Use of Nutrition Data in Decision Making: A Review Paper

Conducted on behalf of the Research Priority Working Group of the WHO-UNICEF Technical Expert Advisory group on nutrition Monitoring (TEAM)

July 2020

World Health Organization

unicef

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This research report is an outcome of the WHO-UNICEF Technical Expert Advisory group on nutrition Monitoring (TEAM) and was supported by the Bill & Melinda Gates Foundation.

This document was prepared by the Research Priority Working Group of the WHO-UNICEF TEAM, under the joint coordination of the Monitoring of Nutrition Status and Food Safety Events Unit, Department of Nutrition and Food Safety, World Health Organization (WHO) and Data & Analytics Section, Division of Data, Analytics, Planning and Monitoring, UNICEF.

Working Group members were (in alphabetic order): Jennifer Coates, Omar Dary, Rafael Flores-Ayala, Edward Frongillo, Purnima Menon, and Wenhua Zhao (TEAM); Kuntal Kumar Saha (WHO Headquarters); and Chika Hayashi (UNICEF Headquarters). The Working Group conceptualized and led the production of this document.

The Working Group acknowledges the contribution of Abdullah Nurus Salam Khan (Consultant), Arnold School of Public Health, University of South Carolina, for conducting this research and writing this report and Edward Frongillo, for supervising this work.

The Working Group is grateful to Mary Arimond (TEAM) for compiling the research topics suggested by all TEAM members that formed the basis of this work.

LIST OF ACRONYMS

BFCI	Baby-Friendly Community Initiative
CORTASAM	Council of Research and Technical Advice on Acute Malnutrition
DHS	Demographic and Health Survey
ENN	Emergency Nutrition Network
FAO	Food and Agriculture Organization
FNTWG	Food and Nutrition Technical Working Group
GNC	Global Nutrition Cluster
GNMF	Global Nutrition Monitoring Framework
HCES	Household Consumption and Expenditures Surveys
LANSA	Leveraging Agriculture for Nutrition in South Asia Research
MEAL	Monitoring, Evaluation, Accountability, and Learning
MICS	Multiple Indicator Cluster Survey
NFNCS	National Food and Nutrition Coordination Secretariat
NFNP	National Food and Nutrition Policy
NGO	Non-government Organization
NHANES	National Health and Nutrition Examination Survey
POSHAN	Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition
RBF4MNH	Results-Based Financing for Maternal and Newborn Health
RUBY	Ringing Up about Breastfeeding earlY
SCF&NSC	Social Cluster Food and Nutrition Steering Committee
SDG	Sustainable Development Goals
SMART	Specific, Measurable, Attainable, Relevant and Timely
SoC	Stories of Change
SUN	Scaling Up Nutrition
SUSTAIN	Scaling Up Sweet potato through Agriculture Nutrition
TEAM	Technical Expert Advisory group on Nutrition Monitoring
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund,
USDA	United States Department of Agriculture
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WIC	Women, Infants, and Children

EXECUTIVE SUMMARY

Background

The WHO and the UNICEF established the Technical Expert Advisory group on nutrition Monitoring (TEAM) to advise on enhancing global monitoring of the Global Nutrition Monitoring Framework (GNMF) indicators to track progress against the six global nutrition targets. Part of TEAM's role is to identify emerging research questions and needs related to nutrition monitoring and to recommend action to develop or refine indicators and operational guidance. This review paper draws on identifying the research priorities for nutrition. The first objective of this report is to examine the information available about how nutrition knowledge and evidence derived from various sources of nutrition data are used by decision-makers in practice in countries. The second objective is to take the most promising research priorities identified by TEAM, among those not part of the first objective, and outline the questions and the current sources of information or groups working on related issues.

Research methods

The literature review was conducted to identify relevant papers on the topic of using nutrition knowledge and evidence to bring policy changes in countries using appropriate search terms in PubMed and Google Scholar database. Several programme documents of different nutrition initiatives such as *Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition* (POSHAN) in India, and *Scaling Up Nutrition* (SUN) Movement, *Stories of Change* (SoC) were reviewed. Two case studies were developed drawing on the country-specific experience of India and Rwanda that highlight major nutrition initiatives regarding the use of information for improving nutrition. The use of nutrition data for decision making (objective 1) is discussed under five themes that span across the process of translating knowledge into policy and action: i) defining the issue, ii) enhancing understanding, iii) influencing actors, iv) informing policy and implementation, and v) monitoring and evaluation. A summary of the literature review is listed to address the second objective.

Findings

A. Defining the issue: knowledge framing

Timely and credible nutrition data on coverage, quality, scale, and nutrition outcomes influence knowledge framing and allow decision-makers to understand the nutrition burden. Effective knowledge framing increased the awareness of multiple nutrition issues among the stakeholders in the six participating countries under the *Stories of Change* (SoC) initiative (Bangladesh, Ethiopia, India, Nepal, Senegal, and Zambia). The SoC team also reported that knowledge framing was crucial for generating awareness among civil society and bringing positive changes in nutrition. For example, in Zambia, community members reported the improved intra-household distribution of food, increased awareness of nutrition, and improvements in local economies. Framing of knowledge also helped in building strong political commitment and maintain strategic communication between different nutrition partners.

Media, however, plays an important role in knowledge framing and communicating nutrition knowledge.

B. Enhancing the understanding: use of multidimensional data

Credible and valid multidimensional data enhance understanding of nutrition problems and provide an empirical basis for evidence-based nutrition policymaking. Data on the health and nutritional status of adults and children collected in national surveys can serve as the basis for national nutrition monitoring and developing dietary guidelines. Dietary surveys in low-income countries, however, are limited by inadequate research infrastructure, low investment, lack of data collection and data processing technology. Developing countries have abundant data on nutrition-specific and nutrition-sensitive indicators, yet evidence-based decision making is hindered due to lack of meaningful utilization of these data. POSHAN in India aimed to fill this knowledge gap by synthesizing the existing pool of information and generating new knowledge through several research activities. The initiative also focused on generating knowledge of the funding process and estimating costs.

C. Influencing multisectoral actors: government and non-government stakeholders and civil society

Successful advocacy for sustaining long-term nutrition commitment by the decision-makers requires meaningful communication of nutrition information with a diverse range of nutrition actors. For example, multisectoral nutrition strategies in Rwanda involving different ministries, the establishment of coordination secretariat to increase synergy between actors, joint planning at national and district level, and collective monitoring of nutrition indicators had contributed to developing multidimensional solutions to tackle the nutrition problems in the country. In Vietnam, Bangladesh, and Ethiopia, *Alive & Thrive* acted as an advocate for infant and young child feeding through evidence gathering, evidence-based policy dialogue, network and capacity building of nutrition actors, and dissemination of evidence using diverse platforms including media campaigns while working closely with the governments and NGOs.

D. Informing policy and implementation: effective communication using data

Politics, governance, country's capacity, and financial resources create an enabling environment to act on the commitments and require communication of knowledge to accelerate nutrition improvements. In Ethiopia, consultative and participatory planning through community engagement is required to reinforce the understanding of nutrition problems by the stakeholders. Nutrition information is used to inform food safety policies and regulatory processes. Often, disagreement among nutrition actors can arise as a result of diversely acting institutional perspectives and interests, and such interest-based conflicts cannot be easily overcome by evidence alone rather require negotiation and conflict resolution through effective communication and by improving contextual knowledge of the stakeholders. *Transform Nutrition* and the SUN movement have produced a toolkit that outlines possible ways to increase the knowledge of decision-makers and prioritizes developing clear and cohesive narratives and evidence to strengthen the multisectoral understanding of the decision-makers.

