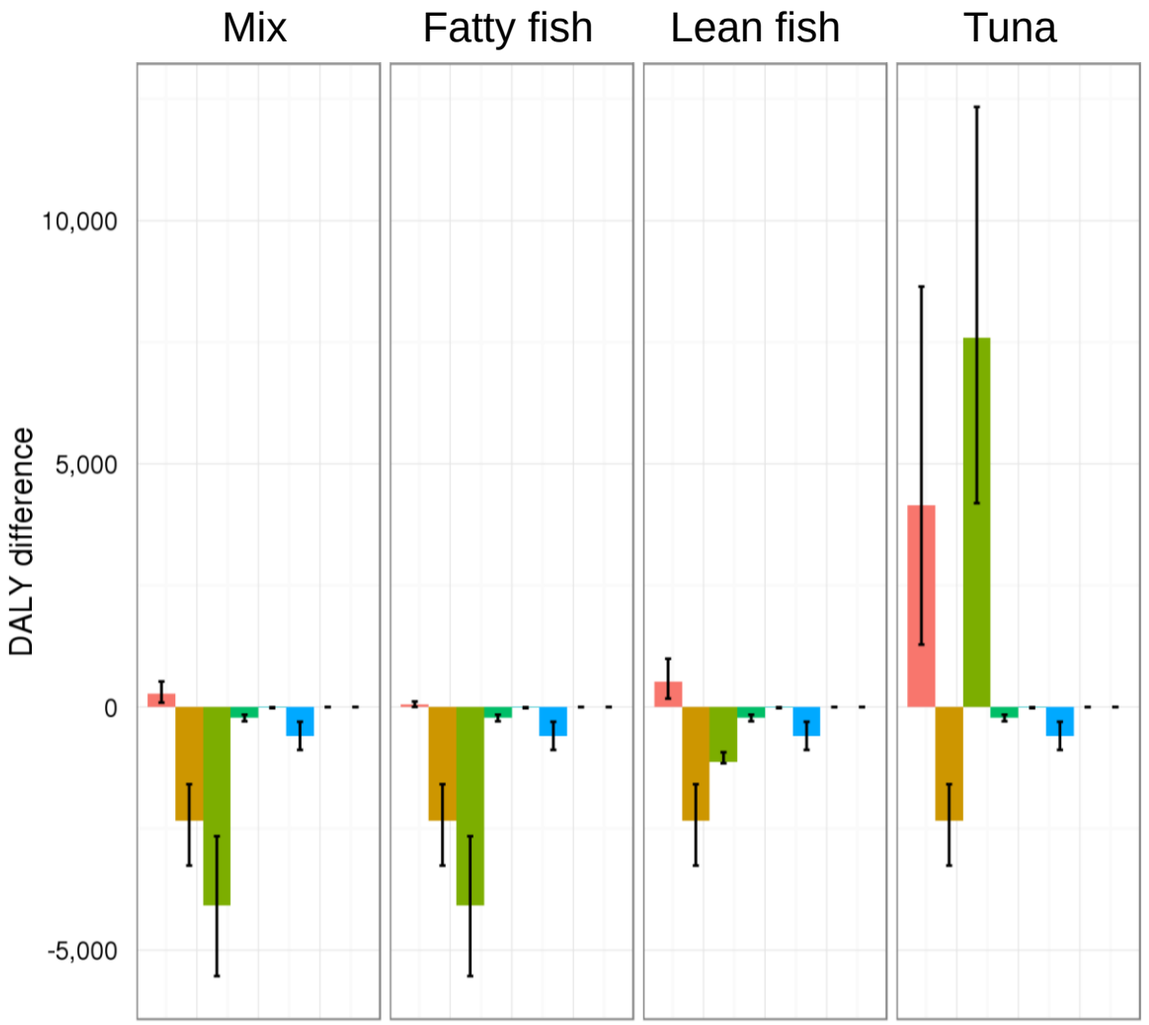
Integrated health and sustainability impacts

- MCDA
- Vizualization



Arfini and Bellassen (2019).

