SUSTAINABLE FOOD SYSTEMS

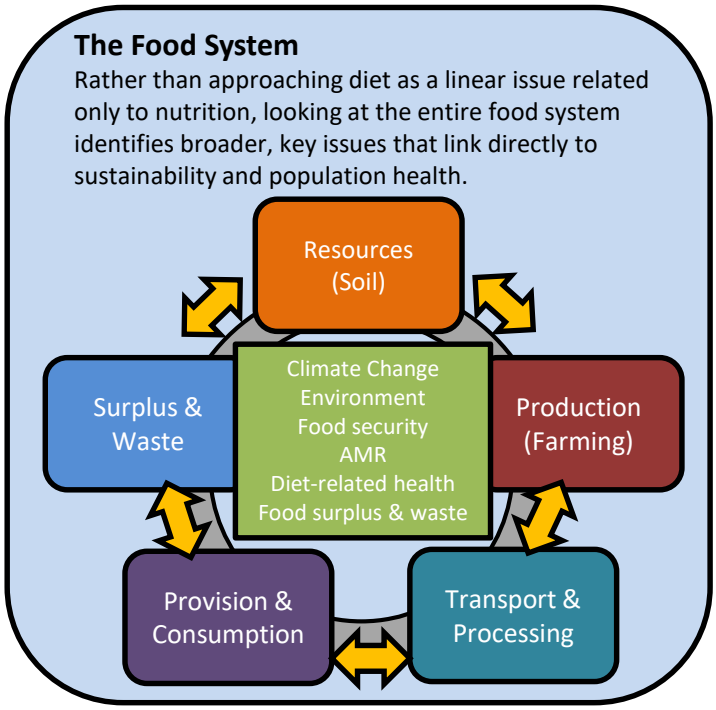
Our current food system poses a 'serious threat to human health and well-being'. [1]

Our current food system contributes to pollution, a reduction in natural resources and to climate change. At the same time, the diet supplied by this food system is the main behavioural driver behind mortality in the UK, followed closely only by tobacco use[2].

The United Nations Food and Agriculture Organisation (FAO) defines Sustainable Diet as 'diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations.' They are also protective of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy.[29]

Public Health Practice

- **Public health should adopt a whole food systems approach and ecological perspective in its view on the importance of diet and health-related outcomes.**
- **In addition to continued focus on reducing prevalence of nutrition-related non-communicable diseases (NR-NCDs), national and local efforts should place additional focus on the need for a population diet and food system with a smaller environmental footprint (e.g., greenhouse gas emissions, water use, land use, pollution and soil management).**
- **Priority should be on advocacy and development of national and local policy, research, programmes and interventions with potential for co-benefit to health and the environment (e.g., promotion of reduced meat consumption, 'less and better'[30] approach, updated procurement and public service catering guidelines to support local, low-impact food production, etc.).**



Climate Change

- Agriculture globally contributes 26% to anthropogenic greenhouse gas emissions (GHGE).[3]
- Livestock contribute to nearly two thirds of agricultural GHG emissions and 78% of agricultural methane emissions[4].
- All-in, 14% of GHGE are from livestock, which is equivalent to entire transportation sector[5].
- By 2050 livestock sector will use 80% of entire CO2 budget alone, if current trends continue[32].
- Of GHGE from agriculture, the 'farm stage' is responsible for 61% (81% including deforestation); combined GHGE from packing, transport and retail contribute only 1 – 9%.[3]

Environment

- Together, agriculture occupies approximately 40% of the Earth's arable surface[34]; with a majority of this (83%) used to produce animal products (meat, dairy, eggs, aquaculture)[3].
- This land use is destructive to species & their habitats; by itself, the UK food supply is directly linked to 33 species extinctions at home and abroad[35].
- Agriculture uses approximately 70% of all freshwater, with livestock using almost one third of this total amount[3,31].
- More than half of nitrogen fertilizer used on crops is lost into the environment [6], with damaging effects on water quality, air quality, greenhouse balance, ecosystems, biodiversity and soil quality[7].
- Ammonia emissions from livestock farming is key contributor to small particulate matter air-pollution in the UK[9].
- Damage from agriculture is largely due to the 'farm stage', accounting for 79% of the acidification and 95% of the eutrophication from the agriculture sector[3].

Resources

Food Climate Resource Network (FCRN), Oxford University - conducts, synthesises, and communicates research at the intersection of food, climate, and broader sustainability issues.

