



Organic Food Systems: Do they produce healthy diets?

Dr. Carola Strassner, MBA

Professor Sustainable Food Systems & Nutrition Ecology
Correns Str. 25 D-48149 Muenster strassner@fh-muenster.de

Managing Director a'verdis Sustainable Foodservice Solutions
Mendel Str. 11 D-48149 Muenster carola.strassner@a-verdis.com



We will consider:

1.

- What seems to be the (health / diet) problem?

2.

- What have we been looking at so far?

3.

- Where do we need to go?



ORGANIC FOOD SYSTEM PROGRAMME

A CORE INITIATIVE OF



We will consider:

1.

- What seems to be the (health / diet) problem?

2.

3.



Food consumption: Triple burden of malnutrition

Undernutrition

- Too little nutrient energy (protein)

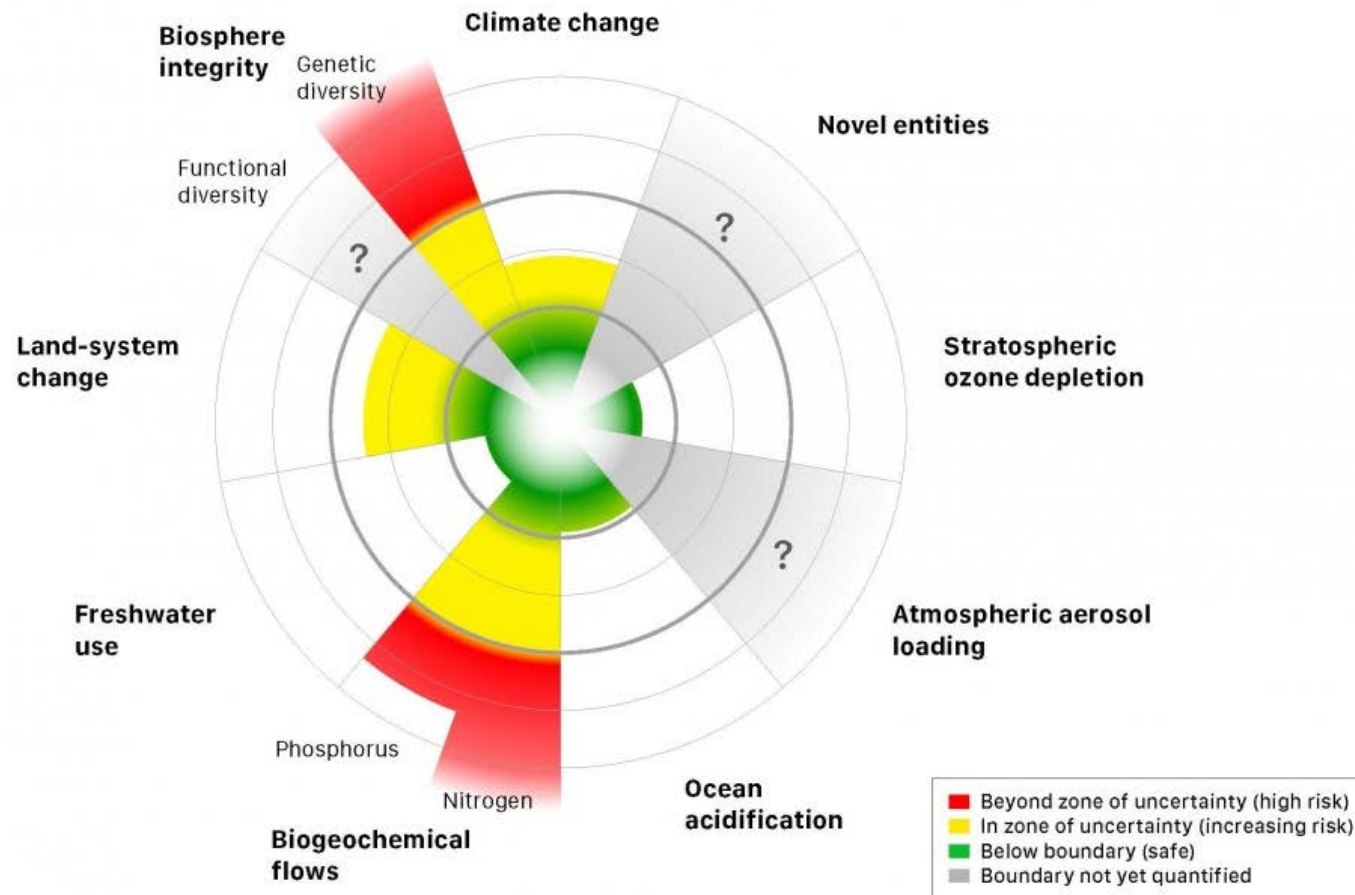
Hidden hunger

- Too little micronutrients (vitamins and minerals)

Overnutrition

- Too much nutrient energy

Food production: implicated in planetary boundary transgression



Source: Steffen et al. (2015)
Planetary boundaries: Guiding
human development on a
changing planet. *Science*
V347:6223, 1259855. DOI:
10.1126/science.1259855.