Health impacts of replacing meat by fish, DK



Outcome

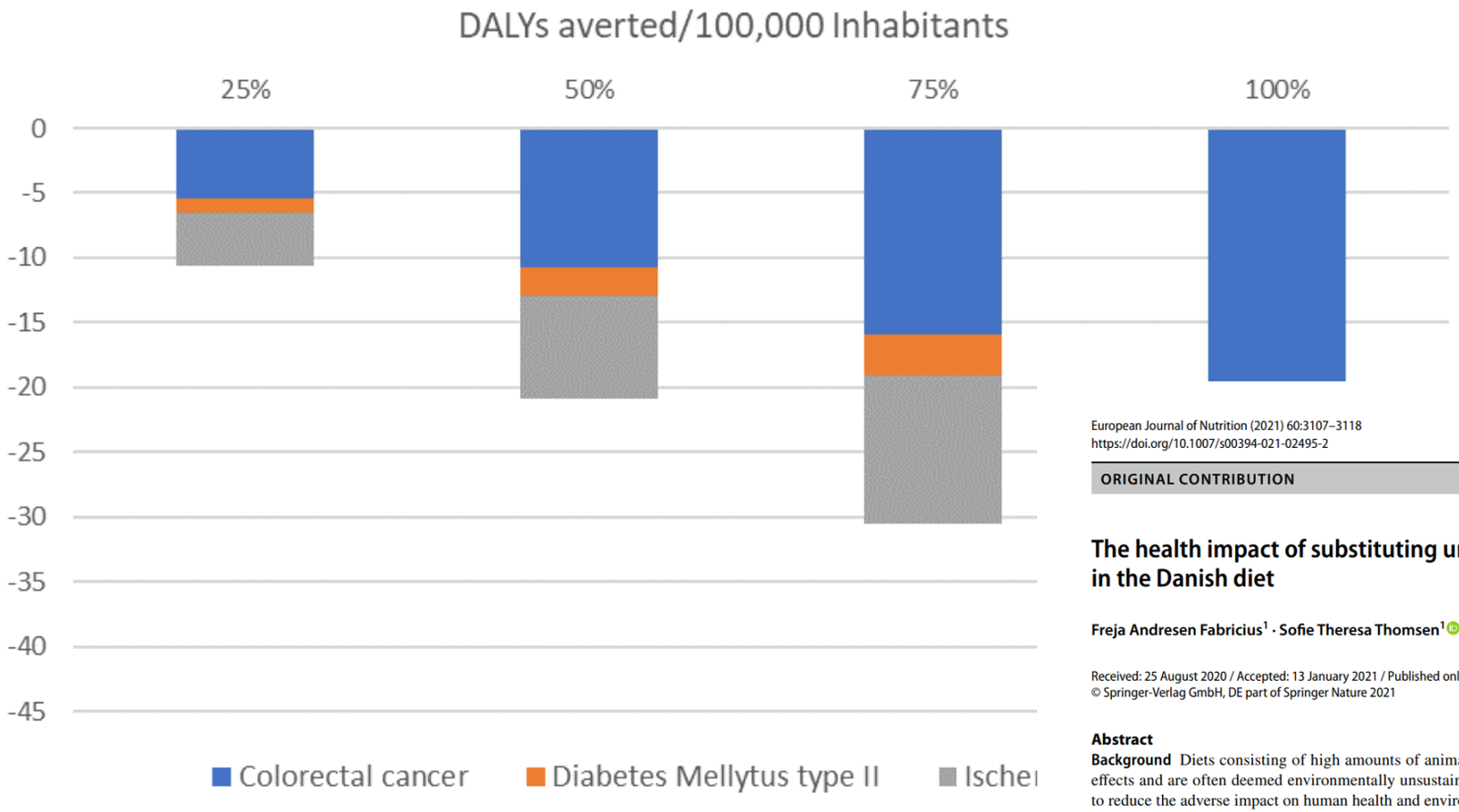
- Intellectual disability (MeHg)
- Intellectual disability (whole fish)
- Fatal CHD (DHA + EPA)
- CRC (processed meat)
- Stomach cancer (processed meat)
- CRC (red meat)
- Hypothyroidism (dioxin + dl-PCBs)
- Male infertility (dioxin + dl-PCBs)