- FCRN.ORG.UK – main site
- FOODSOURCE.ORG.UK – information resources, including series of chapters on sustainable diets

Sustainable Diets, Pamela Mason & Tim Lang (2017), Routledge, Oxfordshire UK. (Book)

Sustainable Diets for Healthy People and a Healthy Planet, United Nations Standing Committee on Nutrition (UNSCN), August 2017. (Policy discussion paper)

The Future of Food and Farming: Challenges and choices for global sustainability – Foresight, 2011 (The Government Office for Science, London (Report)

Reviewing Interventions for Healthy and Sustainable Diets, May 2015, Rob Bailey and David Ross Harper. Chatham House with Energy, Environment and Resources Department, and the Centre on Global Health Security (Research report)

Plates, pyramids and planets : Developments in national healthy and sustainable dietary guidelines: a state of play assessment (2016) Carlos Gonzalez Fischer & Tara Garnett , Published by the Food and Agriculture Organization (FAO) of the United Nations and The Food Climate Research Network (FCRN) at The University of Oxford (Report)

The principles of healthy and sustainable eating patterns (UK guidelines) www.foodsecurity.ac.uk/assets/pdfs/healthy-sustainable-eating-patterns-report.pdf

Diet-Related Health

- Cohort studies link diets high in animal products (especially red and processed meat) to increased risk of type 2 diabetes, certain forms of cancer, weight gain, death from CVD and overall mortality risk [10,11,12,13]
- There are co-benefits to health and environment from dietary patterns that stress lower amounts of meat & animal products.[14,15,16,33]
- The British Dietetic Association (BDA) recommends an emphasis on reduction of meat (red and processed meat in particular), and 'replace with appropriate plant-based proteins'.[10]

Food Security

- Food insecurity is a significant issue in the UK; in 2016-17, the largest food bank delivered 1.2 m food parcels, the ninth consecutive year of increased need[17].
- Intensive farming methods create risk to food security of future generations:
    - Pesticide use linked to decrease in pollinator population and risk of lowered supply of many varieties of fruit and veg[18]
    - Modern agriculture depends on phosphorous-based fertilizer, which is a non-renewable resource; global reserves may be depleted in 50-100 years.[8]
    - Increased atmospheric CO2 levels shown to reduce nutritional content (protein, iron, zinc) content in rice, wheat and soybean crops.[19]

Anti-microbial Resistance (AMR)

- Approximately 700K excess deaths caused from AMR globally; this is estimated to grow to 10 million by 2050.[20]
- In UK 40% of all antimicrobial use is for livestock, with 90% of these used in pigs and chickens.[21]
- Defra 2010-11 survey found 85% of non-organic dairy farms in the UK use routine antibiotic therapy[22] ; modern cephalosporins used by about 16% of farmers.[23]
- A 2015 government review concluded that antibiotic use in livestock increases development of AMR in bacteria affecting humans[20].

Food surplus & waste

- In the UK 7 million tons of food are wasted annually, costing the average UK household £470 per year[24].
- If food waste were a country, it would have the third highest GHGE, after the US and China. [25]
- Waste in the livestock sector is responsible for 12 to 15% of all sector-related emissions[3].
- For every 100 calories fed to animals, only 7 to 30 calories is available for human consumption.[26,27,28]
- Most animal-based products have at least a 2:1 feed to protein conversion ratio[3].

'The implementation of dietary solutions to the tightly linked diet-environment-health trilemma is a global challenge, and opportunity, of great environmental and public health importance.'[16]

- Tilman & Clark, Nature, 2014

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Professional Development Questions

1. Which segment of the food system contributes the highest percentage of greenhouse gas emissions (GHGE)?
   A. Transportation – including cargo shipment, air freight and lorry transport
   B. The 'farm stage' - everything that takes place on the farm.
   C. Processing and packing
   D. Retail and catering provision
   E. All segments of the food system contribute about the same amount to the overall GHGE in the agriculture sector

2. Which two of the following statements are true?
   A. Farming currently relies on phosphorous fertilizer, which is a renewable resource and will be available indefinitely.
   B. For every 100 calories fed to animals used to produce food, about 80 – 90 calories are available for human consumption.
   C. For every 100 grams of protein fed to animals used to produce food, no more than 50 grams of protein are available for human consumption.
   D. Ammonia emissions from livestock farming are a key contributor to small particulate matter air-pollution in the UK.
   E. In the UK, approximately 8% of antibiotics are used for animals in the livestock sector.

FPH General CPD Questions

1. What did I learn from this activity or event?

2. How am I going to apply this learning in my work?

3. What am I going to do in future to further develop this learning and/or meet any gaps in my knowledge, skills or understanding?