Diets in Europe

- Rise in food-energy intake
- Rise in consumption of livestock products (incl. eggs)
- Rise in consumption of sugar and sweeteners
- Consumption of fruit and vegetables remains too low
- Eating out is becoming increasingly common

Source: EUPHA (2017)
Healthy and Sustainable Diets
for European Countries.

1.

2.

- What have we been looking at so far?

3.



Looking at why people choose organic



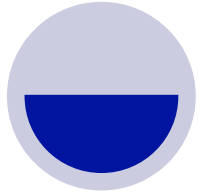
Ethically motivated (occasional buyers) or food safety concerns

(Pino et al. 2012, Michaelidou&Hassan 2008)

Believe it is more healthy and environmental friendly (Pino et al. 2012,
various)

Associate a healthy diet with organic products (Padel & Foster 2005)

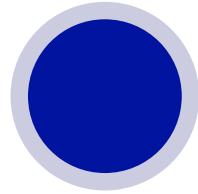
Some in vitro and animal studies



in vitro

- on cell lines /
models

→ strong
conclusions not
possible



animal

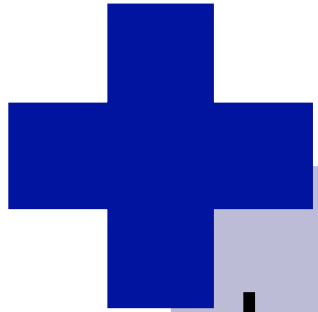
- on fruit flies,
rats, rabbits,
chickens

→ relevance &
implications
unclear

Some human studies

- Women showed **less non-Hodgkin lymphoma**, when eating organic food (Bradbury et al. Br J Cancer 2014)
- Organic diets significantly **reduced pesticide exposure** in adults (Oates et al. Environ Res 2014)
- Organic diet significantly associated with **reduced urinary concentration of pesticide residues** in children (Bradman et al. Environ Health Perspect 2015)
- Children showed **reduced risk of allergic (IgE)sensitisation** and lower prevalence of atopic diseases (Kummeling et al. Br J Nutr 2008, Alm et al. Allergy Immunol 2002, Lancet 1999, Alfven et al. Allergy 2006)

Some foodstuff studies



beneficial
substances

harmful
substances



Some foodstuff studies



A high / better nutritional content:

- dry matter, magnesium, (iron, zinc), anti-oxidants, vitamin C,
- poly-unsaturated fatty acids, esp. omega 3 fatty acids.

(literature reviews/meta-analyses: 2003, 2009, 2011, 2012, 2014)

A much lower contamination (better safety):

- pesticides residues
- cadmium
- lower antibiotics resistances
- nitrates
- comparable/lower mycotoxins, comparable micro-organisms

(literature reviews/meta-analyses: 2003, 2009, 2011, 2012, 2014)

Some foodstuff studies



A high / better nutritional content:

- dry matter, magnesium, (iron, zinc), anti-oxidants, vitamin C,
- poly-unsaturated fatty acids, esp. omega 3 fatty acids.

(literature reviews/meta-analyses: 2003, 2009, 2011, 2012, 2014)

→ **Relevance?**

Some foodstuff studies

Surprised? ←

A much lower contamination (better safety):

- pesticides residues
- cadmium
- lower antibiotics resistances
- nitrates
- comparable/lower mycotoxins, comparable micro-organisms

(literature reviews/meta-analyses : 2003, 2009, 2011, 2012, 2014)