E. Monitoring and evaluation: strengthening the accountability

Accountability requires clarity and cross-sectoral consensus on the roles and responsibilities of different actors for which timely data are required. Data visualizations facilitate decision-making by presenting data in a more interpretative and persuasive way to the target audiences. SUN *Monitoring, Evaluation, Accountability and Learning* (MEAL) is using country dashboards to support SUN Movement stakeholders at national, regional and global levels to assess progress, using a standard set of indicators that are aligned with the SUN's theory of change model. The important indicators without data should also be included for tracking nutrition progress to hold the implementers accountable and displaying them could be a powerful reminder to nutrition-decision makers to highlight gaps and advocate for their inclusion in surveys.

Conclusion

There is a critical need for developing cost-efficient methods of generating multidimensional nutrition data on immediate determinants of malnutrition as well as nutrition-sensitive sectors in the resource poor-countries. Evidence from multiple initiatives to improve nutrition shows that data presented in persuasive and interpretative ways developed awareness about the nutrition issues among the key stakeholders and influenced the decision-making process through multisectoral collaboration. Proactive role of nutrition researchers and programmers in collating, synthesizing, and communicating nutrition information has proven to be a successful strategy of accelerating the knowledge translation into action by engaging policy makers to make sustainable political commitments for nutrition improvement. Making nutrition indicators a priority and using effective monitoring and tracking tools are necessary to further facilitate the decision making and planning for future nutrition programmes in the countries.

1. BACKGROUND

Improving nutrition is central to addressing global development challenges due to nutrition's inherent relationship, both directly and indirectly, with the *Sustainable Development Goals* (SDG). Successful programming to reduce the burden of malnutrition requires addressing the immediate and underlying determinants through nutrition-specific and nutrition-sensitive interventions and simultaneously investing in building an enabling environment with relevant laws, regulations, and policies (1). Nutrition programmes are more successful when they are designed based on robust evidence and knowledge, implemented through multisectoral collaboration, and sustained by increased political commitment and investment (2).

Technical Expert Advisory group on nutrition Monitoring (TEAM) and its role:

The WHO and the UNICEF established the *Technical Expert Advisory group on Nutrition Monitoring* (TEAM) to advise on enhancing global monitoring of the *Global Nutrition Monitoring Framework* (GNMF) indicators to track progress against the six global nutrition targets (3). TEAM aims to achieve this through shared learning and the development of harmonized standards, tools and methods in relevant sectors such as health, agriculture and social protection. Part of TEAM's role is to identify emerging research questions and needs related to nutrition monitoring and to recommend action to develop or refine indicators and methods for the GNMF. TEAM members previously submitted suggested research topics of interest, and many of these topics have been taken up by the working group (the 7th TEAM meeting, 5–6 February 2019, New York, USA), including antenatal iron supplementation, breastfeeding counselling, anthropometry data quality, diet quality indicators, quality-adjusted coverage indicators, annual malnutrition prevalence data for countries and regions, and nutrition in school-age children and adolescents (4).

This review paper draws on the discussion of the 7th TEAM meeting on identifying the research priorities for nutrition. The objective of this report is two-fold. First, the report will examine the information available about how nutrition knowledge and evidence derived from various sources of nutrition data are used by decision-makers in practice in countries (Objective 1). Second, the report will take the most promising research priorities identified by TEAM (Appendix 1), among those not part of objective 1, and outline the questions and the current sources of information or groups working on related issues (Objective 2).

2. RESEARCH METHODS

We conducted a literature review to identify relevant papers on the topic of using nutrition knowledge and evidence to bring policy changes in countries. For the literature search, we used the following search terms: Nutrition AND (Knowledge OR data OR evidence), Nutrition AND (Policy OR Decision making). We used the "PubMed" and "Google Scholar" database to identify relevant papers and had suggestions from nutrition experts with relevant experience to guide and facilitate the literature search. Several programme documents of different nutrition initiatives such as *Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition* (POSHAN) in India, *Scaling Up Nutrition* (SUN) Movement, and *Stories of Change* (SoC),

were reviewed to understand the country-specific context of the use of knowledge and evidence for decision making. We focused our search and used relevant examples primarily in the context of developing countries with a high burden of undernutrition such as India, Ethiopia, and Bangladesh, but best practices from developed countries were also reviewed. Two case studies were developed drawing on the country-specific experience of India and Rwanda that highlight major nutrition initiatives regarding the use of information for improving nutrition in these countries.

This review paper discusses the use of nutrition data for decision making (objective 1) under five themes that span across the process of translating knowledge into policy and action: i) defining the issue, ii) enhancing understanding, iii) influencing actors, iv) informing policy and implementation, and v) monitoring and evaluation (Figure 1). This review paper also includes a summary of the literature review in Appendix 1 to address objective 2.

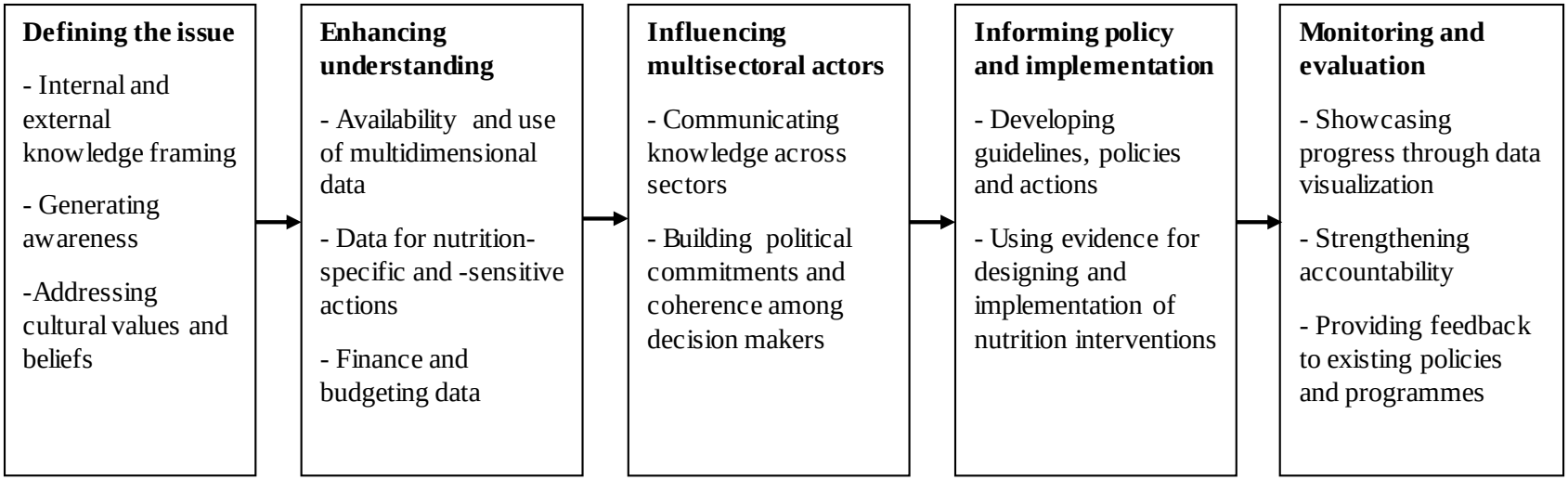

Figure 1: Conceptual framework on use of nutrition data for decision making showing relationships across the themes

