**Sustainable Food Connect**
2026, Vol. 2, Cite as: doi:10.x/journal.x.x.x

SCIFINITI PUBLISHING

OPEN ACCESS

Perspective

# Rethinking "Enough": From Food Security to Nutrition-Driven Sustainable Food Systems

Moawiya A. Haddad*[1], Fajer Alaittan[2], Ali Qoqazeh*[1], Hadeel Alghwairy[3]

[1] Department of Nutrition and Food Processing, School of Agriculture, Al-Balqa' Applied University, Al-Salt, Jordan

[2] Department of Clinical Nutrition and Dietetics, Hashemite University, Zarqa, Jordan

[3] Performance Index Center, KAFA'A, Amman, Jordan

## Abstract

For decades, food policy has primarily focused on progress made in the alleviation of hunger by looking at the volume of food available, and the average caloric intake per person of a given population. However, having enough calories does not mean having enough vitamins and minerals (micronutrients). This also does not translate to having a healthy diet or the avoidance of diet-related non-communicable diseases (NCDs). Accordingly, this viewpoint argues the focus needs to shift from the concept of food security to the concept of nutrition security and in parallel the formulation of a nutritionally sustainable food system within the boundaries of the planet.

Combining the available literature on food and nutrition security theory, the health implications of food insecurity, the documentation of hidden hunger, the governance reforms and policy shifts of the food system, we propose adjusting the previously mentioned three pivot points to operationalize the following solution pathways: (1) adjust the metrics used to define and measure sufficient caloric intake to include measures of dietary quality and the presence of sufficient micronutrient intake; (2) strengthen the integration of immediate social protection measures with, or food security focused climate change and sustainability measures; (3) strengthen the governance mechanisms of participation by ensuring active, direct involvement of citizens in the decision-making processes concerning their food systems.

**Keywords:** food and nutrition security; malnutrition; sustainable food systems; hidden hunger; food policy

## 1. Introduction: When "Full Stomachs" Are Not Enough

For many decades, success against hunger has only been counted in terms of tons of grain and calories. Although this approach has propelled success in terms of food availability, it has obscured an important truth: individuals can achieve "food security" in terms of calories but still experience severe malnourishment. The

concepts for Food and Nutrition Security (FNS) arose out of this problem, recognizing that availability, access, utilization, and sustainability need to be simultaneously met [1]. Food insecurity is consistently associated with poorer health outcomes and higher health care use [2].

It has become evident from global data how limited the earlier perspective on malnutrition. Nearly one-third of the global population has suffered from various types of malnutrition, either resulting from undernutrition or stunting or from overweight and obesity, with micronutrient deficiencies spanning all income levels [3,4,5,6,7]. Almost two billion people are enduring chronic deficiencies in essential vitamins and minerals, most often with no apparent symptoms, known as “hidden hunger” [6, 7].

Caloric intake is only part of the solution to diet-related diseases, as evidenced by the numbers of people whose ill health is caused by food consumption [8, 9]. In the WHO's 2021 report, it states that NCDs are responsible for approximately 75% of all deaths globally, excluding the deaths caused by pandemics, and that over two-thirds of all premature deaths related to NCDs occurred in low- and middle-income countries [8, 9]. NCDs are closely linked to the global "double burden" of obesity, with more than one billion adults in the world classified as obese in 2022 [6, 10, 11].

Food insecurity and micronutrient deficiency may occur along with the existence of these two separate conditions when the local buying environment is often filled with inexpensive, energy-dense, ultra-processed products rather than minimally processed foods from a wide variety of sources [7,12]. At present, diet-related non-communicable diseases comprise the majority of the global burden of disease, and according to the WHO, NCDs are responsible for millions of deaths annually; thus, poor quality diet is not only a secondary factor but also the major cause of disability and death [8,9].

This occurs simultaneously as obesity and overweight rates increase steadily, and most quickly in middle-income countries undergoing rapid changes to urban environments [3].

Even where there is a surplus of available food, the estimated size of the U.S. adult population with obesity remains very high, according to CDC reporting, indicating that sufficient calories can coexist alongside increased potential risk of cardiometabolic disease [6,10, 13].

## 2. From Food Security to Nutrition Security

The U.S. policy discourse has begun to introduce “nutrition security” as a distinct policy objective: “the equitable and stable availability of sufficient food and beverages to support good health and prevent disease, rather than focusing solely on preventing hunger” [5, 9].

To our understanding, making this change means more than semantically renaming our goals. It means that we are turning our focus from success measured in calories to success measured by other factors, including diet quality, the adequacy of micronutrient needs, and cardiometabolic risks.

For LMICs undergoing such a quick nutritional transition, this bi-fold focus becomes, perhaps, even more pressing. The existence of hidden hunger, described in global synopses and within-country analyses, not only exists alongside but also increasingly intersects with rates of obesity and non-communicable diseases [4,5,6] . Strategies centered on maize yields or piecemeal commodity transfer for immediate humanitarian needs can literally cement nutritional patterns that are energy-rich but nutrient-poor [7].

Implication for Program Implementation: Existing programs that support food security can remain; however, the methods used for measuring the effectiveness of these programs will change, and how food is delivered will also change.

Social protection can change from counting calories delivered to measuring diet quality provided with the use of healthy procurement standards, conditioning eligibility to receive nutritious food baskets, and/or providing incentives for using unprocessed foods.

Health systems will now screen for food insecurity and will refer households to the appropriate food-based support pathways. For ease of comprehension, Table1 provides a more expansive list of the types of monitoring and authority channels needed to support this shift across multiple countries rather than one platform.

Examples of illustrative platforms are usual sources of continuous surveillance data and National Nutrition Intake Surveys (for example, internal measures for SISVAN). These data can be integrated into a National Nutrition Information System focused on population-level monitoring and accountability.

## 3. Nutrition Security, Sustainability, and “The Triple Imperative”

Sustainable food systems must simultaneously address three pressing demands: provision for human health, provision for social justice, and provision for environmental protection. As a study shows, "satisfying the growing demand for food products on our planet while not jeopardizing life-support functions on Earth means avoiding transitions to unhealthy and resource- and greenhouse gas-intensive types of food, reducing food waste, and making use of technology to reduce environmental impacts in agricultural production." Unfortunately, environmental and health achievements are too often seen as separate goals rather than integrating parts of a larger policy arena within the reform of the food system [3].

Indeed, from a nutritional security perspective, it is difficult to maintain this dichotomy. Nutritional patterns centered on refined starches, added sugars, ultra-processed products, and low-cost fats are hardly conducive to meeting nutrient adequacy, are shown to fuel hidden hunger and obesity simultaneously, and are also likely to possess large environmental implications. This contrasts with minimally processed and biologically diverse vegetable products, likely coupled with modest animal products where feasible, with nutritional intakes shown to possess favorable nutrient adequacy to relatively support environmental and biodiversity outcomes [3, 5].

The practical approaches that can be pursued to reconcile nutrient density with sustainability include agricultural diversification, particularly with the focus upon legumes, fruit, and vegetables; stewardship of our soil and water; climate-smart agronomy in line with micronutrient goals (including biofortification/fortification as needed); reducing post-harvest losses through the improvement of the storage/distribution chain; and recognizing that nutrient density may degrade throughout the food system, and not just at the farm level [1, 3]. Furthermore, there are government mechanisms to improve access to safe storage, affordable prices, and available sources of food by means of implementable nutrition-sensitive standards in public food procurement; incentive-based policies that support the purchasing of nutrient-dense, minimally processed foods; and regulatory/pricing/market mechanisms that protect consumers and provide options that lessen exposure to food environments containing unhealthy products [1,4,7].

## 4. Governance Lessons: From CONSEA to “Food is Health Policy”

Transforming food systems is not only a technical challenge; it is fundamentally about governance and power. Mozaffarian and colleagues describe how twentieth-century policies, designed to maximize cheap production of staple products, inadvertently helped create the landscape today of ultra-processed, energy-dense diets [4,7].

They call for an integrated, evidence-informed policy strategy that goes far beyond education and individual responsibility, using fiscal measures, regulatory tools, labeling, procurement, and urban planning to reshape food environments [4,7].

In the United States, the American Heart Association now explicitly frames "nutrition security" as a policy goal, recognizing that social and economic inequities in access to healthy food are the main drivers of cardiometabolic disease [9]. This reframing opens the door to aligning agricultural subsidies, food assistance programs, health-care incentives, and local food policies around diet quality and equity, not merely caloric sufficiency.

A further yet equally common illustration of the same concept can be found within Brazil, where CASTRO has recorded the development of a Participatory Food and Nutritional Security System (SISAN) along with the creation of the National Council of Food and Nutrition Security (CONSEA) as an opportunity for civil society and the government to jointly construct policies on three major areas (school feeding, social protection, and dietary practices) [10]. Many observers hold that the disbandment of CONSEA is a significant step backwards for "rights-based" governance within the sphere of food and nutrition [10]. There are, however, additional examples beyond CONSEA that illustrate that the implementation of "integration packages" (the combination of the front-of-package warning labelling and the marketing restriction provisions along with the school environment regulation) can promote a change in the way in which citizens purchase food and serve to demonstrate how Nutrition Security can be achieved through good governance over Food Environment Policy.[11] The effectiveness and credibility of citizen participation in the two forms, that is, the formal council-based approach and the citizen science approach, enhance their credibility and the effectiveness of citizen science by providing additional local evidence concerning the food environment. [10, 12, 13]

## 5. A Forward Agenda: From Metrics to Action

If we agree that "enough" needs to be redefined to include nutrition and sustainability, what does this imply for practice?

First, metrics must evolve. Household food security scales that focus solely on quantity, or national indicators that track only undernourishment, are no longer sufficient. Indicators of dietary quality, dietary diversity, micronutrient adequacy, and, where feasible, environmental footprints should be incorporated into routine monitoring systems [1,3,5].

Example of integrated national monitoring approaches, including national monitoring of food consumption and dietary intake, micronutrient intake, and routine dietary surveillance via a National Nutrition Information System (NNIS) that integrates routine monitoring of population-level Dietary Quality Indicators (DQI) and Nutritional Adequacy Indicators (NAI). Secondly, explicit integration of short-term safety nets and long-term approaches rooted in food is needed in policy packages. Evidence on the health consequences of food insecurity [2] and the importance of diverse, minimally processed diets to address hidden hunger [4,5] supports integration of social protection, public procurement (e.g., schools, hospitals), agricultural diversification, fortification where appropriate, and strong regulation of ultra-processed foods [7,9,11]. RUSF and RUTF are two examples of "nutrition-first" products in the context of an acute malnutrition crisis [14,15] .

By aligning the specification (process, product, and source) and procurement of these types of foods with sustainable sourcing and locally acceptable formulations, wherever feasible, the outcomes of these products can be maximized and may also help to build more resilient supply chains [7,9]. In addition, there is an emerging opportunity to link nutrient density and circular economy strategies through the valorization of nutrient-rich by-products into safe food ingredients, thus allowing for the diversification of sources for protein and micronutrients without the need for proportional land expansion. Such an opportunity needs to be governed carefully and with due diligence for food safety [3].

Third, where feasible, utilizing the "food is medicine" program model should be integrated into social protection and health systems. Moving from treating diet as secondary to lifestyle advice to creating a health system-directed pathway that supports disease prevention and management directly supports the way policy and practice discussions on nutrition security and food-based interventions are framed 9,10].

Finally, greater knowledge and evidence on food systems and sustainability should be developed and widely disseminated, and academic journals are well positioned to serve as platforms through which these topics and the related research can be effectively curated and shared.—i.e., evaluations of climate-sensitive policy related to nutrition, political economy analysis of food environments, and case studies of rights-based governance innovations, e.g., CONSEA [3,10].

**Table 1. Operationalizing nutrition security: indicators, examples, and policy levers**

| Domain | What to monitor / implement | Why it matters | Policy levers / delivery platforms |
|---|---|---|---|
| Diet-related burden & "double burden" | Track NCD mortality, premature deaths, and obesity trends alongside undernutrition and micronutrient deficiency **[9,10]** | Supports the "hidden hunger" argument and shows why calories alone are insufficient (Rev 1 & 3) **[9,10]** | Align food policy goals with health outcomes; use nutrition security framing to guide cross-sector coordination **[5,9]** |
| Nutrition-sensitive production & sustainability | Diversified production + climate-smart practices aligned with nutrient goals; protect soil/water; reduce post-harvest losses **[1,3]** | Addresses "how to ensure nutrient-dense production sustainably" (Rev 2) while keeping sustainability explicit **[3]** | Agriculture diversification incentives; loss reduction; nutrition objectives embedded in food system planning **[1,3]** |
| Food environment governance (country example) | Integrated package: FOP warning labels + marketing restrictions + school environment measures **[11]** | Concrete example beyond CONSEA showing implementation and measurable shifts (Rev 1 & 3) **[11]** | Regulatory package to reshape purchasing and improve food environments **[11,4]** |
| Acute malnutrition "nutrition-first" products | Apply quality/specification frameworks for RUTF/RUSF; procurement aligned with standards **[12,13]** | Responds directly to Rev 1 (RUSF/RUTF) and strengthens practical relevance | Standard-based procurement; context-appropriate formulations where feasible **[12,13]** |
| Monitoring architecture & accountability | Build/strengthen a National Nutrition Information System (NNIS): combine routine surveillance + surveys + administrative data **[14]** | Gives an implementable monitoring model (Rev 1 & 3) without expanding references excessively | Standardize data flows; link indicators to program redesign and reporting dashboards **[14]** |
| Governance & citizen participation | Pair formal participation mechanisms with citizen-generated monitoring approaches ("citizen science") **[8,15]** | Expands governance examples and operationalizes citizen voice (Rev 1 & 3) | Community co-design; citizen evidence streams complement regulator/industry data **[8,15]** |

## 6. Conclusion

The time when "food security" could be equated with calories is gone. In a world of hidden hunger, rising obesity, and accelerating environmental crises, producing more foodespecially more of the wrong kinds of foodis not going to deliver health, equity, or sustainability.

FNS, correctly understood, is a capability: the real freedom of all people to access, choose, and enjoy diets that support healthy lives today without compromising the diets of future generations. Achieving this requires that we move from calorie-centered metrics and individual policies to nutrition-driven, sustainability-aligned food systems underpinned by rights-based governance.

## 7. Policy and program strategies for action:

1. Establish regular measures of dietary quality (dietary diversity and micronutrient adequacy) and report this information on government dashboards.

2. Use public procurement to institutionalize healthy and minimally processed diets in schools and hospitals.

3. Employ regulatory tools (labeling, marketing regulations, fiscal policies) to mitigate the prevalence of UPFs in food pantries and other food environments.

4. Align agricultural and trade policies and incentives with respect to nutrient density and sustainability, rather than merely the quantity of food produced.

5. Support citizen engagement and participatory governance to maintain accountability and effective oversight of these systems.

In our judgment, this kind of rethinking of "enough" is not optional; it is the minimum ethical standard for food policy in the 21st century.

## Abbreviations

FNS – Food and Nutrition Security
NCDs – Noncommunicable Diseases
LMICs – Low- and Middle-Income Countries
UPFs – Ultra-Processed Foods
RUTF – Ready-to-Use Therapeutic Food
RUSF – Ready-to-Use Supplementary Food
SISAN – Sistema Nacional de Segurança Alimentar e Nutricional (Brazil)

## Author Contributions

Conceptualization: M.A.H., F. A.; Investigation: A.Q., H.A.; Resources: M.A.H., A.Q.; Data curation: F.A.; Writing—original draft: F.A.; Writing—review & editing: M.A.H.,

F.A., A.Q., H.A.; Visualization: F.A.; Supervision: M.A.H., A.Q.; Project administration: M.A.H.
All authors have read and agreed to the published version of the manuscript.

## Funding

No external funding was received for this work.

## Conflicts of Interest

The authors declare no conflicts of interest.