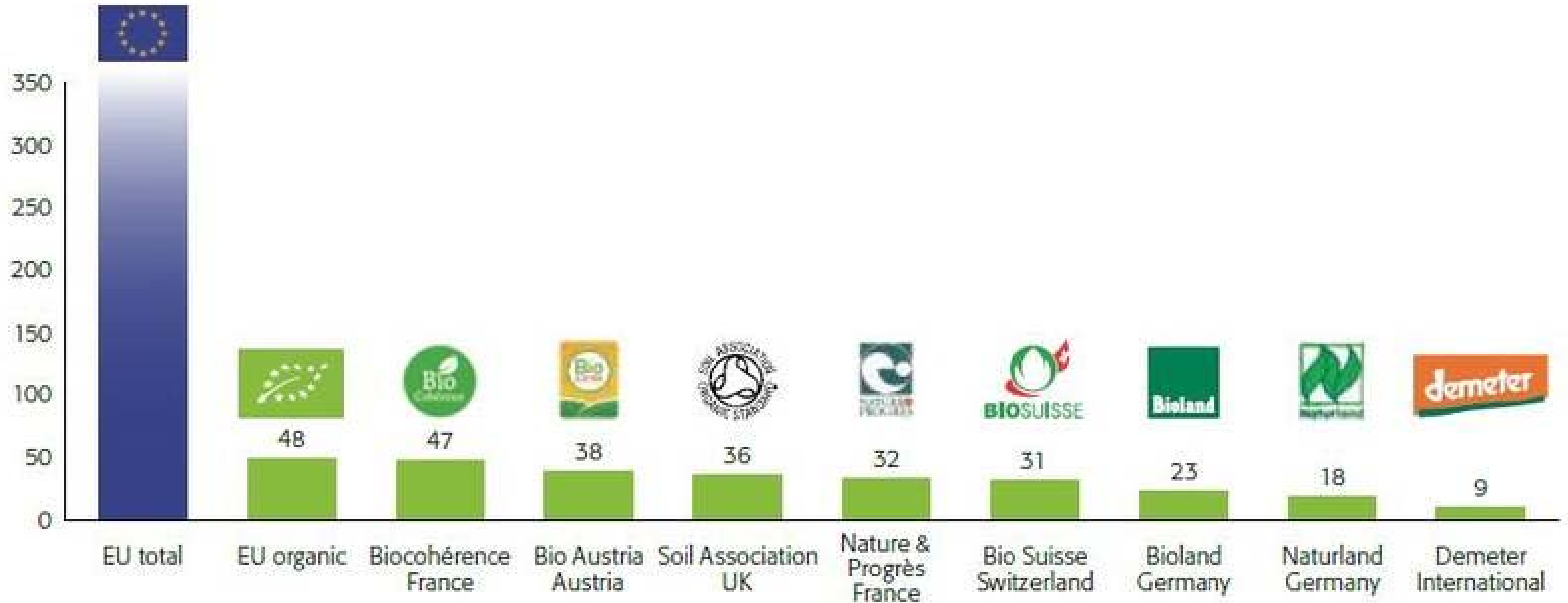
Factors potentially influencing organic food composition

- No synthetic pesticides
- No synthetic fertilizer (N)
- No GMOs
- Restricted animal feeding regime
- Restricted use of antibiotics
- (Restricted use of food additives)
- (Principle of processing with care (regulation of technologies still open))