3. FINDINGS

3.1 Defining the issue: knowledge framing

Framing of nutrition knowledge comprises a set of concepts and theoretical perspectives by which decision-makers (and nutrition actors) perceive and are made aware of nutrition problems including the definition, magnitude, and possible causes. Development of both internal framing alignment, i.e., the nutrition actors are aligned with a common interpretation of a problem, and external framing alignment, i.e., public portrayal of nutrition issues that resonate with the external audience, is required as the primary step for decision making (5). Framing is most effective when it is developed based on existing knowledge and evidence and influenced by timeliness and credibility of nutrition data on coverage, quality, scale, and nutrition outcomes (6). Gillespie and colleagues (2017) identified that being able to frame nutrition challenges with support from international community increased the awareness of multiple nutrition issues among the stakeholders in the six participating countries under the *Stories of Change* (SoC) initiative (Bangladesh, Ethiopia, India, Nepal, Senegal, and Zambia) (6). The SoC team synthesized knowledge by analysing the countries' trends of change in nutrition indicators and identifying possible determinants of the change (using regression and decomposition analysis) and thus aided understanding where decision-makers of the respective countries stand in the nutrition landscape comparing with others. Framing of knowledge also helped maintain strategic communication among different nutrition partners to understand the severity and burden of malnutrition (e.g., high stunting rates) and enabled strong political commitment building to address the problems (6).

Knowledge framing is also crucial for generating awareness among civil society and bringing positive changes in nutrition as explored by the SoC team through community-level research. In Zambia, community members reported the improved intra-household distribution of food, increased awareness of nutrition, and improvements in local economies – all of which were linked to improvements in nutrition in the country (7). In-depth information about the lived experience of the respondents thus complements the quantitative data collected on nutrition indicators and help decision-makers develop more pragmatic nutrition policies.

Knowledge framing is more likely to influence policies when it is aligned with the underlying values, beliefs, and motivation of the decision-makers as reported in a study examining the advancement of nutrition policies in Vietnam (8). Providing adequate resources to decision-makers on the high stunting problem in Vietnam through multiple *Mainstreaming Nutrition Initiative* meetings and capitalizing the problem on cultural motivations (stunting having impacts on the country's socio-economic improvement, sports performance) helped achieve the 'external framing' of stunting issues and influence the policy focus on addressing the stunting (8).

Media, as one of the key stakeholders in the policy-making process, plays an important role in knowledge framing and communicating nutrition knowledge through debates and dialogues (9). In Malawi, South Africa, and Zambia, an initiative was taken by *Feed the Future Innovation Lab* to strengthen the capacity of the media to report on food security and nutrition policy-related issues by capacity development workshops for young journalists (10). The workshop was an

opportunity for journalists to network with researchers who could provide their expert opinions and to participate in a policy analysis exercise. In Bangladesh, *Alive & Thrive* had media engagement activities as part of the policy advocacy component of the initiative to improve key practices related to breastfeeding and complementary feeding (11).

Despite appropriate framing of nutritional issues, the taking of appropriate actions is not guaranteed. For instance, information on the nutritional need of the population at the time of acute and prolonged crisis, either natural (e.g., drought) or humanmade (e.g., forcibly displaced population), is a critical need for effective and efficient emergency response. The framing of such catastrophe often highlights the lack of food as the reason for undernutrition among that population and the food aid donors and NGOs take interest in food distribution activities without prioritizing quality and nutrition content of the distributed food (12).

3.2 Enhancing the understanding: use of multidimensional data

Credible and valid multidimensional data enhance understanding of nutrition problems and provide an empirical basis for evidence-based nutrition policymaking. Given the complexity of multisectoral system within which nutrition-related decisions are taken and implemented, the sources of available nutrition data are also multi-dimensional in nature. In the US, the *National Health and Nutrition Examination Survey* (NHANES) produces rich data on the health and nutritional status of adults and children periodically (13). This multidisciplinary survey collects data on dietary intake, dietary supplement, dietary behaviour, risk factors for diet-related chronic disease, environmental exposure, and nutritional status of the participants. Automated data entry platform along with the evolving nature of the survey protocol allows timely release of population-level estimates and reference data in the public domain. NHANES can also be linked externally with information on food environment, market economy, and health record, and the databases are continuously updated through public-private partnerships. NHANES, therefore, serves as the basis for national nutrition monitoring to inform diverse policies related to nutrition and health, and developing dietary guidelines (13).

Dietary surveys in low-income countries, however, are limited by inadequate research infrastructure, low investment, lack of data collection and data processing technology, and insufficient food composition information, all of which limit the scope of evidence-based decision making by the nutrition actors (14). Use of contextually adaptable, interviewer-administered dietary assessment platforms such as computer-based or tablet-based programmes could improve efficiency in collection of dietary and nutrition behaviour data and minimize the huge cost related to data management in low-income countries (14).

Despite the gap in the availability of diet and food consumption data, developing countries have abundant data on nutrition-specific and nutrition-sensitive indicators generated through periodically conducted nationally representative surveys. Yet, evidence-based decision making is hindered in these countries due to a lack of meaningful utilization of these data (6). The cross-sectional design of the available national surveys limits their usability to explain causal paths linking the drivers of nutritional change with the outcomes. Moreover, the dearth of evidence generated from well-designed prospective studies evaluating nutrition-specific or

nutrition-sensitive interventions in the public domain further limits evidence-based decision making.

POSHAN in India aimed to fill this knowledge gap by synthesizing the existing pool of information and generating new knowledge through a number of research activities (15). In Africa, the *African Network of Food Data System* (AFROFOODS) supported by the *International Network of Food Data Systems* (INFOODS) strengthened the capacity of governments and sub-regional laboratories for the development and regular update of country-specific and regional food composition databases which have informed policy development in many African countries (16).

In addition to nutrition-specific interventions aimed at modifying immediate factors of malnutrition (e.g., individual diet and supplements intake), evidence suggests that the improvement in nutritional status in several countries is largely attributable to the nutrition-sensitive sectors including economic development, women's education and empowerment, improved water, sanitation and hygiene (WASH), reduction in fertility rates, and increased access to health care (6). A key challenge that developing countries face is inconsistencies in data collection, lack of quality data on agriculture and nutrition, and limited analysis of data as identified by a review paper from the *Leveraging Agriculture for Nutrition in South Asia Research* (LANSA) research consortium (17). As part of exploring how agriculture and food-related interventions can be better designed to improve nutrition, LANSA highlighted the importance of creating publicly accessible data repositories supported by bioinformatic tools to facilitate access and analysis of large data sets for long term return on investment (18).

