DInA
Micronutrient Data Innovation Alliance

Micronutrient FORUM
Turning evidence into collective action

Nutrition Modeling Consortium

Draft Concept Note

Background

Malnutrition remains one of the largest contributors to child morbidity and mortality, impaired growth and mental development, infectious and chronic disease, and a loss of human potential.[1] Nutrition interventions are among the most cost-effective and impactful solutions to improve health and well-being of individuals and nations.[2,3] Proven nutrition interventions include promotion of exclusive breastfeeding, provision of micronutrient supplements, large-scale food fortification, management of acute malnutrition, and promotion of diverse diets, among others[4].

Even though the evidence base for good nutrition is well-established, policymakers face difficult decisions, especially in low- and middle-income countries (LMICs) where resources are constrained. They grapple with critical questions such as:

- *What is the current state of malnutrition in my country, and how does it rank against other health priorities?*
- *Which nutrition interventions should be prioritized to maximize impact?*
- *Are current nutrition interventions reaching the most vulnerable populations and having the intended impact?*
- *How can progress be tracked and sustained?*

For policymakers to effectively answer these types of questions, they require timely, accurate, and actionable data.

Nutrition modeling, and more recently the role of artificial intelligence (AI), is increasingly recognized as an important tool that provides decision-makers with evidence-based information. Modeling can be defined as a "mathematical framework representing variables and their interrelationships to describe observed phenomena or predict future events."[5] Nutrition models integrate data from diverse sources which can be used to inform the design, implementation, and monitoring of nutrition policies and programs.

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[1] Institute of Medicine (US) Committee on Micronutrient Deficiencies. Prevention of Micronutrient Deficiencies: Tools for Policymakers and Public Health Workers. Howson CP, Kennedy ET, Horwitz A, editors. Washington (DC): National Academies Press (US); 1998. PMID: 25101378.

[2] Larsen B, Hoddinott J, Razvi S. Investing in Nutrition: A Global Best Investment Case. Journal of Benefit-Cost Analysis. 2023;14(S1):235-254. doi:10.1017/bca.2023.22.

[3] Shekar, M., Shibata Okamura, K., Vilar-Compte, M., Dell'Aira, C., & eds. Investment Framework for Nutrition 2024. (Washington, DC: World Bank, 2024). doi:10.1596/42164.

[4] Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., & Black, R. E.; Lancet Nutrition Interventions Review Group, the Maternal and Child Nutrition Study Group. (2013). Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet, 382(9890), 452–477.

[5] Porgo TV, Norris SL, Salanti G, Johnson LF, Simpson JA, Low N, Egger M, Althaus CL. The use of mathematical modeling studies for evidence synthesis and guideline development: A glossary. Res Synth Methods. 2019 Mar;10(1):125-133.

Several mathematical optimization nutrition modeling tools currently exist (Table 1). These models are largely focused on informing cost-effective nutrition programming approaches to meet nutritional needs in different contexts and evaluating the economic impact of inaction and action. The tools can help policymakers target interventions, allocate resources efficiently, and forecast the potential benefits of policy changes. However, significant challenges hinder the advancement of developing and applying nutrition models to improve decision-making. These include limited capacity in both the development and application of models, gaps in the availability of primary data and access to the data that does exist, risk of incorrect or conflicting models, and challenges in interpreting modeling results for policy and program decision-making. For instance, the different methodologies and assumptions underlying these tools can lead to different answers to critical policy and program questions (i.e., the potential impact of a micronutrient intervention program in a specific context).