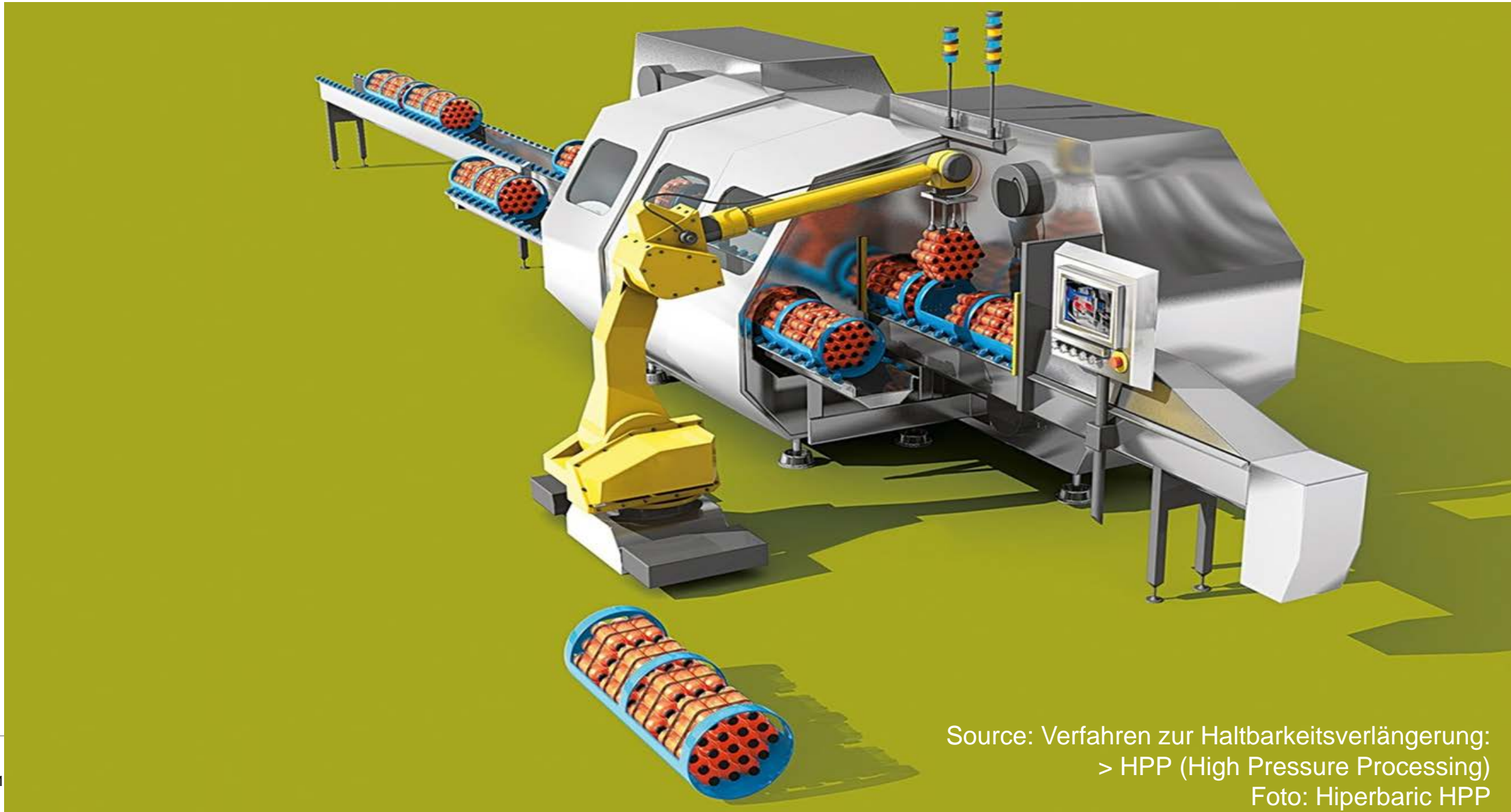
Sources: IFOAM Standards, EU-Regulation 834/2007 + 889/2008
+ others

Note: National regulations (e.g. Bio Suisse) or private standards (e.g. Demeter) are more restrictive

Organic food processing “with care” – permitted additives



Processing technologies



Source: Verfahren zur Haltbarkeitsverlängerung:
> HPP (High Pressure Processing)
Foto: Hiperbaric HPP

Why is processing important?

Fotos © Peter Menzel



1.

2.

3.