Information on finance data, i.e., the detailed understanding of the funding process, estimating cost, budget allocation, etc., is crucial to improving predictability, transparency, and accountability of donor funds. Evidence demonstrating the efficacy and cost-effectiveness of nutrition interventions help support effective advocacy and policies when they are clearly communicated with the decision-makers (5). Lamstein et al. (2016) discussed the acute shortage of financing data in developing countries and suggested governments and their partners should develop and strengthen budget and expenditure tracking systems for nutrition (2). In five sub-Saharan African countries, the *Budget Transparency and Child Nutrition* report found low rates of budget transparency for child nutrition and recommended that governments should publish planned spending and expenditures on child nutrition over multiple budget years and submit timely annual accounts to independent audit offices (19). Often, the shift of interest of the key project management team during post-intervention period could hinder generation of scientific knowledge from project activities as observed in Bangladesh, Vietnam, and Ethiopia after investing substantial resources for costing of the *Alive & Thrive* project to promote infant and young child feeding (personal communication). The POSHAN initiative in India, on the other hand, could successfully generate knowledge on costing estimate for delivering nutrition-specific and sensitive information (15, 20). This set of information aims to facilitate the decision-makers in examining the programmes that account for major share of the total estimated cost (e.g., supplementary food and cash transfers to women in India), estimating the return on investment, and prioritizing the most effective programmes for scaling up (20).

3.3 Influencing multisectoral actors: government and non-government stakeholders and civil society

Nutritional improvement has recently been driven by different multisectoral actors in the internal and external context connected by institutional links (2). Such a network of actors varies widely in structure and membership composition including government bureaucrats, NGOs, donors, academics, private sector, international agencies, and civil society representatives such as community leaders. Stakeholders perceive in general that there is a lack of consistent, reliable, and convincing evidence-base on nutrition (21). Successful advocacy for sustaining long-term commitment by the decision-makers, therefore, requires meaningful communication of nutrition information with a diverse range of nutrition actors to overcome this perception. One programme review paper, as part the SoC initiative in Rwanda, identified that multisectoral nutrition strategies involving different ministries, establishment of coordination secretariat to increase synergy between actors, joint planning at national and district level, and collective monitoring of nutrition indicators had contributed to increasing nutrition awareness among the decision-makers and developing multidimensional solutions to tackle the nutrition problems (22).

Knowledge is more likely to be translated into policy actions when authoritative bodies are part of synthesizing and generating evidence in a coordinated way (5, 23). In Vietnam, Bangladesh, and Ethiopia, a similar role was played by *Alive & Thrive* that acted as an advocate for infant and young child feeding, especially complementary feeding, through evidence gathering, evidence-based policy dialogue, network and capacity building of nutrition actors, and dissemination of evidence using diverse platforms including media campaigns while working closely with the governments and NGOs (24). *Alive & Thrive's* success in bringing positive policy changes in these countries was largely attributed to its diverse and sustained efforts of showcasing the evidence using high profile policy windows and building consensus around the issues through the engagement of the policy champions (24).

The SUN Movement used experiential learning and drew upon the experience of policymakers, nutrition leaders, programme managers, implementers and also representatives from civil society from 57 participating countries (as of August 2019) in a collective effort to improve nutrition since 2010 (25). SUN also provides support for ensuring a minimum set of good quality nutrition data to address the data gaps through their global and regional partners. The efforts of SUN in bringing multiple stakeholders from multiple levels together to share their experience and commit to common nutrition results have been successful in bringing positive nutrition policies in the participating countries as identified by the *Monitoring, Evaluation, Accountability, and Learning* (MEAL) system (26). The MEAL System uses a set of 79 indicators to capture countries' progress aligned with the SUN Movement Theory of Change and relies on both primary and secondary data collected by the SUN networks. The secondary data are gathered from validated global databases such as WHO, UNICEF, DHS, MICS, FAO, and others (26). Being members of the SUN Movement, the countries monitor their implementation progress, assess their impact on nutrition, and share the results ensuring that good quality data is used for decision making, accountability, and advocacy.

To increase the use of the data by nutrition actors into decision making more proactive engagement is required as they are more often the passive user of nutrition data as suggested by one paper examining the use of *Household Consumption and Expenditures Surveys* (HCES) (27). More proactive involvement of the nutrition actors through planning, designing, implementation, and analysis of such surveys are required so that these surveys can be strengthened for evidence-based policymaking which is more aligned to the specific nutrition needs of the country. In cases, a diverse nutrition community should consult with experts from diverse areas including economists and market analysts to address the country-specific technical and financial constraints (27).

3.4 Informing policy and implementation: effective communication using data

The policy is developed as a result of strong political commitment to implement nutrition-related activities in the countries and the use of data helps make the commitments specific, measurable, attainable, relevant and timely (SMART) (28). Politics, governance, country's capacity, and financial resources create the enabling environment to act on those commitments and require generation and communication of knowledge to accelerate the nutrition. In absence of adequate multi-level communication and multi-sectoral collaboration, it is difficult to balance the dominance of top-down governance over the bottom-up planning, participation and feedback mechanism which results in poor implementation of nutrition activities at and below the national level. One SoC paper based on Ethiopia suggested that to progress both nutrition-specific and nutrition-sensitive programming using multisectoral platforms adequate understanding of and commitment to addressing nutritional challenges are required by the mid-level actors (29). The authors suggested that consultative and participatory planning through community engagement is required to reinforce the understanding of nutrition problems by the stakeholders (29). Beyond the national boundary, global decision-makers – primarily donors and civil society – need data to support their financing, strategic planning, and advocacy decisions to support country stakeholders.

Besides informing policy through evidence-based development of political commitment, nutrition information is also used to inform food safety policies and regulatory processes. NHANES data in the US have been used to develop and revise food labelling and food fortification policies, and establish food safety guidelines (13). Formation of regulation and policies are not often straightforward when complex issues are involved and there is diversity among the nutrition experts regarding the nutrition problem. In Australia, obesity emerged as a social and political issue, however, the resulting alliance of physical activity, nutrition, and other issues into a single obesity category was problematic and brought a diversity of experts into the competition (30). When the lack of a clear regulatory target is identified as a challenge more specific targeting of product categories with a strong evidence-base can be successful to raise awareness around the use of the product (e.g., the role of sugar-sweetened beverages for child obesity). But absence of evidence on complex issues like obesity may defer the development of political interest in obesity prevention policies (30). This fact suggests that political priority is more likely to emerge when both an evidence-informed and practice-based approach to policy is adopted (31). Pelletier and colleagues (2011) found that the disagreement among the nutrition actors was the result of diversely acting institutional perspectives and interests, and

such interest-based conflicts cannot be easily overcome by evidence alone rather require negotiation and conflict resolution through integrating scientific evidence and improving contextual knowledge of the stakeholders (12). *Transform Nutrition* and the SUN Movement have recently produced a toolkit that outlines possible ways to increase the knowledge of decision-makers and prioritizes developing clear cohesive narratives and evidence to strengthen the multisectoral understanding of the decision-makers (32).

3.5 Monitoring and evaluation: strengthening the accountability

Accountability requires clarity and cross-sectoral consensus on the roles and responsibilities of different actors including the citizens and civil society. To establish accountability and inform actions, timely data on outcomes of actions and programmes are required to be available and accessible in public domains. In the US, NHANES data are used for monitoring, tracking the nation's nutrition and health status, developing monitoring tool and updating reference index. The data are also used to plan and evaluate federal nutrition programmes especially the food assistance programme and to determine how well the nation is doing in terms of dietary reference intakes (13). While the majority of nutrition data come from national surveys providing the estimates at national or state level, there is paucity of data at the sub-national level. Data are also required to ensure horizontal coherence (information sharing across sectors) and vertical coherence (national to community level) among the stakeholders as well as the community members.