Table 1: Nutrition modeling tools that were the focus of the previous Nutrition Modeling Consortium

Model	Purpose	Developer(s)
Fill the nutrient gap (FNG)	Estimate the lowest cost of a nutritious diet based on locally available foods and its affordability.	UN World Food Programme, with inputs from partners including International Food Policy Research Institute, University of California Davis, Harvard University, Epicentre, Mahidol University, United Nations Children's Fund, and Save the Children.
Micronutrient Action Policy Support (MAPS)	Estimate micronutrient deficiencies at various spatial and temporal scales and inform food system interventions.	University of Nottingham, London School of Hygiene & Tropical Medicine, University of California, Davis, British Geological Survey, International Food Policy Research Institute, Addis Ababa University and Lilongwe University of Agriculture and Natural Resources
Micronutrient Intervention Modeling Project (MINIMOD)	Estimate intervention strategies that will reach the most individuals at risk of micronutrient deficiency at the lowest cost.	University of California, Davis
Outcome Modeling for Nutrition Impact (OMNI)	Estimate nutrition and non-health impacts due to nutrition interventions.	Nutrition International
Optifood	Estimate nutrient gaps in local diets.	London School of Hygiene & Tropical Medicine
Optima Nutrition	Estimate funding allocations that will minimize stunting, wasting, anemia and under-five mortality.	Optima Consortium for Decision Science, the Burnet Institute, and the World Bank
PROFILES	Spreadsheet-based tool used to calculate consequences if malnutrition does not improve, and the benefits if improved.	Updated by the Food and Nutrition Technical Assistance Project (FANTA), originally developed by Academy for Educational Development (AED), now FHI360

*Information in this table is modified from summaries developed for each tool by the Nutrition Consortium, currently not publicly available. There are other nutrition modeling tools that may be of interest, such as the Cost of the Double Burden, Cost of Hunger, Cost of Not Breastfeeding, Cost of the Diet, Institute for Health Metrics and Evaluation, Intake Modelling and Prediction Program, Modelling and Mapping Risk of Inadequate Micronutrient Intake, The Lives Saved Tool, and Strengthening Economic Evaluation for Multisectoral Strategies for Nutrition.[6]

[6] Knight F, Bourassa MW, Ferguson E, Walls H, de Pee S, Vosti S, Martinez H, Levin C, Woldt M, Sethurman K, Bergeron G. Nutrition modeling tools: a qualitative study of influence on policy decision making and determining factors. Ann N Y Acad Sci. 2022 Jul;1513(1):170-191.

From 2017 to 2020, the New York Academy of Sciences led the Nutrition Modeling Consortium with funding from the Gates Foundation. The Consortium fostered collaboration among modelers, improved understanding of the purpose of existing tools, and promoted transparency in modeling processes.[7] The group also produced a collection of papers on the application of various models in different country contexts.[8] With the closure of the Consortium, a collaborative platform for information exchange was lost. Since then, existing models have been applied and new models developed but results between models are not always consistent, making the practical application of models especially challenging. The absence of such a platform hampers progress in advancing computational modeling techniques, aligning models where appropriate, clarifying model discrepancies when they arise, and critically, connecting modeling outputs more effectively to policy action.

Refactoring the Nutrition Modeling Consortium for National Impact

Sustained collaboration between policymakers, program implementers, and modelers is essential to ensure models directly inform nutrition decision-making at the national level. We propose establishing a Nutrition Modeling Consortium to improve availability, access, and use of modeling tools by country decision-makers.

Policy Questions

The Consortium's actions will be driven by the need to answer key policy questions, including:

- How can models support understanding of the relative contribution and synergistic effects of complementary nutrition interventions for improving nutrition and health outcomes?
- To what extent do current nutrition models produce objectively accurate outputs that are sufficiently valid for decision-making?
- How can empirical data and outputs from various models complement each other to inform evidence-based decision-making?
- How can we address conflicting results from empirical data and modeled outputs, as well as disagreements between models, to inform evidence-based decision-making?

Consortium Objectives

- Identify and coordinate opportunities to apply nutrition models in national decision-making processes.
- Strengthen capacity in LMICs both in the development and application of nutrition models.
- Advance current practices, emerging efforts, and future innovations in nutrition modeling.

Consortium Outputs

For the first year, we propose the following outputs:

1. A prioritized **set of actions** needed to improve the use of existing modeling tools, refine existing tools, and/or create new tools. This will feed into the Collective Action Plan on Nutrition Data, also being led by DInA in partnership with the World Bank.