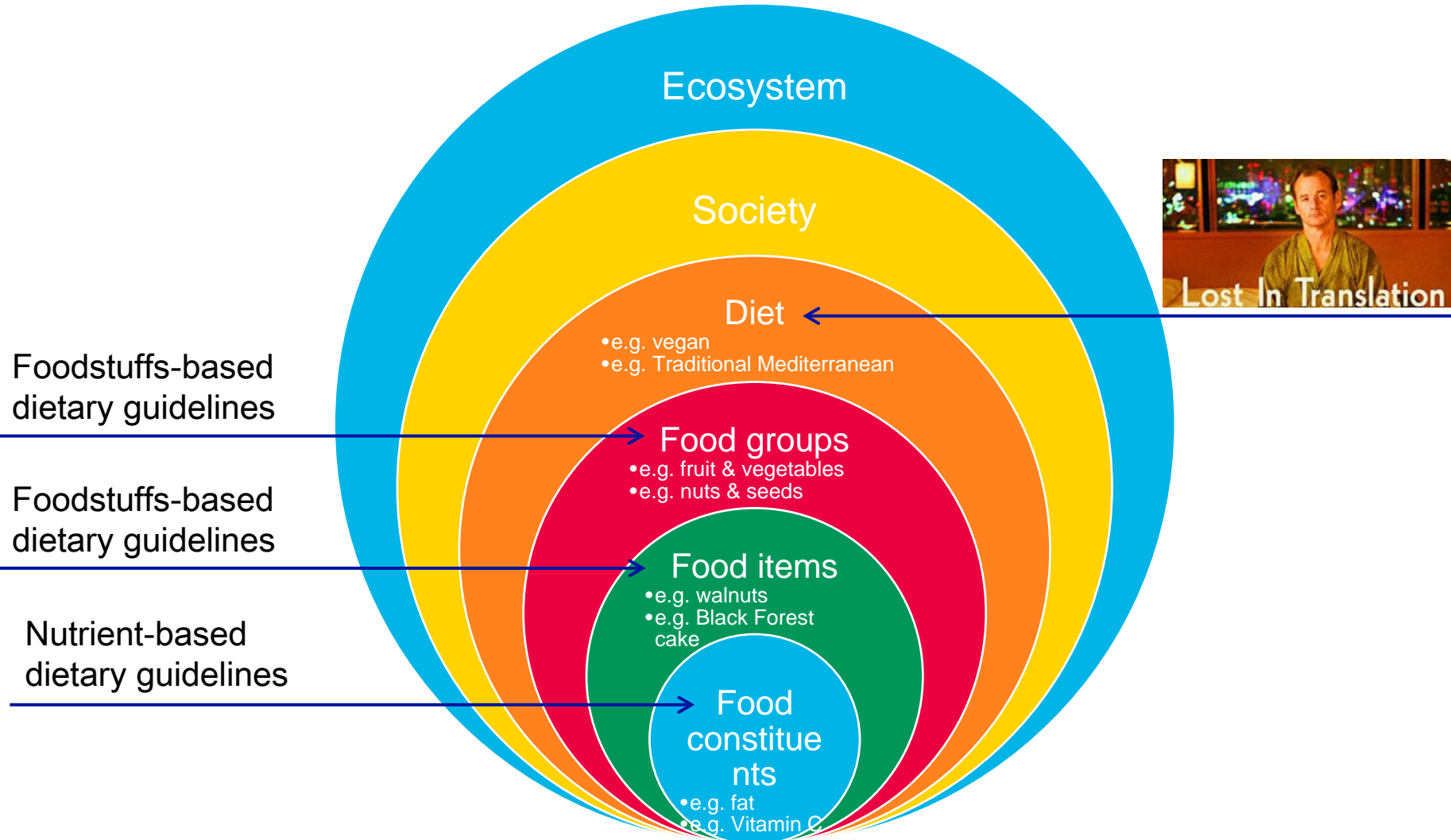
• Where do we need to go?



“The problem with nutrient-by-nutrient nutrition science is that it takes the nutrient out of the context of food, the food out of the context of diet and the diet out of the context of lifestyle.”

Marion Nestle, New York University, nutritionist

System levels of human nutrition



“Are you wondering what to prepare for dinner tonight? Data analyses reveal that certain food choices greatly benefit both your health and the environment. But what to do with this evidence remains a challenge to society”

Elke Stehfest, Nature, 2014

Diet-based studies

- no traditional, food-group-based “organic diet”
- but: organic consumers
- and: nutrition, food and lifestyle studies
- e.g. German National Nutrition Survey II
(NVS – Nationale Verzehrsstudie II, 2008)
13.074 men and women
18 - 80 years of age



German National Nutrition Survey II

In order to examine dietary patterns a healthy eating index (HEI-NVS) was developed. The consumption of 10 relevant food groups was assessed by comparing with the recommendations from the German Nutrition Society (DGE).

- Buyers of organic food showed more favourable food choices than non-buyers of organic food.
- A higher frequency of purchasing organic food was positively associated with a more favourable food choice.
- Furthermore, a positive relationship between healthy dietary patterns, nutrition knowledge and a healthy lifestyle was found.

Source: Hoffmann I & Spiller A (2010): Data Interpretation Based on the German National Nutrition Survey II (NVS II): An Integrative Analysis of Behavioural and Lifestyle-Related Factors for Organic Food Consumption. <http://orgprints.org/18055/>



German National Nutrition Survey II

organic food buyers compared to non-buyers:

- buyers are more often of normal weight (less often overweight or obese)
- non-smoker
- physically active
- persons with good knowledge of nutrition
- they more often classify their health status as very good or good
- buyers of organic food adhere to a healthier lifestyle

Source: Hoffmann I & Spiller A (2010): Data Interpretation Based on the German National Nutrition Survey II (NVS II): An Integrative Analysis of Behavioural and Lifestyle-Related Factors for Organic Food Consumption. <http://orgprints.org/18055/>



French National Nutrition Survey - Nutrinet-Santé Cohort Study

- Follow-up : >10 years, Recruitment: 5 years (2009 >)
- Volunteers aged ≥ 18 years
- Dedicated secure HTML interface for web-based questionnaires
- Biochemical samples and clinical examination in a subsample (> 20 000 subjects for blood and urine)
- To date: 260 000 subjects in the cohort



French National Nutrition Survey - Nutrinet-Santé Cohort Study

Regular consumption of organic food is associated with :

- Less report of restrictive diet
- Higher education level
- Generally comparable income
- No smoking
- Higher level of physical activity
- The more frequent organic food consumption , the higher the adherence to Nutritional Guidelines (cf. PNNS)

Source: E. Kesse-Guyot, S. Péneau, C. Méjean, F. Szabo, P. Galan, S. Hercberg, D. Lairon (2013) Profiles of organic food consumers in a large sample of French adults: results from the Nutrinet-Santé Cohort Study. PlosOne. Doi 10.1371/journal.pone.0076998)



Diet-based studies



**some
observations**

Regular consumers of organic products exhibit specific socio-demographic characteristics (higher education level), with a better dietary pattern (more plant food-based) fitting food-based and nutritional recommendations.