Data visualizations facilitate decision-making by presenting data in a more interpretative and persuasive way of conveying the key messages to the target audiences. Conventionally, many such visualization techniques in nutrition aim to track progress towards global goals without highlighting the data that help interpret pathways in the Theory of Change. This, in turn, makes it difficult for the decision-makers to identify and prioritize the specific intervention elements (actionable indicators) that lead to the observed changes and to support strategic planning, implementation, and advocacy decisions. The SUN MEAL is using country dashboards to support SUN Movement stakeholders at national, regional and global levels to assess progress, using a standard set of indicators that are aligned with the SUN's Theory of Change model. These dashboards aim to identify patterns in performance and inform strategic decisions towards reducing the burden of malnutrition in SUN countries. The monitoring dashboards are also adaptable for use at the sub-national level by including additional indicators if they are available (33). The important indicators without data should also be included for tracking nutrition progress to hold the implementers accountable and displaying them could be a powerful reminder to nutrition-decision makers to highlight gaps and advocate for their inclusion in surveys. For example, the SUN MEAL reports a list of 'in progress' relevant and critical indicators for countries even if they lack data in that field (33). Also, the GNMF has included twenty indicators to track monitoring of the six global nutrition targets, however, many countries currently lack the data to report on these indicators.

Accountability regarding the nutrition-sensitive aspects of national programmes is inadequate in most of the developing countries due to lack of evidence on agriculture-nutrition linkages i.e., how agricultural productions have impacts on nutrition outcomes. The available evidence,

mostly derived from nutrition-focused pilot projects or agricultural interventions, is scattered and poorly documented. In a paper examining the nutrition sensitivity of agriculture in Bangladesh, India and Pakistan, van den Bold and colleagues (2015) suggested that high-quality data on nutrition, agriculture, and health need to be collected with functioning coordination involving public and private organizations related to health, WASH, nutrition, and agriculture to increase the accountability of nutrition-sensitive initiatives. The authors also suggested that dissemination of knowledge and evidence derived from those data across multiple stakeholders can expand the nutrition literacy from policymakers to extension workers and communities and engage them in making concerted effort efficiently towards improving nutrition in their countries (21).

3.6 Case Studies

POSHAN in India: Use of nutrition data through the development of knowledge system, identification of knowledge network and promoting knowledge mobilization

The use of relevant and timely nutrition data has always been a challenge in developing and adopting effective nutrition policies and implementing actions through multisectoral collaboration in developing countries like India. POSHAN has played a pivotal role in facilitating the availability of, access to, and use of knowledge to inform programme and policy decisions among the stakeholders working for nutrition improvement in India (15).

POSHAN aimed to create a '*knowledge system*' through the synthesis of an existing pool of information and generation of new knowledge through a number of research activities and presenting it before the nutrition actors of the country. As part of knowledge synthesis, POSHAN conducted review of programme and policy documents at national level, compiled and featured findings from global and national research papers on its website, abstract digests, newsletters, supported public launch of global nutrition studies, developed district data profiles, and conducted secondary analysis from national surveys. To generate new knowledge, the research team of POSHAN conducted a number of research activities including stakeholder network mapping exercise to better understand the landscape of and links among actors involved in influencing programme and policy decisions in nutrition. This has helped identify the '*knowledge network*' of nutrition in India.

Research conducted by POSHAN identified that the knowledge network that brought varied stakeholders together did not have an associated strong knowledge resource base (34). Therefore, POSHAN aimed to strengthen the existing nutrition network through '*knowledge mobilization*' i.e. process of connecting research to decisionmakers to inform decisions by bringing diverse stakeholders at district, state and national levels, facilitating dialogues, learnings, and consensus-building around nutrition issues and by engaging with media to report on nutrition-related issues (15). POSHAN also worked towards strengthening the dialogue around the availability and use of data to track nutrition status and thus promoting the accountability of the nutrition actors to their commitments of achieving nutrition targets (15).

Thus, developing a comprehensive package of nutrition information and facilitating diverse nutrition actors in a collaborating network, POSHAN could successfully support effective decision-making for nutrition and accelerate the change in nutrition in India (35).

Rwanda: Use of nutrition information for effective communication and raising awareness across multiple sectors

Rwanda has observed a substantial reduction in prevalence of wasting, stunting, and anaemia among children between 2005 and 2015, yet the country faces high burden of malnutrition. A range of health, fertility and socioeconomic factors was identified as the drivers of this change in nutrition (22). These drivers of change acted in an enabling environment comprising positive leadership, governance, and policy environment. In the past few decades, there have been a

number of collaborative efforts to identify and prioritize nutrition issues and develop coordinated multi-sectoral planning to improve nutrition in the country. During these stages of developing the concerted efforts, knowledge, and evidence generated from nutrition information and data played a vital role.

Rwanda has been successful in raising awareness among its governmental and non-governmental nutrition actors, civil society representatives and people in general about the key nutrition problems such as low coverage of exclusive breastfeeding and adequate complementary feeding, stunting, and anaemia. Nutrition actors were engaged in nutrition discussion through discourses and policy dialogues which helped them understand the implication of investing in nutrition-specific and nutrition-sensitive programmes to tackle the nutrition issues. To highlight these issues, the prevalence of different nutrition indicators is used as an estimate of the problem burden and yearly trends of nutrition indicators are generated using multiple *Demographic and Health Survey* (DHS) datasets to see how the country is performing over the years. A number of joint and collaborative initiatives involving multiple sectors of government took place over the years to reach a common consensus around the nutrition problems and established an enabling environment for making political and financial commitments to address the problems in a coherent way. One such initiative was the adoption of multisectoral National Food and Nutrition Policy 2013-2018 (NFNP) which brought different ministries and sectors together to address nutrition in Rwanda. Once the commitments to nutrition were made, clear and transparent communication of nutrition knowledge and evidence between the sectors (horizontal coherence) and at different levels of institutional structures (vertical coherence) were required in every stage of planning, designing and implementing the agreed-upon interventions. Investments were made to facilitate the complex and challenging task of coordinating multiple sectors for a common goal. The *Social Cluster Food and Nutrition Steering Committee* (SCF&NSC), the *Food and Nutrition Technical Working Group* (FNTWG), and the *National Food and Nutrition Coordination Secretariat* (NFNCS) are some examples of the coordinating bodies that functioned in Rwanda to improve the synergy among the nutrition stakeholders. The decentralized government structure of Rwanda played a key role in minimizing the complexity of communicating the nutrition goals across different levels of administrative hierarchy (e.g., national and sub-national levels) and reduced the challenge of information asymmetry as observed in other developing counties of the world. These committees as well as the governing bodies focused on strengthening the monitoring and evaluation of nutrition programmes across different sectors and made effective use of monitoring and evaluation data to inform decision making for scaling up of the effective programmes. The district-level analysis of improvement in nutrition showed that the districts with better nutrition status had put more intensive efforts in coordinating multiple sectors using monitoring and evaluation data than their counterparts. This further underscores the importance of using nutrition information and data in decision making.

Various methods of behaviour change communications including mass media have been used to make the population aware of the key nutrition issues of the country, particularly on food security, breastfeeding, and complementary feeding. The knowledge and evidence generated from various nutrition research and activities helped develop the contents of the communication materials as well as guided the policy dialogues among the nutrition actors.