CHD: coronary heart disease

CRC: colorectal cancer

Thomsen et al., 2018

Health impact of replacing beef with pulses, DK



European Journal of Nutrition (2021) 60:3107–3118
https://doi.org/10.1007/s00394-021-02495-2

ORIGINAL CONTRIBUTION

The health impact of substituting unprocessed red meat by pulses in the Danish diet

Freja Andresen Fabricius[1] · Sofie Theresa Thomsen[1] · Sisse Fagt[2] · Maarten Nauta[1]

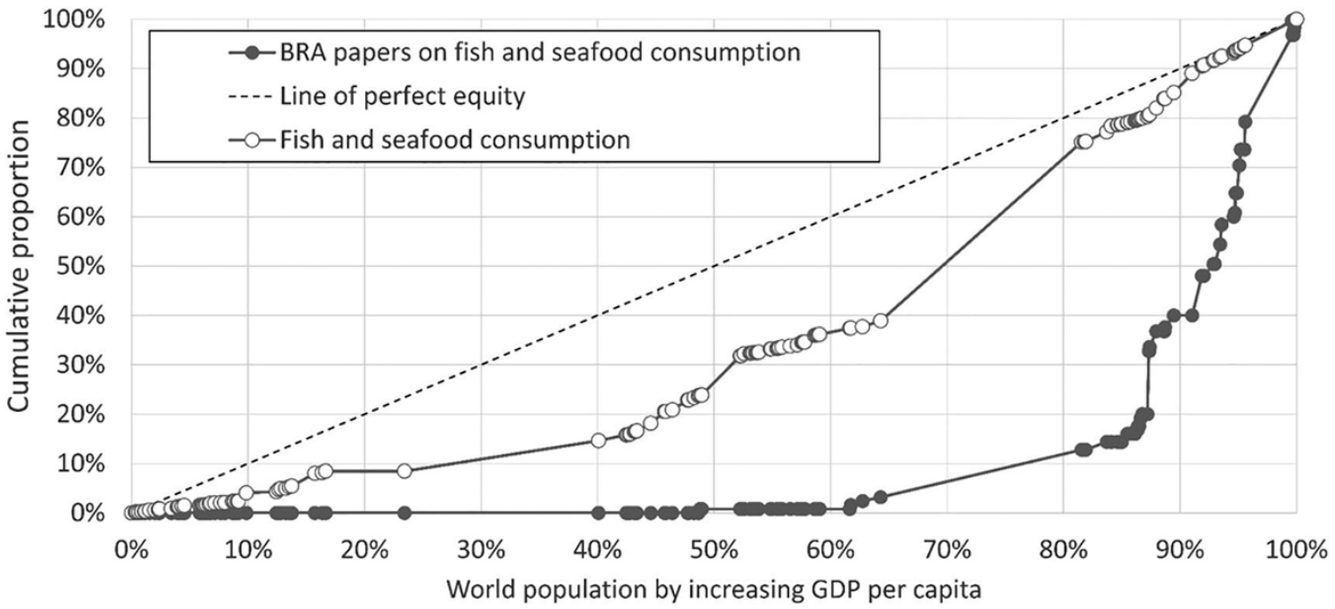
Received: 25 August 2020 / Accepted: 13 January 2021 / Published online: 30 January 2021

Abstract

Background Diets consisting of high amounts of animal-based protein have been associated with adverse public health effects and are often deemed environmentally unsustainable. Therefore, replacing red meat by pulses has been proposed to reduce the adverse impact on human health and environment. However, unprocessed red meat is an important source of nutrients, such as vitamin B_{12}, iron, zinc and selenium, and the substitution may have negative impact on nutrient adequacy.