They are markedly less overweight and obese, and exhibit a better compliance with the sustainable diet concept, i.e. more plant foods, better nutrition, better safety, better lifestyle and health (here: adiposity), to minimize energy / water use and environmental impacts.

Spotlight on ultra-processed foods

Doritos Cool Ranch Flavored Tortilla Chips

- 01 Corn
- Vegetable Oil:**
- 02 Corn oil
- 03 Canola oil
- 04 and/or Sunflower Oil
- 05 Maltodextrin (made from corn)
- 06 Salt
- 07 Tomato powder
- 08 Cornstarch
- 09 Lactose
- 10 Whey
- 11 Skim milk
- 12 Corn syrup solids
- 13 Onion powder
- 14 Sugar
- 15 Garlic powder
- 16 Monosodium glutamate
- Cheddar Cheese:**
- 17 Milk
- 18 Cheese cultures
- 19 Salt
- 20 Enzymes
- 21 Dextrose
- 22 Malic acid
- 23 Buttermilk
- 24 Natural flavor
- 25 Artificial flavor
- 26 Sodium acetate
- Artificial color including:**
- 27 Red No. 40
- 28 Blue No. 1
- 29 Yellow No. 5
- 30 Sodium caseinate
- 31 Spices
- 32 Citric acid
- 33 Disodium inosinate
- 34 Disodium guanylate