Increased availability of health and nutrition-related programmes and awareness among the community people, in turn, improved the accessibility and utilization of such services leading to improved nutrition status in Rwanda over the years.

4. CONCLUSION

Successful nutrition programming through sustainable political commitments and multisectoral collaboration requires robust evidence generated from multidimensional nutrition data on immediate factors of malnutrition as well as nutrition-sensitive sectors. This review paper identifies that to make decisions based on nutrition data, the information must be credible and valid and properly communicated among the users of such information. This points to a critical need for developing cost-efficient methods of generating a range of nutrition data in resource-poor countries. Evidence from multiple initiatives to improve nutrition in different countries shows that data presented in persuasive and interpretative ways developed awareness about the nutrition issues among the key stakeholders of the countries and influenced the decision-making process. Proactive role of nutrition researchers and programmers in collating, synthesizing, and communicating nutrition information has proven to be a successful strategy of accelerating the knowledge translation into action by engaging the policy makers of the countries to make sustainable commitments for nutrition improvement. Nutrition information is also essential for maintaining strategic communication among the national and international nutrition partners playing critical role in decision making. To further facilitate the decision making and planning for future nutrition programmes, making nutrition indicators a priority and using effective monitoring and tracking tools are required globally.

REFERENCES

1. Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, et al. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? The lancet. 2013;382(9890):452-77.
2. Lamstein S, Pomeroy-Stevens A, Webb P, Kennedy E. Optimizing the multisectoral nutrition policy cycle: a systems perspective. Food and nutrition bulletin. 2016;37(4_suppl):S107-S14.
3. World Health Organization. WHO/UNICEF Technical Expert Advisory group on nutrition Monitoring (TEAM). Available at: https://www.who.int/nutrition/team/en/.]
4. World Health Organization. The Seventh Meeting of the WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring (TEAM). 2019. Available at: https://www.who.int/nutrition/team/2019-team-7thmeeting-report.pdf?ua=1
5. Baker P, Hawkes C, Wingrove K, Demaio AR, Parkhurst J, Thow AM, et al. What drives political commitment for nutrition? A review and framework synthesis to inform the United Nations Decade of Action on Nutrition. BMJ global health. 2018;3(1):e000485.
6. Gillespie S, van den Bold M, Team SoCS. Stories of change in nutrition: an overview. Global food security. 2017;13:1-11.
7. Nisbett N, van den Bold M, Gillespie S, Menon P, Davis P, Roopnaraine T, et al. Community-level perceptions of drivers of change in nutrition: evidence from South Asia and sub-Saharan Africa. Global food security. 2017;13:74-82.
8. Lapping K, Frongillo EA, Studdert LJ, Menon P, Coates J, Webb P. Prospective analysis of the development of the national nutrition agenda in Vietnam from 2006 to 2008. Health policy and planning. 2011;27(1):32-41.
9. Bou-Karroum L, El-Jardali F, Hemadi N, Faraj Y, Ojha U, Shahrour M, et al. Using media to impact health policy-making: an integrative systematic review. Implementation Science. 2017;12(1):52.
10. Hendriks S, Babu SC, Mkandawire E, Nankhuni F. Strengthening Policy Systems: Enhancing media's capacity to report on food security and nutrition policy issues. Michigan State University, Feed the Future Innovation Lab for Food Security ...; 2017.
11. Sanghvi T, Haque R, Roy S, Afsana K, Seidel R, Islam S, et al. Achieving behaviour change at scale: Alive & Thrive's infant and young child feeding programme in Bangladesh. Maternal & child nutrition. 2016;12:141-54.
12. Pelletier DL, Menon P, Ngo T, Frongillo EA, Frongillo D. The nutrition policy process: the role of strategic capacity in advancing national nutrition agendas. Food and Nutrition Bulletin. 2011;32(2_suppl2):S59-S69.

13. Ahluwalia N, Dwyer J, Terry A, Moshfegh A, Johnson C. Update on NHANES dietary data: focus on collection, release, analytical considerations, and uses to inform public policy. Advances in nutrition. 2016;7(1):121-34.
14. Bell W, Colaiezzi BA, Prata CS, Coates JC. Scaling up dietary data for decision-making in low-income countries: new technological frontiers. Advances in Nutrition. 2017;8(6):916-32.
15. IFPRI. POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India): Overview [Available from: https://poshan.ifpri.info/files/2014/04/BR-001-POSHAN-Overview_102214.pdf.
16. Ene-Obong H, Schönfeldt HC, Campaore E, Kimani A, Mwaisaka R, Vincent A, et al. Importance and use of reliable food composition data generation by nutrition/dietetic professionals towards solving Africa's nutrition problem: constraints and the role of FAO/INFOODS/AFROFOODS and other stakeholders in future initiatives. Proceedings of the Nutrition Society. 2019:1-10.
17. Gillespie S, van den Bold M, Hodge J. Nutrition and the governance of agri-food systems in South Asia: A systematic review. Food Policy. 2019;82:13-27.
18. Gupte J, Longhurst R. How do the state's organisational capacities at the micro-and macro-levels influence agriculture-nutrition linkages in fragile contexts? Food Policy. 2019;82:74-83.
19. Accountability & Transparency for Human Rights. Budget Transparency and Child Nutrition: AT4HR, IBP and Save the Children; April 2013 [Available from: https://www.internationalbudget.org/wp-content/uploads/Budget-Transparency-and-Child-Nutrition-23Apr13.pdf.
20. Menon P, McDonald CM, Chakrabarti S. Estimating the cost of delivering direct nutrition interventions at scale: national and subnational level insights from India. Maternal & child nutrition. 2016;12:169-85.
21. van den Bold M, Kohli N, Gillespie S, Zuberi S, Rajeesh S, Chakraborty B. Is there an enabling environment for nutrition-sensitive agriculture in South Asia? Stakeholder perspectives from India, Bangladesh, and Pakistan. Food and nutrition bulletin. 2015;36(2):231-47.
22. Iruhiriye E, K. Olney D, V. Ramani G, Heckert J, Niyongira E, Frongillo EA. Understanding how rwanda created an enabling environment for improvements in nutrition and the challenges that remain: IFPRI; 2019 [Available from: https://www.ifpri.org/publication/stories-change-rwanda-understanding-how-rwanda-created-enabling-environment-improvements.
23. Cullerton K, Donnet T, Lee A, Gallegos D. Effective advocacy strategies for influencing government nutrition policy: a conceptual model. International Journal of Behavioral Nutrition and Physical Activity. 2018;15(1):83.
24. Harris J, Frongillo EA, Nguyen PH, Kim SS, Menon P. Changes in the policy environment for infant and young child feeding in Vietnam, Bangladesh, and Ethiopia, and the role of targeted advocacy. BMC public health. 2017;17(2):492.

