Organic Food Systems: Do they produce healthy diets?

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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?
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1. What seems to be the (health / diet) problem?
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)
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)
Heathy and Sustainable Diets for European Countries.
1. What seems to be the (health / diet) problem?

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3. Where do we need to go?
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)

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.

A much lower contamination (better safety):
- pesticides residues
- cadmium
- lower antibiotics resistances
- nitrates
- comparable/lower mycotoxins, comparable micro-organisms
Some foodstuff studies

A high / better nutritional content:
- dry matter, magnesium, (iron, zinc), anti-oxidants, vitamin C,
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→ Relevance?
Some foodstuff studies

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- cadmium
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- nitrates
- comparable/lower mycotoxins, comparable micro-organisms

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

Source/Graph: FiBL (January 2015)
Processing technologies

Source: Verfahren zur Haltbarkeitsverlängerung:
> HPP (High Pressure Processing)
Foto: Hiperbaric HPP
Why is processing important?
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?

• 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

- **Ecosystem**
- **Society**
- **Diet**
  - e.g. vegan
  - e.g. Traditional Mediterranean

**Food groups**
- e.g. fruit & vegetables
- e.g. nuts & seeds

**Food items**
- e.g. walnuts
- e.g. Black Forest cake

**Food constituents**
- e.g. fat
- e.g. Vitamin C

Foodstuffs-based dietary guidelines

Nutrient-based dietary guidelines
“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”

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
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.

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

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)

Diet-based studies

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

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

Ecosystem

Society

Diet
- e.g. vegan
- e.g. Traditional Mediterranean

Food groups
- e.g. fruit & vegetables
- e.g. nuts & seeds

Food items
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price-question changes!
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

General socio-economic, cultural and environmental conditions

Living and working conditions (i.a. agriculture & food production, education, work environment, unemployment, water and sanitation, healthcare services, housing)

Social and community networks

Individual lifestyle factors

Age, sex and constitutional factors

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)*

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**
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**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.
Thank you!

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