Drought in the Somali region of Ethiopia is hitting the population very hard

© UNICEF/Raphael Pouget/Ethiopia/2021

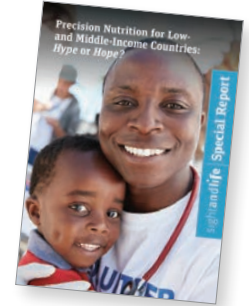# Precision nutrition in low- and middle-income settings

This is a summary of the following paper: *Sight and Life (2022) Precision Nutrition for Low- and Middle-Income Countries: Hype or Hope.* **https://sightandlife.org/resource-hub/ magazine/ precision-nutrition-for-low-and-middle-income- countries-hype-or-hope**

gramme models, local partners, community structures and innovation to address the devastating effects of climate change on nutrition.

Generalisable recommendations for programmes to improve nutrition in the context of climate change

Given the far-reaching consequences of climate change on nutrition, well-integrated and *flexible programmes* are required. These will necessarily span different sectors, such as agriculture, health, gender, disaster risk reduction and others. Building resilience in each sector is essential; gender empowerment is also key.

A flexible and *localised strategy* for climate change and nutrition is needed, drawing on a set of core project models and a mechanism to diagnose and adapt according to context. For example, local partners can draw on local and indigenous knowledge. Local agriculture research stations make plant available varieties that are adapted to the new climate conditions and to local pests and diseases.

Capacity building at all levels of the organisation for climate change adaptation is also necessary. Drawing up guidelines using in-house and global resources is necessary, with a full list of possible measures to take.

Strong *community resilience* is essential to adapt to climate change, and this can be nurtured to help communities cooperate, adapt, advocate and innovate in the face of the new challenges.

A *systematic monitoring* system designed to cross all sectors is necessary for organisations to share their experiences and build evidence about challenges and effective strategies.

It is extremely urgent that the devastating effects of climate change on nutrition should be addressed. This series of case studies shows that communities and organisations can work together in a myriad of ways to try and build local resilience. However, mitigation on a global scale is imperative.

Precision nutrition (Box 1) is an emerging area of research that falls under the umbrella of precision medicine – an approach that has yielded big wins in developed countries across areas such as targeted cancer therapy or microbiome sequencing, following the introduction of Big Data into healthcare. Physicians have known for decades that individuals respond individually to different treatment regimens, yet only now do they have the tools at their disposal to delve into the reasons behind this. While targeted treatments may therefore yield the greatest benefit on an individual level, precision medicine creates a dilemma for public health professionals who deal with healthcare at the population level. This is especially pertinent for lower-income countries, where resources are often constrained to the point that even basic healthcare remains a challenge. Is a move towards precision nutrition therefore irrelevant, or do these very challenges increase the need for more precise, efficient approaches?

The authors of the report highlight the importance of targeting the most vulnerable groups with a precision nutrition approach. Using the example of pregnant women with anaemia – which affects between 33% and 75% of pregnant women in developing countries (Abdallah et al, 2022) – such a strategy could deliver cost-effectiveness, given that interventions could be distributed in smaller amounts rather than through costly blanket supplementation. Anaemia reduction can boost productivity by providing additional economic benefits for this group, and increasing nutrient status in mothers can reduce the subsequent burden of disease in their children, reducing healthcare costs further down the line. This represents a more strategic application of resources rather than the blanket approach that national health systems employ today.

The report also highlights a pyramid infographic that outlines the accessibility of different approaches (p. 14) and methods (p. 15). It notes that demographic surveys, which make up the bulk of many nutrition research projects, are at the base of the pyramid – accessible and not constrained by resources, yet imprecise and limited – with lifestyle data collection presenting the next step in personalisation. Such data (diet, physical activity, dietary diversity, etc.) are commonplace, but not routinely measured in all settings. At the tip of the pyramid, and currently too costly for many low- and middle-income countries (yet becoming more accessible), are genetic and omics methods. These are not yet routine in high-income settings, but are currently available through many private healthcare sys-

tems. The spectrum of phenotype measurements (anthropometry and clinical biomarkers) at the accessible end of the pyramid, and of metabolic indicators (wearable devices, oral glucose tolerance tests, gut microbiota analysis, etc.) at the other end, are also represented here.

Although this road map for the future may be exciting, representing a shift from generic guidelines such as the Food Pyramid towards targeted, personalised and ultimately precision nutrition (p. 77), the field remains in its infancy, and scale-up of such technology remains unfeasible within many poorer health systems.

"Precision nutrition is in its early stages and too soon to introduce as a treatment for chronic diseases in the general population. Research is being conducted on the application of precision nutrition for obesity, metabolic syndrome, certain cancers, and type 2 diabetes"
(Harvard T.H. Chan School of Public Health, 2023)

A detailed breakdown of this report is beyond the scope of this summary, but readers are encouraged to explore this topic further by accessing the full report. It also provides a useful glossary of precision nutrition terminology (p. 6), helping readers make sense of a complex topic where nutrition, biochemistry, genomics and the computer sciences intersect.

Box 1 — What is precision nutrition?

Precision nutrition evaluates an individual's unique DNA, race, gender, health history, lifestyle habits, microbiome and metabolic response to specific foods or dietary patterns to determine the most effective eating plan to prevent or treat disease. It aims to provide safer and more effective ways to prevent and treat disease by providing more accurate and targeted strategies. Precision nutrition assumes that each person may have a different response to specific foods and nutrients, so that the best diet for one individual may look very different from the best diet for another.

References

Abdallah F, John S, Hancy A et al (2022) Prevalence and factors associated with anaemia among pregnant women attending reproductive and child health clinics in Mbeya region, Tanzania. PLOS Global Public Health, 2, 10. **https://journals.plos.org/globalpublichealth/article ?id=10.1371/journal.pgph.0000280**

Harvard T.H. Chan School of Public Health (2023) The Nutrition Source: Precision Nutrition. **https://www.hsph. harvard.edu/nutritionsource/precision-nutrition/**