25. Scaling Up Nutrition (SUN) Movement. SUN Movement Strategy and Roadmap (2016-2020) 2016 [Available from: https://scalingupnutrition.org/wp-content/uploads/2016/09/SR_20160901_ENG_web_pages.pdf.
26. Scaling Up Nutrition (SUN) Movement. Monitoring, Evaluation, Accountability and Learning – MEAL Baseline report 2016 [Available from: https://scalingupnutrition.org/wp-content/uploads/2018/10/MEAL-Baseline-Report-ExSumm_Mar2018.pdf.
27. Fiedler JL. Towards overcoming the food consumption information gap: Strengthening household consumption and expenditures surveys for food and nutrition policymaking. Global Food Security. 2013;2(1):56-63.
28. Achadi E, Ahuja A, Bendech MA, Bhutta ZA, De-Regil LM, Fanzo J, et al. Global nutrition report 2016: From promise to impact: Ending malnutrition by 2030: International Food Policy Research Institute; 2016.
29. Warren AM, Frongillo EA. Mid-level actors and their operating environments for implementing nutrition-sensitive programming in Ethiopia. Global food security. 2017;13:66-73.
30. Baker P, Gill T, Friel S, Carey G, Kay A. Generating political priority for regulatory interventions targeting obesity prevention: an Australian case study. Social science & medicine. 2017;177:141-9.
31. Swinburn B, Gill T, Kumanyika S. Obesity prevention: a proposed framework for translating evidence into action. Obesity reviews. 2005;6(1):23-33.
32. Transform Nutrition The Scaling Up Nutrition (SUN) Movement. Identifying, Engaging and Sustaining Champions for Nutrition: A Toolkit Geneva: SUN; 2017 [Available from: http://docs.scalingupnutrition.org/wp-content/uploads/2017/12/SUN-Engaging-andsustaining-champions-for-nutrition-ENG.pdf.
33. Manorat R, Becker L, Flory A. Global Data Visualization Tools to Empower Decision-Making in Nutrition.
34. Anuradha T, Kunaratnam Y, McGrath L. An overview of the nutrition knowledge systems and networks in India. 2015.
35. Nisbett N, Wach E, Haddad L, El Arifeen S. What drives and constrains effective leadership in tackling child undernutrition? Findings from Bangladesh, Ethiopia, India and Kenya. Food Policy. 2015;53:33-45.
36. Rao N, Gazdar H, Chanchani D, Ibrahim M. Women's agricultural work and nutrition in South Asia: From pathways to a cross-disciplinary, grounded analytical framework. Food Policy. 2019;82:50-62.
37. Stelmach-Mardas M, Kleiser C, Uzhova I, Peñalvo J, La Torre G, Palys W, et al. Seasonality of food groups and total energy intake: a systematic review and meta-analysis. European journal of clinical nutrition. 2016;70(6):700.

38. Roba KT, O'Connor TP, O'Brien NM, Aweke CS, Kahsay ZA, Chisholm N, et al. Seasonal variations in household food insecurity and dietary diversity and their association with maternal and child nutritional status in rural Ethiopia. Food Security. 2019:1-14.
39. Lachat C, Nago E, Verstraeten R, Roberfroid D, Van Camp J, Kolsteren P. Eating out of home and its association with dietary intake: a systematic review of the evidence. Obesity reviews. 2012;13(4):329-46.
40. Saksena MJ, Okrent AM, Anekwe TD, Cho C, Dicken C, Effland A, et al. America's Eating Habits: Food Away From Home. United States Department of Agriculture, Economic Research Service; 2018.
41. Smith LP, Ng SW, Popkin BM. Trends in US home food preparation and consumption: analysis of national nutrition surveys and time use studies from 1965–1966 to 2007–2008. Nutrition journal. 2013;12(1):45.
42. Nishida C, Uauy R, Kumanyika S, Shetty P. The joint WHO/FAO expert consultation on diet, nutrition and the prevention of chronic diseases: process, product and policy implications. Public health nutrition. 2004;7(1a):245-50.
43. Schulze MB, Martínez-González MA, Fung TT, Lichtenstein AH, Forouhi NG. Food based dietary patterns and chronic disease prevention. bmj. 2018;361:k2396.
44. Cohen DA, Knopman DS. Existing Regulatory Approaches to Reducing Exposures to Chemical-and Product-Based Risk and Their Applicability to Diet-Related Chronic Disease. Risk Analysis. 2018;38(10):2041-54.
45. Arteaga I, Heflin C, Gable S. The impact of aging out of WIC on food security in households with children. Children and Youth Services Review. 2016;69:82-96.
46. De Onis M, Borghi E, Arimond M, Webb P, Croft T, Saha K, et al. Prevalence thresholds for wasting, overweight and stunting in children under 5 years. Public health nutrition. 2019;22(1):175-9.
47. Forster DA, McLardie-Hore FE, McLachlan HL, Davey M-A, Grimes HA, Dennis C-L, et al. Proactive Peer (Mother-to-Mother) Breastfeeding Support by Telephone (Ringing up About Breastfeeding Early [RUBY]): A Multicentre, Unblinded, Randomised Controlled Trial. EClinicalMedicine. 2019;8:20-8.
48. Quinn EM, Gallagher L, de Vries J. A qualitative exploration of breastfeeding support groups in Ireland from the women's perspectives. Midwifery. 2019;78:71-7.
49. Ahoya B, Kavle JA, Straubinger S, Gathi CM. Accelerating progress for complementary feeding in Kenya: Key government actions and the way forward. Maternal & child nutrition. 2019;15:e12723.
50. Regan S, Brown A. Experiences of online breastfeeding support: Support and reassurance versus judgement and misinformation. Maternal & Child Nutrition. 2019:e12874.

51. Grant A, McEwan K, Tedstone S, Greene G, Copeland L, Hunter B, et al. Availability of breastfeeding peer support in the United Kingdom: A cross-sectional study. Maternal & child nutrition. 2018;14(1):e12476.
52. Shakya P, Kunieda MK, Koyama M, Rai SS, Miyaguchi M, Dhakal S, et al. Effectiveness of community-based peer support for mothers to improve their breastfeeding practices: A systematic review and meta-analysis. PloS one. 2017;12(5):e0177434.
53. Okello JJ, Kwikiriza N, Muoki P, Wambaya J, Heck S. Effect of Intensive Agriculture-Nutrition Education and Extension Program Adoption and Diffusion of Biofortified Crops. Journal of Agricultural & Food Information. 2019;20(3):254-76.
54. Mohmand N. UNHCR experiences of enabling continuity of acute malnutrition care in the East, Horn of Africa and Great Lakes region. Field Exchange issue 60. 2019:101.
55. Nimpagaritse M, Korachais C, Roberfroid D, Kolsteren P, El Idrissi MDZE, Meessen B. Measuring and understanding the effects of a performance based financing scheme applied to nutrition services in Burundi—a mixed method impact evaluation design. International journal for equity in health. 2016;15(1):93.
56. Basinga P, Gertler PJ, Binagwaho A, Soucat AL, Sturdy J, Vermeersch CM. Effect on maternal and child health services in Rwanda of payment to primary health-care providers for performance: an impact evaluation. The Lancet. 2011;377(9775):1421-8.
57. Petrosyan V, Melkom Melkomian D, Zoidze A, Shroff ZC. National scale-up of results-based financing in primary health care: the case of Armenia. Health Systems & Reform. 2017;3(2):117-28.
58. Lohmann J, Wilhelm D, Kambala C, Brenner S, Muula AS, De Allegri M. 'The money can be a motivator, to me a little, but mostly PBF just helps me to do better in my job.'An exploration of the motivational mechanisms of performance-based financing for health workers in Malawi. Health policy and planning. 2017;33(2):183-91.