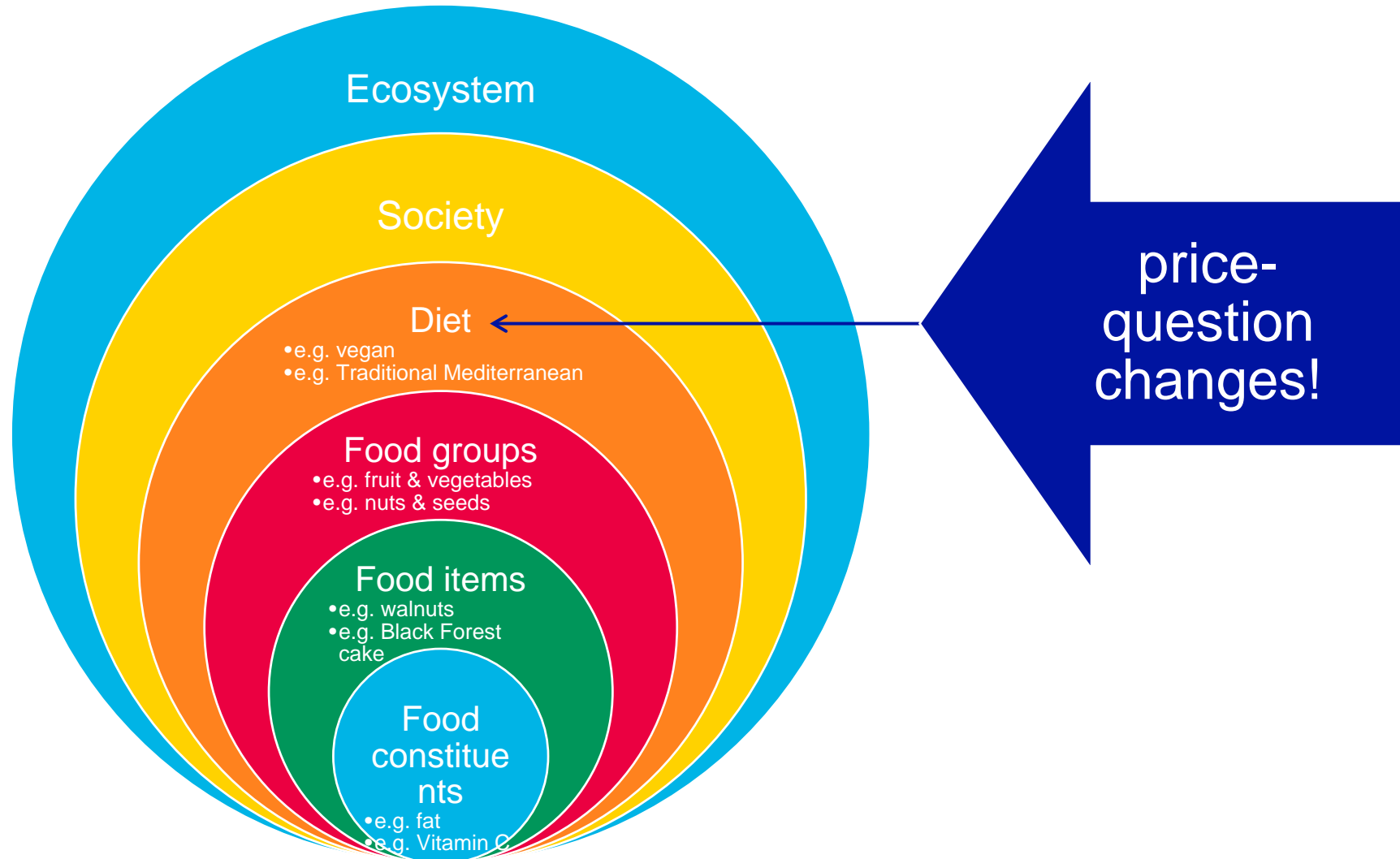


Quelle: Eshlimann Studio, Dwight Eshlimann

What are they?

Ultra-processed foods are industrial formulations made entirely or mostly from substances extracted from foods (oils, fats, sugar, starch, and proteins), derived from food constituents (hydrogenated fats and modified starch), or synthesised in laboratories from food substrates or other organic sources (flavour enhancers, colours, and several food additives used to make the product hyper-palatable). Manufacturing techniques include extrusion, moulding, and pre-processing by means of frying.

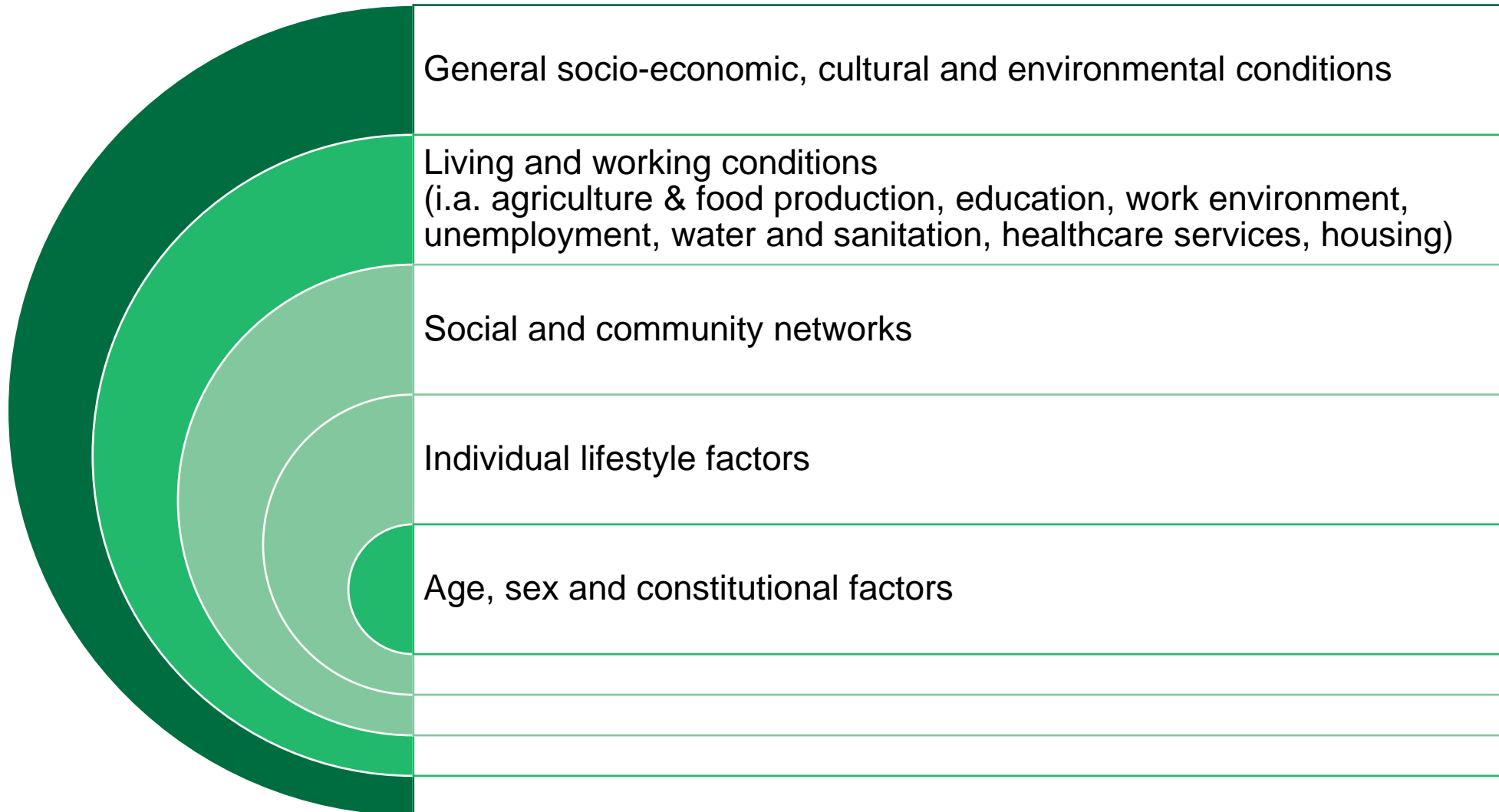
Diet based studies



Diets in settings

- A case study in Denmark shows that „green“ caterers offer more healthier food than do other caterers (Mikkelsen et al., 2006)
- Results indicate that organic food intervention strategies can be supportive for strategies to increase the healthiness of school eating patterns (Chen et al., 2010)
- An exploratory survey of 38 foodservice operators in Germany suggests that buying and using organic foodstuffs seems to be associated with healthier food fare and better knowledge of foods (Strassner & Roehl, 2017 in press)

From diet-based studies to health



Source: Dahlgren &
Whitehead (1991)
Determinants of Health
Model

To Public Health Nutrition (PHN) studies



- **Positive impact on fruit & vegetable consumption of primary school pupils.** *Pre-post study of flagship schools*
- **Increased school meal take up for paid & free school meals.** *Longitudinal study.*
- **Positive trends in school performance, pupil attainment and behaviour.** *Analysis of Ofsted reports.*
- **Extensive reforms to food education in schools and place of catering in schools.** *Cooks & caterer survey.*
- **Impacts on local procurement & economy.** *SROI study (GBP1:GBP4,41)*



Source: Jones M et al. (2016) Capturing the value of sustainable food procurement through Social Return on Investment analysis. Lessons from the Soil Association's Food for Life programme. Presented at the 12th IFSA Symposium, UK, 12th-15th July 2016

Diets link Sustainability and Health

New Healthy Diet Concept (WHO)

- **Food systems**, including all components of production, processing and distribution **should be sustainable, resilient and efficient in providing more diverse foods** in an equitable manner, with due attention to **assessing environment and health impacts**.

New Sustainable Diet Concept (FAO)

- **Sustainable diets** are those diets with low **environmental** impacts which contribute to food and nutrition security and to **healthy** life for **present and future generations**. Sustainable diets are protective and respectful of biodiversity and **ecosystems**, culturally acceptable, accessible, economically **fair** and affordable; nutritionally adequate, safe and healthy; while optimizing **natural and human resources**.

Diets link Sustainability and Health

Principle of health

OA should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible

Principle of fairness

OA should build on relationships that ensure fairness with regard to the common environment and life opportunities

Sustainable diets are those diets with low **environmental** impacts which contribute to food and nutrition security and to **healthy** life for **present and future generations**. Sustainable diets are protective and respectful of biodiversity and **ecosystems**, culturally acceptable, accessible, economically **fair** and affordable; nutritionally adequate, safe and healthy; while optimizing **natural and human resources (FAO)**

Principle of ecology

OA should be based on living ecological systems and cycles, work with them, emulate them and help sustain them

Principle of care

OA should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment



FH MÜNSTER
University of Applied Sciences

Thank you!

With thanks to OFSP-colleagues: Susanne Bügel, David Gould, Jostein Hertwig, Johannes Kahl, Denis Lairon, Flavio Paoletti, Ewa Rembialkowska

Dr. Carola Strassner, MBA

Professor Sustainable Food Systems & Nutrition Ecology
Correns Str. 25 D-48149 Muenster strassner@fh-muenster.de

Managing Director a'verdis Sustainable Foodservice Solutions
Mendel Str. 11 D-48149 Muenster carola.strassner@a-verdis.com



ORGANIC FOOD SYSTEM PROGRAMME

A CORE INITIATIVE OF



**Sustainable
Food Systems
PROGRAMME**