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Healthy diet: A definition for the United Nations Food Systems Summit 2021

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Definition:

A healthy diet is one that is human health promoting and disease preventing, and safeguarding of planetary health by:

- Providing adequacy without excess, of nutrients from *foods* that are nutritious and healthy
- Avoiding the introduction of health-harming substances, through all stages of the value chain.

Healthy diets must be affordable, culturally acceptable. They must progressively change towards originating from sustainable production and processing systems that do not adversely affect local and regional ecologies.

Rationale:

The aim of this document is to propose a simple definition of a healthy diet that permits the alignment of terminology for the Food Systems Summit, and highlights several critical challenges related to the three components of a healthy diet highlighted above. The evidence and potential solutions to achieving healthy diets, including all considerations noted, is the subject of the Action Track and Science Group papers and is not addressed here.

What constitutes a healthy diet has been the source of debate in the nutrition community for decades. Innumerable definitions exist, with many similarities and several contradictions over time.[1] The contradictions arise at least in part from diversity in the underlying health issues that the diets intended to address. Some diets are based on observed dietary patterns in populations where certain diseases, particularly non-communicable diseases (NCDs) appear less prevalent. Studies have then tested these dietary patterns in population sub-groups for the potential to promote health or prevent disease in other contexts (e.g., Mediterranean diet[2]). Although the topic of much research,[1] such diets do not consider all potential health outcomes across all contexts. Nor do they account for local availability and affordability of food types or the cultural traditions and acceptable of foods. Another approach has been to model optimal dietary patterns for a specific food group, based on consumption and mortality data.[3] But several challenges remain, including lack of dietary data from many populations and sub-groups.

Food safety is rarely articulated explicitly as part of a healthy diet, yet it is implicitly assumed. Without ensuring safety, foods cannot nourish and instead will cause illness. The World Health Organization (WHO) has identified a series of guiding principles of healthy diets that seek to address all forms of malnutrition and related health issues, and permit contextualization to individual characteristics, cultural contexts, local foods and dietary customs rather than suggesting a prescriptive approach.[4] Building on such evidence, *Food based dietary guidelines* (FBDG) are intended to provide the basis for national food and agricultural policies and have been developed by over 100 countries.[5] The content of FBDG can be varied but generally include a set of recommendations for foods, food groups, and dietary patterns that minimize risk of deficiencies, promote health and prevent disease in specific contexts.

The idea of extending the definition of healthy diets to include considerations of environmental or planetary health in addition to human health is not new. Principles to guide a "sustainable healthy diet", based primarily on eating local and minimizing processed food were published as early as 1986[6]. Form the start, these principles have received considerable criticism from the nutrition, agriculture, and food sectors.[7] Aligned with the approach for healthy diets, FAO and WHO have set out a series of guiding principles for the achievement of contextually appropriate sustainable, affordable, healthy diets.[8,9] The recent EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems took a prescriptive approach, providing specific recommendations for food groups and the quantities of food in each group that promote human health and can be produced within planetary boundary considerations.[10] Like the earlier efforts, the EAT-Lancet Commission diet has received criticism on several fronts, including lack of consideration for food affordability.[11] The Commission however, calls for research to adapt the diet to local contexts. Future studies may provide evidence of this potential.

There will always be tensions between the indicative or guiding principles approach to defining a healthy diet, which leaves much room for interpretation, and the prescriptive approach which tends to underestimate the complexities of extrapolation for age, sex, life-stage, culture, food availability, affordability, among other considerations. Despite these challenges, guidance on what constitutes a healthy diet – one that promotes human health, prevents disease, and safeguards the planet - remains critically important.

1. Foods that are nutritious and healthy

Definition and rationale:

A nutritious and healthy food is "*one that provides beneficial nutrients (e.g. vitamins, minerals, essential amino acids, essential fatty acids, dietary fibre) and minimizes potentially harmful elements (e.g. anti-nutrients, quantities of sodium, saturated fats, sugars)*" (GAIN,[12] drawing on definitions published by Drewnowski[13] and Katz et al[14]). While conceptually simple, there is no easy universally accepted approach to classifying foods in this regard. Similarly, some context specificity is required in the categorization of individual foods as nutritious and healthy. The same food, for example whole fat milk may provide much needed nutrients to one population group (e.g., underweight 3-year-old children), but be less "healthy" for another due to its high calorie and fat content (e.g., obese adults).

"Nutrient profiling" or the rating of foods based on their nutrient density (i.e., nutrient content per 100 g or per 100 kcal or per serving) has evolved substantially in recent years as an approach to classifying individual foods.[13,15] Such scores now provide the basis for several regulatory and health promotion-aimed efforts, including front of pack labelling and health claims.[16] Recent efforts have also proposed more complete profiling approaches that in addition to nutrient density, take into consideration the food groups of ingredients (e.g., fruit or vegetable content), and develops further the content of ingredients (e.g., types of fat) that should be limited.[15] To date, nutrient-profiling has been used predominantly for packaged foods in many high-income and several middle-income countries. Important limitations remain for extending its utility to unpackaged foods and in contexts where a large portion of food is not commercially produced.

Challenges to establish "adequacy without excess of nutrients" from food:

Imperfect characterization of population nutrient requirements to avoid deficiency and promote health: Reference values for nutrient intakes of humans have been established focussing on the avoidance of deficiency and excess. Nutrient requirements vary by age, sex, and life stage (e.g., pregnancy), and among individuals such that no single value, even within age/ sex groups can be defined. *Estimated average requirements* are therefore developed and converted *into recommended daily nutrient intake* levels that will, at the population level ensure that the requirements of 95% of the population are met.[17] *Upper tolerable limits* are set at the minimum level above which potential deleterious effects may be observed. At this time, there is no single set of recommended nutrient intakes that has been globally accepted and estimates are made using diverse methodological approaches. Experts are now calling for such efforts to be harmonized with a transparent and consistent approach.[18]

In addition to the focus on nutrient deficiency avoidance, much research has focused on the potential health effects – both positive and negative - of consuming specific foods, food groups or dietary patterns.[1] Evidence for the health promoting components of the diet (e.g., fruits and vegetables; nuts and seeds) and for the health harming effects of excess quantities of some nutrients or dietary components, for example, trans fat, salt, sugar, forms the basis of the guidelines proposed by FAO,[8,19] WHO,[4] and the HLPE.[9] While the basic tenants of these guidelines are unlikely to change, evidence for all dietary components continues to evolve, and to some extent is constrained by the imperfect estimates of nutrient requirements and upper tolerable limits discussed above. Some have also called for greater transparency and better management of commercial interests in research of the associations between food products and health outcomes.[20] Emerging evidence suggests that eventually, dietary recommendations may be personalized to optimize human health outcomes based on individual characteristics,[21,22] but science is still far from achieving this goal.

Imperfect knowledge of the nutrient and "anti-nutrient" content of food: Our ability to fully characterize dietary patterns of populations, and individuals (where data permit) is highly dependent on the quality of the food composition tables, i.e., databases containing the amounts of nutrients in foods per specific portion sizes. Unfortunately, there are many issues with food composition tables including lack of data, or out of date information for many countries and world regions, and particularly for less common foods (e.g., edible insects), substances that influence nutrient absorption (e.g., tannins, phytate), lack of and/or out-of-date information on nutrients added (or lost) as a result of processing, including food fortification, poor or unclear analytical approaches, lack of consideration for nutrient bioavailability, among others.[23] Fortunately, this issue is well recognized and substantial advances have been made through the efforts of the INFOODS project of FAO.[24]

Lack of consensus and standardized definitions related to food processing and health implications: A growing body of evidence suggests that highly processed foods are human health harming.[25] Recent studies have also highlighted the impact of such foods on the environment,[26] an issue that was even raised in the very early discussions on sustainable diets.[6,7] Recent studies have primarily used the NOVA classification of ultra-processed foods,[27,28] but as yet, there is no single accepted definition that clearly lays out the specific aspects of food processing that should be avoided.[29,30] The implications of highly processed foods, particularly those high with sugar, trans fat, salt, is not in debate, but consensus on how to classify such foods, define food processing categories, and the implications for industry by reaching consensus and operationalizing the definition is urgently needed.