Method Using a risk–benefit assessment (RBA) approach, we, therefore, estimated the health impact of substituting unprocessed red meat by pulses on the burden of non-communicable diseases in Denmark, using Disability-Adjusted Life Years (DALY). Furthermore, we assessed the impact of the substitution on nutrient adequacy.

Risk-benefit studies globally – fish and seafood



Poorest 60%:
- 36% of global fish consumption
- <1% of benefit-risk analyses

Wealthiest 10%:
- 15% of global fish consumption
- 60% of benefit-risk analyses

Thomsen et al. 2022 Human health risk-benefit assessment of fish and other seafood: a scoping review. Crit Rev Food Sci Nutr. 2022;62(27):7479-7502. doi: 10.1080/10408398.2021.1915240

Recent and ongoing developments

Capacity building


EXTERNAL SCIENTIFIC REPORT

APPROVED: 11/12/2019

doi:10.2903/sp.efsa.2019.EN-1768

RiskBenefit4EU – Partnering to strengthen Risk-Benefit Assessment within the EU using a holistic approach

- Novel case study
- International collaboration
- Training

Novel Foods


EXTERNAL SCIENTIFIC REPORT

APPROVED: 08 April 2022

doi:10.2903/sp.efsa.2022.EN-7316

Novel foods as red meat replacers – an insight using Risk Benefit Assessment methods (the NovRBA project)

- Framework development
- Novel foods

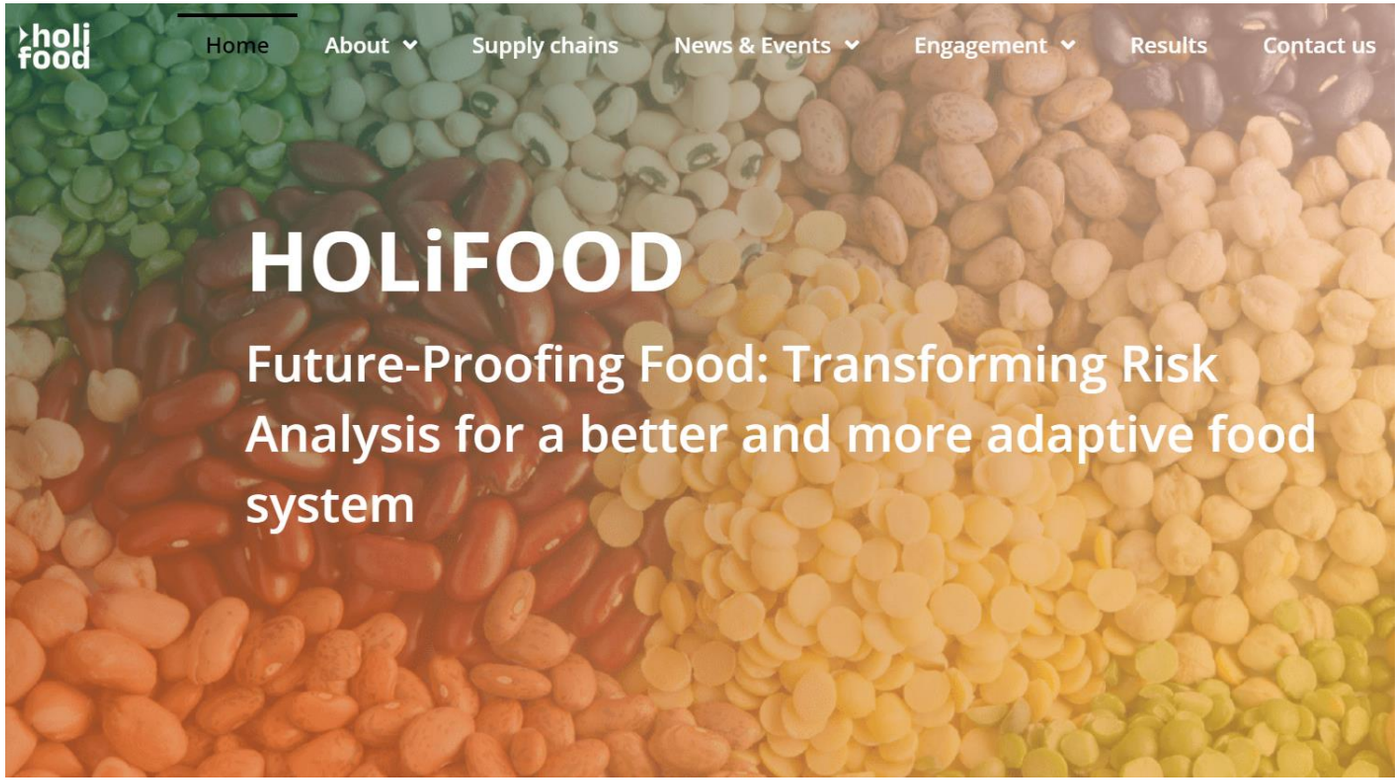
Holistic assessment

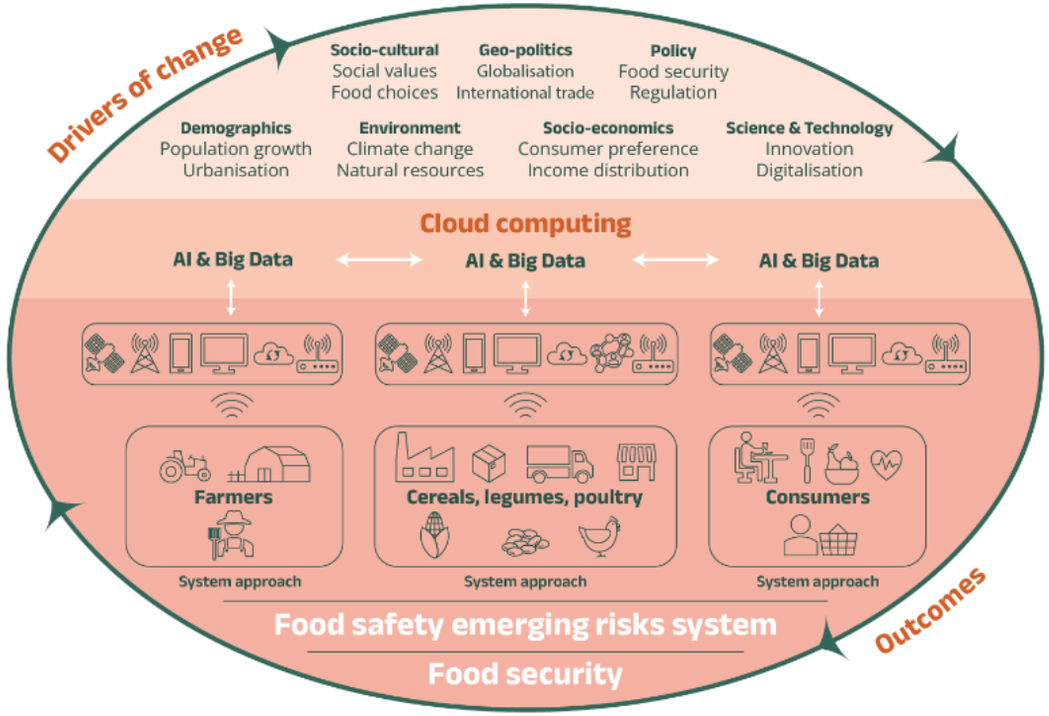

ALTERNATIVA Alternative protein sources in the European diets – integrating health risk-benefit and sustainability [EFSA Project]

