



UNSCN

United Nations System Standing Committee on Nutrition

NEWS

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A Spotlight on the Nutrition Decade

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Sustainable, resilient food systems for healthy diets

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Aligned health systems providing universal coverage of essential nutrition actions

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About UNSCN NEWS

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To contribute to future issues of the **UNSCN NEWS**, or to be added to our mailing list, please send an email to info@unscn.org. Manuscripts submitted for consideration are reviewed, although publication is not guaranteed.

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Chair's Round-up

MICHEL MORDASINI

UNSCN Chair

Vice-President of International Fund for Agricultural Development

Dear UNSCN News reader,

I would like to first thank you for your continued support to this publication and even more importantly, for your personal and professional interest, advocacy and engagement in advancing the daily fight against malnutrition in all its forms. At the UNSCN, we feel privileged to be associated with you, your organization and the UN Member States in this crucial endeavour.

Multiple evidence and data clearly show the severe and dramatic consequences of inaction. The 2016 Global Nutrition Report reminds us that an estimated 45% of deaths of children under five are linked to malnutrition, and that nutrient-deficient and unhealthy diets are now, by far, the largest risk factors responsible for the global burden of disease. Malnutrition in all its forms continues to hamper the lives and opportunities of millions of people worldwide, holding back the aspirations of future generations.

Fortunately, we are entering a special time in history, as we witness an unprecedented rise in high-level political commitment and financing for nutrition. It is a trend largely attributed to a greater appreciation for the central role that nutrition plays in human development and in sustainable development more broadly.

The global nutrition targets as agreed by the World Health Assembly in 2012, the global non-communicable diseases targets, and the recommendations of the Second International Conference on Nutrition in 2014 provide a clear plan of action to fight all forms of malnutrition. These targets and recommendations have been woven into the fabric of the Sustainable Development Goals,



where they should be seen as crosscutting and essential to the achievement of the 2030 Agenda. The UN Decade of Action on Nutrition (2016-2025), proclaimed by the United Nations General Assembly on April 2016, amplifies that message by calling for accelerated, coordinated, global action on nutrition.

In my role as Chair, I have had the privilege of watching UNSCN members come together to develop strategies and share lessons learned to better reach these global nutrition targets. While UNSCN's constituent members are the five UN agencies with an explicit mandate for nutrition – Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF) and World Food Programme (WFP), the Committee involves all UN agencies that have a stake in nutrition-related issues. The knowledge and experience provided through this varied membership creates an array of expertise, enabling the UNSCN to identify, assess and address new and emerging issues in a holistic manner.

For the UN Decade of Action on Nutrition to achieve longstanding results, we need to be forward thinking and adaptive to the constantly evolving nutrition landscape. Emerging issues include modifications in dietary patterns, urbanization and

the effects of climate change on food availability. These pressures cause the greatest stress to those who are most vulnerable, a fact that needs to be considered when designing and implementing policies and programmes.

The vision and framework of the Nutrition Decade has been carefully crafted by its co-conveners, FAO and WHO. These two UNSCN members have rallied behind the UN General Assembly Resolution 70/259 and have successfully produced the UN Decade of Action on Nutrition (2016-2025) Work Programme to help connect the independent initiatives of governments and their many partners including the UN agencies. The Work Programme will also serve as an accountability mechanism, tracking progress on agreed commitments in an open and transparent manner.

Setting out the Nutrition Decade's Work Programme is an inclusive, continuous and collaborative process, building upon and connecting the independent initiatives of governments and their many partners. The UNSCN is supporting these efforts by collecting the ideas and contributions of all relevant actors through online discussions and by exploring the issues raised through this edition of UNSCN News. UNSCN also works to ensure that the UN "delivers as one" on nutrition by strengthening policy coherence, fostering joint global actions, investigating emerging issues, enhancing dialogue and knowledge sharing, and promoting accountability and advocacy on nutrition.

As Vice-President of IFAD, I reaffirm my organization's full commitment to contribute concretely and effectively to the Nutrition Decade in support of the Member States. As a specialized UN agency and an international financial institution focused on the needs of smallholder farmers and poor rural people, IFAD seeks to improve nutrition by combining solid technical knowledge with the provision of the finance that governments need to make lasting and effective investments in nutrition-sensitive agriculture. Considering IFAD's comparative advantage, significant contributions to the Nutrition Decade will be made to sustainable, resilient food systems for healthy diets (Action Area 1) and to trade and investment for improved nutrition (Action Area 4).

In the momentum of the Nutrition Decade, UNSCN has benefitted from a renewal as it commemorates its 40th anniversary and its return to Rome. The UNSCN was created in 1977 as the Administrative Committee on Coordination (ACC) Subcommittee on Nutrition, which at that time was accountable to the ACC through an UN Economic and Social Council (ECOSOC) resolution. In early 2016, UNSCN members met at FAO headquarters in Rome to renew their support to UNSCN and to agree on the development of a new strategic plan, according to the agreed new roles, and the added value in the current nutrition context.

The original ECOSOC mandate (1977) remains valid for and relevant to UNSCN during the Nutrition Decade. For example, it stipulates that UNSCN should "keep under review the overall direction, scale, coherence and impact of the UN system response to the nutritional problems of the world". Furthermore, it highlights UNSCN's role as a "point of convergence in harmonizing the policies and activities in the UN system". Indeed, UNSCN will continue to serve as a platform for honest reflection and experience sharing, both positive and negative, to make available the necessary guidance to collectively plan for the future.

The Nutrition Decade is the culmination of the actions of all relevant actors to ensure that the final collective result is greater than the sum of the individual efforts. The world now has a complete and comprehensive set of nutrition targets. It has a sustainability agenda that provides the social, economic and environmental context in which the nutrition targets should be met. There is high-level political attention to nutrition, and many organizations, institutes and individuals have been mobilized in support of nutrition in several important and influential initiatives, programmes and networks.

The Nutrition Decade is currently underway and we must all engage towards its success. With the exceptional commitment and high professionalism of our coordinator Stineke Oenema and her team, and thanks to your continued support, UNSCN is ready to do its share.

Michel Mordasini
UNSCN Chair



Michel Mordasini is Vice-President of the International Fund for Agricultural Development (IFAD) since December 1, 2013. Mordasini, a Swiss national, has over 35 years in bilateral and multilateral development cooperation, with a rich field experience. His latest assignments were as Executive Director on the Board of the World Bank and, since 2011, Assistant Director-General of the Swiss Agency for Development and Cooperation (SDC) in charge of Swiss multilateral aid and SDC's response to global challenges faced by developing countries with a particular focus on climate change, water, food security and migration. Michel Mordasini became the 12th UNSCN Chair on January 1, 2016 by unanimous vote by the UNSCN Executive Committee.

Editorial

STINEKE OENEMA

UNSCN Coordinator

I am pleased to introduce this first UNSCN News since the renewal of the Committee early 2016. Last year we took time to refocus the UNSCN so that it would be a United Nations (UN) only committee just as in 1977 when it began, focusing on global policy coherency across the entire UN system, while facilitating consistent and accountable delivery by the UN System at the country level. Many of you, our readers, had asked to continue publishing the UNSCN News (formerly the SCN News), since it provides a valuable platform to the entire nutrition community for sharing lessons and insights on nutrition. In the renewed UNSCN, we continue providing this platform.

Indeed, this platform may have an even more important role today in the UN Decade of Action on Nutrition (2016-2025). As explained in the Foreword by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) – the co-leads of the Nutrition Decade – this Decade belongs to everyone. This 42nd issue of UNSCN News serves as a platform for society-wide discussion, following on the earlier UNSCN-led online consultations late 2016 and early 2017.

The UN General Assembly, through its Resolution 70/259, called on UNSCN to support the organisation of the Nutrition Decade. Therefore, as another step to support, UNSCN launched the Call for Contributions focusing on the UN Decade of Action on Nutrition (2016–2025) requesting papers on, but not restricted to, the six action areas identified in the ICN2 Framework for Action. These six



action areas are: sustainable and resilient food systems for healthy diets; aligned health systems providing universal coverage of essential nutrition actions; social protection and nutrition education; trade and investment for improved nutrition; safe and supportive environments for nutrition at all ages; and strengthened governance and accountability for nutrition. Many responded to this call with exciting ideas, recommendations and viewpoints covering the entire scope of the Nutrition Decade. We received articles related to all six aforementioned areas, but clearly, when taking into consideration how the themes of the papers are connected, some could easily fall under more than one action area. