



Moving towards *more sustainable food systems*

1. Global food security and nutritional status

The world faces significant nutritional challenges of widespread hunger, undernutrition, overweight and obesity.

In many countries, particularly those of low and middle income, undernutrition co-exists along with overweight and obesity or diet-related non-communicable diseases, known as the double burden of malnutrition.¹

In 2019, about two billion people did not have regular access to safe, nutritious, and enough food; of whom 690 million experienced hunger, mostly in Asia (381 million) and Africa (250 million).² Among children under five, 21.3% (144 million) are stunted and 6.9% (47 million) are wasted as of 2019. At the same time, overweight in children younger than five years has increased from 4.9% (30.3 million) in 2000, to 5.6% (38.3 million) in 2019.³ At least 340 million children and adolescents aged 5 to 19 years and 1.9 billion adults were overweight or obese in 2016.⁴ Globally, 2.4 million deaths in females and 2.3 million deaths in males were attributed to high BMI in 2017.⁵ In addition, about two billion people globally are affected by micronutrient deficiencies.

2. Shifts in dietary intake over time

The global increase in the prevalence of overweight and obesity and the double burden of malnutrition faced by many low- and middle-income countries are the result of dietary changes together with increasing sedentary lifestyles. In low- and middle-income countries, modernisation, urbanisation, economic development and increased wealth have resulted in a nutrition transition, reflected by diets shifting from traditional, predominantly plant-based diets towards Western-style diets high in animal-source foods and refined carbohydrates.⁷ Also, highly processed easy-to-prepare and ready-to-eat foods, which are usually high in fat, sugar and/or salt, are widely available because of modernisation and the globalisation of food systems.⁸ Compared to unprocessed foods, ultra-processed foods are more energy-dense and nutrient-poor,⁹ and often more affordable.^{9,10} Consumption of ultra-processed foods is associated with

various adverse health outcomes.¹¹ National household availability of ultra-processed foods was shown to be associated with the national prevalence of obesity in 19 European countries.¹²

Unhealthy diets contribute significantly to the global burden of disease. In 2019, dietary risks contributed to 3.48 million global deaths in females and 4.47 million deaths in males.¹³ High intakes of sodium, and low intakes of whole grains, fruits, nuts and seeds or vegetables are the top dietary risk factors for deaths globally.¹⁴

3. Impact of food production and the food industry on the environment

The global food system needs to supply enough food for the growing world population, but at the same time it needs to enhance food security, prevent all forms of malnutrition, be economically viable, and minimise environmental degradation.¹⁵

The food system includes all elements and activities that relate to production, processing, distribution, preparation, and consumption of food.¹⁶ The cost of food is affected by all the elements of a food system.² Ericksen¹⁷ proposed the first framework for food systems, which is broadly outlined below:

- The interactions between and within biogeophysical and human environments, which determine a set of activities
- The activities themselves:
 - (i) Producing food
 - (ii) Processing and packaging of food
 - (iii) Distributing and retailing food (activities i, ii and iii are all part of the food supply chain)
 - (iv) Consuming food
- Outcomes of the activities, contributing to the following:
 - (i) Food security in terms of food availability (type, amount, and quality), food access (affordability, allocation, and preference), and food utilisation (nutritional value, social value, and food safety)
 - (ii) Environmental security (e.g. climate change, water availability, and water quality)

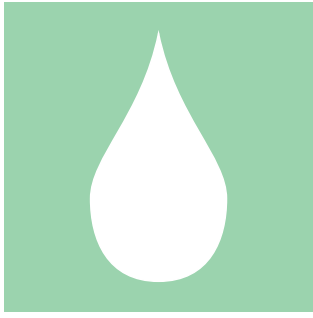
- (iii) Social welfare (socio-economic goals: income, employment, and health)

- Other determinants of food security (stemming in part from the interactions in the first bullet).¹⁷

Food production is resource intensive and has a negative impact on the environment and ecosystems (including biodiversity, soils, waterways, and climate change). Half of the world's habitable land and 70% of global freshwater withdrawals are used for agriculture. Agriculture accounts for over a quarter of global greenhouse gas (GHG) emissions and over three-quarters of global ocean and freshwater eutrophication (the pollution of waterways with nutrient-rich pollutants).¹⁸ The environmental impact of food production is among the lowest for wholesome plant-based foods (e.g. whole-grain cereals, vegetables, and fruit), and the highest for meat (unprocessed and processed).¹⁹ Excluding animal-source foods from the diet can significantly reduce agricultural land-use, GHG emissions, acidification, eutrophication and freshwater withdrawals.²⁰ Dietary shifts to more plant-based diets will have environmental benefits, but may, however, result in higher food loss and waste, as vegetables and fruits are highly perishable and therefore prone to spoilage.²¹

Some level of food loss (from the post-harvest stage up to, but excluding, the retail phase) and food waste (at the retail and consumer phase) is unavoidable. Reducing or minimising food loss and waste will lead to more efficient use of natural resources and have environmental benefits.²¹ Efforts to reduce food loss and waste, however, have financial implications, for example, the cost of improved storage facilities, packaging material and transport.²¹ Packaging can reduce food loss by preventing foods getting damaged or spoiled, but it contributes to environmental pollution.²²