Project coordinated by Ricardo Jorge, INSA Portugal

- Integration of sustainability dimensions
- Method development

Recent and ongoing developments





Recent and ongoing developments

Nordic Risk-benefit Assessment: health impacts of replacing meat by pules in three Nordic countries

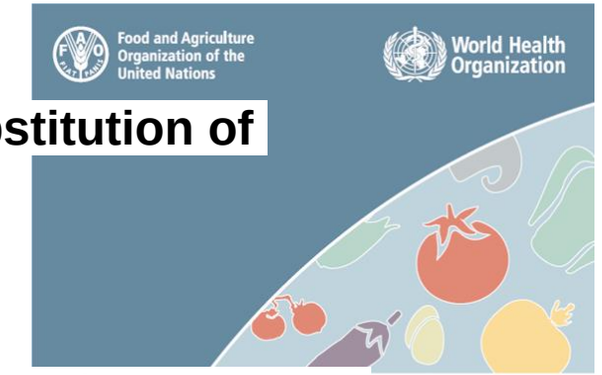
Assessing the impact of dietary transitions

- Measuring **the health and sustainability impacts** of **transitioning** from current diets to more sustainable and healthy diets, including health and environmental impacts

  Contact Anna Elisabeth Jacob, DTU and Claire Dénos, Ghent University

- Assessing the **health and environmental impact of the** isocaloric s**ubstitution of animal-based foods** with the irrespective **plant-based analogues**

  Contact Catarina Carvalho, University of Porto



- **RBA** of **shifts to alternative plant-based diets** with focus on an increased exposure to **mycotoxins**

  Contact Octavian Mihalache, University of Parma

- Estimating the **effect of specific dietary switches on the life expectancy** in Italy

  Contact Matteo Perillo, University of Bologna

Remaining challenges

Methodological

- Weight of evidence for a causal effect
  - imbalance between toxicology and nutrition
  - exclusion of many chemicals
  - weight of evidence for dose-response

Application and communication

- Knowledge translation
- Adoption for policy-making

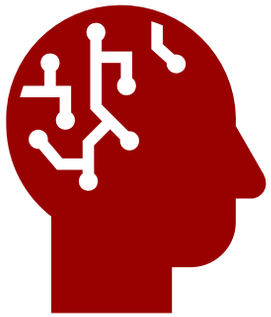
Integration of other dimensions

- Environment, socio-economic, culture

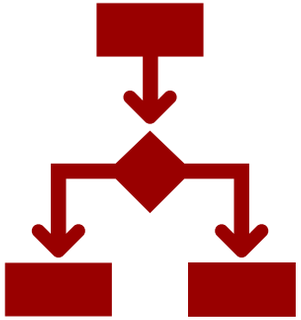
Opportunities

Collaboration

Capacity building



New technocologies



Harmonized methods

Harmonization and sharing of models

International activities

World Health Organization

Health Topics | Countries | Newsroom | Emergencies | Data | About WHO

Home / Newsroom / Article / Call for experts for Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption

Call for experts for Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption

Related Highlight

Report of the Joint FAO/WHO Expert Consultation on the Risks of Benefits of Fish Consumption (2010)

World Health Organization

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Call for experts to develop WHO food-based dietary guidelines

Related Highlight

WHO's work on healthy diet

International activities

EVENT REPORT

efsa
European Food Safety Authority
Supporting Publications

APPROVED: 08 December 2022

doi:10.2903/sp.efsa.2022.EN-7772

EFSA Scientific Colloquium 26

Risk-benefit assessment of combined exposure to nutrients and contaminants through food

European Food Safety Authority

International Scientific Conference on “Global commodity chains from a risk assessment perspective”, 27-29 May, Berlin 2024

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