[7] The New York Academy of Sciences. Nutrition Modeling Consortium October 31 – November 1, 2019, Meeting Report.
[8] https://nyaspubs.onlinelibrary.wiley.com/doi/toc/10.1111/(ISSN)1749-6632.nutrition-modelling-consortium

2. A **brief** contextualizing the differences between models, such as providing clarity on the different estimates of the potential impact of LSFF, or an alternative topic identified by the Consortium.
3. A **paper** on the impact of reduced primary data availability on modeling and opportunities/future directions of nutrition modeling, or an alternative topic identified by the Consortium.
4. A costed **long-term plan** for the Nutrition Modeling Consortium, including direct engagement with regional and national partners.

By delivering these initial outputs, the Consortium will provide immediate benefits to decision-makers while laying the foundation for longer-term collaboration, coordination, and greater impact.

Structure of the Consortium

The Consortium will consist of a chair, a secretariat, and approximately 12-15 members including a mix of modelers and end-users (policymakers and program managers) from across different geographical regions. The Consortium will meet four times in the first year: February 2026, March 2026, May 2026, and August 2026.

Potential Long-Term Activities of the Consortium

There are several potential activities the Nutrition Modeling Consortium could cover. Each of these are interconnected and build on one another, although in some cases the level of effort of the activities varies widely. The long-term hope is for the Consortium to encompass all these areas, potentially through an overarching working group supported by smaller subgroups.

- **Increase the application of existing models:** At their center, models are intended to inform policy and programs. Nutrition models need to be embedded within policymaking process and driven by demand from the end user. The Consortium could support policymakers by providing guidance on the selection, interpretation, and application of model outputs for policy and programs. It could also identify opportunities for applying models, such as bringing together national stakeholders, modelers, and funders to develop a roadmap on the application of models in contexts where the necessary data exists, and where model outputs can be used to address national policy and program opportunities. In addition, the Consortium could explore ways to better link dashboards with models and incorporate their outputs into dashboards.
- **Strengthen capacity to develop and apply models:** Models are often applied infrequently in a country, making it challenging to maintain expertise and build sustained capacity. This often results in reliance on external technical assistance for both model development and application. The Consortium could seek ways to expand training opportunities for academics in LMICs to develop and apply models, as well as strengthen regional mechanisms to support national governments to apply models. Consortium members would include modelers and users from LMICs.
- **Harmonize and coordinate:** Nutrition modeling tools may yield different answers to the same or similar questions, creating potential confusion for policymakers and others. The Consortium could contextualize model outputs and illustrate reasons for seeming discrepancies when conflicting modeling results occur. This work would strengthen tool

credibility and increase the effective application of the tools in the right context for the right purpose.

- **Identify requisite source data**: Models require primary data that are accurate, relevant, and timely. The Consortium could play a role in identifying the source data needed for nutrition models, mapping where those data already exist, and advocating for their continued collection and open access. This effort could take a broad approach to advancing nutrition models more generally, or it could focus on specific models and/or countries, working in collaboration with regional and national data partners such as Learning Network on Nutrition Surveillance (LeNNS) and National Information Platforms for Nutrition (NIPN) platforms.
- **Advance modeling techniques:** Model development involves complex decision-making processes, numerous assumptions, and evolving technologies. The rapid growth of statistical methods and the application of artificial intelligence present opportunities to improve nutrition modeling. The Consortium could monitor advances in modeling more broadly, discuss adaptation of relevant techniques to nutrition, and anticipate future modeling needs.
- **Promote integration with other disciplines:** The nutrition modeling community often works in isolation. Given the multifactorial nature of nutrition, it is important to connect nutrition modeling efforts with other topical areas and foster collaboration among modelers from different disciplines. The intersection between nutrition and infectious disease is an especially important area of focus. Additionally, the infectious disease and other modeling communities have made substantial advancements from which valuable lessons can be drawn to improve nutrition modeling practices. The Consortium could create better linkages to other modeling communities through hosting workshops or other forums to share information.