APPENDIX 1

List of topics suggested by TEAM Research Priority Working Group, possible research questions and sources of information or research groups working on the listed topics

Research topics	Research questions	Sources and/or working groups
Use of nutrition data		
How countries are using nutrition data for decisions; and what kind of data triggers action	• Covered under objective 1	• Covered under objective 1
Nutrition monitoring needs across the life course		
Importance in countries of cross-sectoral data and data on how nutrition contributes to the outcomes of other sectors such as agriculture and social protection		
Variation in diet or weight		
Seasonality in diet or weight	• What are the direct and indirect paths of change in diet during seasonal variation? • How household food security, dietary diversity, and nutrient intakes differ between agricultural seasons among different populations (e.g., pregnant women) in different contexts (agrarian vs. highly industrialized environment)? • Which indicators are sensitive and specific to the change in diet due to seasonality?	• India National Family Health Survey-4 • *Leveraging Agriculture for Nutrition in South Asia* (LANSA) consortium (36) • A systematic review on seasonality of food groups and energy intake (37) • Seasonal variation in household food insecurity and dietary diversity in Ethiopia (38) • In Shivgarh, Uttar Pradesh, season was a relatively weak predictor of growth in

Research topics	Research questions	Sources and/or working groups
	• What are the sustainable ways to manage the change in diet due to seasonality?	infants but may be a stronger predictor in primarily rainfed agricultural areas (Emily Madan, Cornell University dissertation)
Within-country differences by province, state, or district	• How much variation occurs at provincial, state, and district levels?	• India National Family Health Survey-4
Diets in contexts where meals are eaten outside of the home	• What is the change in the pattern of eating habit outside of the home? • What is the relationship of out-of-home eating frequency with obesity and other diet-related chronic diseases? • What is the diet quality and nutritional intake when meals are eaten outside of the home?	• A systematic review on eating out of home and its association with dietary intake (39) • USDA report on foods away from home (40) • Smith et al. discuss the changing trend of home food preparation in US (41)
Information needed for the prevention of diet-related chronic disease	• What indicators should countries use to track and estimate diet-related chronic disease and what are the available source of nationally representative information? • What are some possible ways to predict and prevent diet-related chronic diseases, especially in developing countries? • How can food environments and dietary pattern be shifted to prevent diet-related chronic diseases? • How nutrition information can contribute to developing food policies and regulations to prevent diet-related chronic diseases? • What is the role of nutrition literacy and health communication theories in preventing diet-related chronic disease?	• TEAM Diet Quality Working Group • Diet collaborators of *Global Burden of Diseases, Injuries, and Risk Factors Study* (GBD) • The WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases (42) • Matthias B Schulze and colleagues (2018) discuss current knowledge of the associations between dietary patterns and chronic diseases (43) • Cohen and Knopman discuss policies to protect Americans from harmful exposures leading to diet-related chronic diseases (44)

Research topics	Research questions	Sources and/or working groups
Adjusting estimates (for example, to account for 'aging-out')	• What are some theoretical groundings of aging-out of nutrition care? • What are changes in food security due to aging-out of age-specific nutrition assistance programmes?	• Arteaga et. al (2016) discuss the impact of aging-out of WIC on food security (45)
Child nutrition indicators		
Appropriate responses to prevalence thresholds for wasting, overweight, and stunting in children under 5 years	• How the proposed new prevalence thresholds have an influence on prioritizing the nutrition needs and actions of the countries, targeting the programmes by donors and global actors, tracking the progress, defining a nutrition emergency? • How the proposed prevalence thresholds for wasting, overweight, and stunting including admission and discharge criteria for SAM vary among children with acute and chronic illness such as dehydration and diarrhea, anemia, nutritional edema; born with low birth weight, fetal growth restriction • How different social, economic, cultural and political environment influence the threshold level (e.g., during forceful migration, immigrant and refugee children, war crisis etc.? • How to best address the nutrition indicators for children under 6 months of age?	• De Onis and Colleagues (2019) TEAM Working Group on programmatic implications of the new prevalence thresholds for wasting, overweight, and stunting in children under 5 years (46) • Global Nutrition Cluster (GNC) • *Council of Research and Technical Advice on Acute Malnutrition* (CORTASAM)/ No Wasted Lives Coalition • *Wasting-Stunting Technical Interest Group*/ Emergency Nutrition Network (ENN) • Action Against Hunger or Action Contre La Faim (ACF) • Sphere Project
Prevalence thresholds for severe acute malnutrition (SAM)		

Research topics	Research questions	Sources and/or working groups
Relapse in SAM treatment	• What criteria make the definition of SAM relapse specific, differentiating from 'new cases' • What is the burden of SAM relapse in the countries in different contexts? • How can the CMAM programme effectively track relapse cases? • What is the acceptable rate of relapse cases in SAM treatment? • What interventions to tackle relapse in SAM treatment are appropriate, effective and scalable?	• Countdown 2030
Nutrition initiatives		
Effectiveness of mother-to-mother support groups	• What are the roles of peer support at different stages of pregnancy, delivery, and postnatal period (breastfeeding and IYCF practices)? • Can the peer-support group be used for identifying SAM and MAM cases in the community? • What motivates the mother to continue seeking peer support, attending support-group meetings? • How can online platforms aid the functioning of peer-support groups? • How can support groups promote agriculture-based nutrition-sensitive programmes?	• *Ringing Up about Breastfeeding earlY* (RUBY) in Australia: Peer support for breastfeeding provided in postnatal period by telephone call (47) • *Volunteer Breastfeeding Support Groups* in Ireland (*La Leche League* of Ireland, *Friends of Breastfeeding*, Cuidiú etc.) (48) • *Baby-Friendly Community Initiative* (BFCI) supported by MCSP/USAID in Kenya: Cooking demonstration of complementary foods (49) • Regan and Brown (2019) explored online peer support system for breastfeeding (50)

Research topics	Research questions	Sources and/or working groups
		• Aimee Grant and colleagues (2019), explored breastfeeding peer support group in the UK (51) • Prakash Shakya and colleagues conducted systematic review and meta-analysis on the effectiveness of peer-support group for improving breastfeeding practices (52) • *Scaling Up Sweet potato through Agriculture Nutrition* (SUSTAIN) in Kenya (53) • UNHCR nutrition programme (54)
Paid performance-based initiatives (e.g., in Nigeria)	• How does performance-based financing (PBF) strengthen the strategic purchasing of health care and improve nutrition? • What indicators should be prioritized (e.g., remunerated indicators) to assess the impact of PBF on nutrition improvement? • How can the trainer's incentive-based initiatives improve the effectiveness of nutrition training programmes? • What is needed to implement the best-suited strategies in PBF (health manager's autonomy, community involvement, etc.)? • To what extent can PBF address social determinants of health inequalities?	• Performance-based financing scheme applied to nutrition services in Burundi (55), Rwanda (56), Armenia (57), and *Results-Based Financing for Maternal and Newborn Health* (RBF4MNH) Initiative in Malawi (58) • Competency-based/incentive-based nutrition training programme for government health workers in Bangladesh by UNICEF

World Health Organization

For more information, please contact:

Department of Nutrition and Food Safety
World Health Organization
Avenue Appia 20, CH-1211 Geneva 27, Switzerland

Email: nutrition@who.int

www.who.int/nutrition