2. Avoiding the introduction of health-harming substances

Definition and rationale:

Food safety refers to "*all those hazards, whether chronic or acute, that may make food injurious to the health of the consumer*".[31] Food safety issues can arise from food contamination with biological hazards, pathogens, or chemicals (natural or processed contaminants, residues of pesticides or veterinary medicine etc.) during production, processing, storage (including but not limited to the lack of adequate cold storage), transport and distribution of food, as well as in the household. Standards and controls are in place to protect consumers from unsafe foods.[9] In addition to the disease burden, foodborne disease in LMICs is also a concern because of a broad range of economic costs and its impacts on market access.[32]

Current knowledge suggests that biological hazards and antimicrobial resistance may present a higher burden of disease compared to chemical hazards, although there is still uncertainty due to difficulty in measuring and attributing long-term and chronic effects. Chronic effects due to chemicals (natural or processed contaminants, pesticide residues etc.) are more difficult to trace and to quantify their actual impact on disease burden. The study by the Foodborne Disease Burden Epidemiology Reference Group of the World Health Organization (FERG/WHO)[33] estimated that the global burden of foodborne diseases was comparable to that of HIV/AIDS, malaria and tuberculosis with low- and middle-income countries (LMICs) bearing 98% of this burden. The FERG/WHO report[33] quantified the burden of disease from aflatoxin, cassava cyanide and dioxins. Some work has also been done to estimate the burden of illness due to four foodborne metals (arsenic, cadmium, lead, methylmercury) which is estimated to be substantial.[34]

Despite the heavy burden of disease among LMICs, the systems and practices for monitoring foodborne hazards and risks, food safety system performance and related disease outcomes are predominantly utilised in high income countries (HICs). Whilst there are many promising approaches

to managing food safety in LMICs, few have demonstrated sustainable impact at scale. It is also important to distinguish between food safety and food quality. Food safety ensures that food is fit for human consumption and not injurious to human health and is most often under the competence of veterinary, health or agricultural inspectors while food quality is a market category which is usually the responsibility of food or market inspectors.[35]

Challenges assessing and ensuring the safety of foods:

Food safety has complex interactions with other societal concerns. Safety must be built into foods, and this puts responsibility for food safety all along the value chain, including producers, processors, transporters, retailers, and consumers. If food chain actors lack the requisite knowledge, resources, and skills, then safety cannot be assured. Some food safety perceptions and knowledge may be shared generationally and may not be scientifically grounded. In many LMICs, food is often purchased from traditional markets close to the point of production and undergoes limited transformation.[36] Several traditional ways of processing food can be highly effective at reducing risk, but foodborne illness is may still be linked to poor hygiene conditions, close contact with animals, and limited access to clean water from market through household. Informal market drivers and incentives for safe food are often weak, although adverse food safety events can leave the sellers vulnerable to reputational harm. As such, food safety has implications for livelihoods. Likewise, foodborne diseases can have important implications for women's resilience. Women predominate in traditional food processing and sales and are usually responsible for food preparation at home.

The preferred method for improving food safety and quality is preventive, and many but not all potential food hazards can be controlled along the food chain. The challenge is in engaging the food industry at all levels to understand their role in preventing food contamination through the application of good practices i.e. good agricultural practices (GAP), good manufacturing practices (GMP), good hygienic practices (GHP), and the Hazard Analysis Critical Control Point system (HACCP). The principles of HACCP have been formalised by the Codex Committee on Food Hygiene and provide a systematic structure that the food industry, both large and small, can use for the identification and control of foodborne hazards. Governments should recognize the application of a HACCP approach by the food industry as a fundamental tool for improving the safety of food[31] but the level of safety that these food safety systems are expected to deliver has seldom been defined in quantitative terms.

In addition to HACCP, the Codex Alimentarius Commission (CAC) sets standards to address safety and nutritional quality of foods for most segments of the food chain, with the objective of protecting consumer health and fair practices in trade. The CAC establishes standards for maximum levels of food additives, limits for contaminants and toxins, and residue limits for pesticides and veterinary drugs.

Some countries, especially LMIC, have not adopted modern food safety control systems even though there is a significant burden of food related illness.[36] Many countries lack effective public health surveillance systems, so the burden of foodborne disease and broader economic ramifications are not well understood. Food safety capacity may be concentrated either geographically, e.g. in the capital city, or for niche markets intended for export. Building on these analyses, the World Bank recommends that governments consider how to make "smart" food safety investments, such as investing in foundational knowledge, human resources and infrastructure, including those that address basic environmental health issues, such as access to clean water, improved sanitation and reduced environmental contamination in the soil, water and air.[36]

Food safety priorities for countries include addressing risks from farm to table, changing from reactive to proactive approaches to food safety, and adopting a risk analysis approach to ensure prioritized

decision making. Building food safety capacity will assist governments in economic development, by improving the health of their own citizens and opening countries to more food export markets and tourism.[36]

3. Progressively change towards sustainable production and processing systems

Definition and rationale:

Throughout history, the evolution of tools, techniques, and processes to increase agricultural production to meet food, fuel, clothing, and other needs has been inextricably linked to advancement of societies and the growth of economies.[37] With the industrial revolution and the green revolution food costs has been kept relatively low and productivity high. The environmental consequences of this progress however, are now well documented,[37] and much has been published on ways and opportunities for change.

The current food production system is unsustainable, as it both causes unacceptable environmental impacts and depletes non-renewable resources. It relies heavily on the consumption of non-renewable fossil fuels and mineral resources, depletion of groundwater reserves and excessive soil loss.[38] The FAO has defined sustainable development in agriculture, forestry and fisheries as conserving land, water, plant, and animal genetic resources; promoting environment conservation; and choosing approaches that are technically appropriate, economically viable and socially acceptable.[39]

Challenges toward achieving sustainable food production and processing:

The urgency of the climate agenda will require action despite imperfect evidence, but several challenges are particularly critical to address.

Defining the specifics of health promoting and disease preventing diets and how to achieve them in economically feasible and culturally appropriate ways for all population sub-groups (see several specific gaps in Section 1). Achieving sustainable food production and processing will require substantial departure from current dietary practices across regions of the world.[40] Many of those changes would similarly be health promoting, for example, reduction in meat consumption where currently very high.[10] The evidence to inform the nature of those changes, and how to achieve them in ways that ensure that the needs of vulnerable populations sub-groups are not compromised, are economically feasible, and culturally acceptable requires further investigation.

Important variation in the environmental impact of food production and processing among producers and production methods requires further study to guide recommendations and regulatory mechanisms. A recent review estimated that the environmental impact of food production and processing can vary up to 50-fold among producers of the same product depending upon the production system or region.[41] Additionally, most analytical literature, focusses on production, consumption or both without much consideration of the whole food system.[40,42] It is important to identify regional and local approaches that can inform such transitions. While work is being done to develop the technology infrastructure for improved decision making for sustainable production, the tools to manage transitions to more sustainable agriculture systems are reliant on significant data assessment. Several tools have been developed to help standardize the analysis of food production practices.[38,43,44] Further efforts are needed to ensure that the data for application of such tools is available at the right level for decision making.

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