Furthermore, food processing is a water-intensive industry, particularly with regard to dairy, meat and poultry, and fruit and vegetable processing. Transporting food over long distances also increases GHG emissions and depletion of non-renewable resources.²²



4. Sustainable healthy diets

Variety, adequacy, moderation, and overall balance are key components of a healthy diet.² Sustainable diets should also have low environmental impact, be accessible, affordable, safe, and fair, and be culturally acceptable.²³

Friel *et al.*²⁴ proposed three overarching guidelines for sustainable healthy diets, namely:

1. Food consumed above a person's energy requirement is an avoidable environmental burden.
2. Consuming less discretionary foods, which are energy-dense, highly processed and packaged, reduces both the risk of dietary imbalances and the use of environmental resources.
3. A diet with less animal- and more plant-sourced foods has both health and ecological benefits.

In 2019, the EAT-Lancet Commission report was published, and the authors argued that a predominantly plant-based diet containing low amounts of animal-source foods are beneficial for both improved health and the environment.¹⁶ Globally, fruits and vegetables account for the biggest share of the cost (31.2%) of the EAT-Lancet diet, followed by legumes and nuts (18.7%), dairy (13.2%), and meat, eggs and fish (15.2%).²⁵ This diet will, however, be unaffordable to most of the population in low- and middle-income countries.²⁵

Reducing the intake of red meat and increasing the intake of healthy plant foods will improve environmental sustainability¹⁹ and have health and economic benefits.²⁶ Health benefits associated with plant-based diets include lower blood cholesterol concentrations,²⁷ lower incidence of Type 2 diabetes,²⁸ lower risk of cardiovascular morbidity and mortality²⁹ and all-cause mortality.³⁰ Healthy plant-based diets are higher in fruits, vegetables, whole grains, and plant protein, and lower in refined carbohydrates and animal foods.³¹

In 2019, the FAO and WHO²³ published a comprehensive list of guiding principles for sustainable healthy diets. These guidelines consider health aspects, environmental

impact, and sociocultural aspects. To enable shifts to sustainable healthy diets, the food system needs to supply adequate amounts of healthy foods. Fruits and vegetables, for example, are an integral part of sustainable healthy diets, and a daily intake of at least 400 g is recommended to reduce the risk for developing non-communicable diseases.³² For a sizeable proportion of the population this is not achievable, as in many regions globally, availability of vegetables and fruit for human consumption is below the recommended 400 g per day. In Africa, for example, availability of fruit and vegetables was 191 g/capita/day in 2017.²

Context-specific sustainable healthy diets

Globally, food systems are diverse and there are big discrepancies in food security and nutrition status across and within countries.² As a result, health and environmental impacts due to dietary shifts are context-specific and will differ between regions. Also, it is not always possible to satisfy all four domains of sustainable nutrition, namely nutrition, economics, society, and the environment, and trade-offs will depend on the local context.³³

For example:

In high-income countries, substituting animal-source foods and shifting towards a more plant-based diet will simultaneously reduce health risks and environmental impact. In contrast, in low-income countries that rely heavily on starchy staples, food security strategies to diversify diets will reduce health risks, but at the same time increase environmental impact.³⁴

In lower-income countries with a high prevalence of nutrient deficiencies and undernutrition, an increase in meat consumption may be needed to supply adequate amounts of essential nutrients. Under these circumstances the priority would be to meet dietary requirements and nutrition targets, with high environmental impact as a trade-off.²

In many countries, dairy intake is lower than the recommendations, and increasing dairy intake to meet the recommendation would result in substantial increases in the environmental impact.³⁵ Drewnowski³⁶ argues that the environmental impact of dairy in the diet needs to be weighed

against the high nutrient density of milk and milk products. A study in the United Kingdom showed that usual diets with the highest dairy content had higher potential for eutrophication (nutrient pollution in water), but these diets also had higher nutrient content and better overall diet quality and was associated with lower blood pressure compared to usual diets with lower dairy content.³

In countries where the food system not only provides food but also drives the rural economy, the negative impact that transforming food systems may have on the income and livelihoods of smallholder farmers needs to be considered and mitigated.²

It therefore follows that sustainable healthy diets should not be based solely on environmental impact.³⁶ The four interconnected and context-specific domains of sustainable food systems (nutrition, economics, environment, and society) and the trade-offs between these domains need to be considered when transforming food systems.³⁶ Guidelines for a sustainable healthy diet and transformation of food systems therefore need to be context-specific. This will require double-duty actions, aimed at simultaneously addressing all forms of malnutrition.³⁸ This includes, among others, agricultural and food system policies to support healthy diets and policies to improve food environments that consider all forms of malnutrition.³⁸ Developing dietary guidance and other policies that promote sustainable nutrition requires continuous interdisciplinary collaboration.³⁹



Evidence-based review with full references:

https://www.rediscoverdairy.co.za/evidencebased_reviews/sustainable-nutrition/sustainable-food-system

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