## Acknowledgements

The authors acknowledge Al-Balqa' Applied University and KAFA'A Center for institutional support.

**AI-declaration:** The authors declare that AI-assisted tools, including Grammarly and QuillBot, were used solely for grammar correction and language clarity. These tools were not used for writing, generating, interpreting, or analyzing the scientific content of the manuscript. All scientific ideas, interpretations, and conclusions presented in this article are the original work of the authors.

## References

[1] Simelane, K. S.; Worth, S. Food and Nutrition Security Theory. Food Nutr. Bull.2020, 41 (3), 367–379. https://doi.org/10.1177/0379572120925341.

[2] Gundersen, C.; Ziliak, J. P. Food Insecurity and Health Outcomes. Health Aff. (Millwood)2015, 34 (11), 1830–1839. https://doi.org/10.1377/hlthaff.2015.0645.

[3] Lindgren, E.; Harris, F.; Dangour, A. D.; et al. Sustainable Food Systems—A Health Perspective. Sustain. Sci.2018, 13 (6), 1505–1517. https://doi.org/10.1007/s11625-018-0586-x.

[4] Weffort, V. R. S.; Lamounier, J. A. Hidden Hunger—A Narrative Review. J. Pediatr. (Rio J.)2024, 100 (Suppl 1), S10–S17. https://doi.org/10.1016/j.jped.2023.08.009.

[5] Nair, M. K.; Augustine, L. F.; Konapur, A. Food-Based Interventions to Modify Diet Quality and Diversity to Address Multiple Micronutrient Deficiency. Front. Public Health 2016, 3, 277. https://doi.org/10.3389/fpubh.2015.00277.

[6] World Health Organization. One in eight people are now living with obesity (News release). 1 Mar 2024. https://www.who.int/news/item/01-03-2024-one-in-eight-people-are-now-living-with-obesity (accessed 2026-01-19).

[7] Mozaffarian, D.; Angell, S. Y.; Lang, T.; Rivera, J. A. Role of Government Policy in Nutrition—Barriers to and Opportunities for Healthier Eating. BMJ 2018, 361, k2426. https://doi.org/10.1136/bmj.k2426.

[8] World Health Organization. Noncommunicable diseases (Fact sheet). Updated 25 Sep 2025.
https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases (accessed 2026-01-19).

[9] Churchwell, K.; Scarmo, S.; Lloyd-Jones, D. M. Promoting Nutrition Security Through Policies and Programs. Circulation 2022, 146 (1), e1–e2. https://doi.org/10.1161/CIRCULATIONAHA.122.060824.

[10] Castro, I. R. R. The Dissolution of the Brazilian National Food and Nutritional Security Council and the Food and Nutrition Agenda. Cad. Saúde Pública 2019, 35 (2), e00009919.

[11] Taillie, L. S.; et al. Changes in Food Purchases after the Chilean Policies on Food Labeling, Marketing, and Sales in Schools: A Before-and-After Study.
Lancet Planetary Health 2021, 5 (8), e526–e533. https://doi.org/10.1016/S2542-5196(21)00172-8

[12] UNICEF. National Nutrition Information System (NNIS): Module Five—Data Sources and Modalities. 2021.
https://data.unicef.org/wp-content/uploads/2021/12/NNIS-module-5-webv2.pdf (accessed 2026-01-19).

[13] Aylward, B. L.; et al. Citizen science in monitoring food environments: a qualitative collective case study of stakeholders' experiences during the Local Environment Action on Food project in Alberta, Canada.
BMC Public Health 2022, 22, 665. https://doi.org/10.1186/s12889-022-13030-1

[14] Codex Alimentarius Commission. Guidelines for Ready-to-Use Therapeutic Foods (CXG 95-2022).
https://workspace.fao.org/sites/codex/Standards/CXG%2095-2022/CXG_095e.pdf (accessed 2026-01-19).

[15] UNICEF Supply Division. Ready-to-Use Supplementary Food (RUSF) Specification (S0000248).
https://www.unicef.org/supply/media/16636/file/S0000248-RUSF-Specification.pdf (accessed 2026-01-19).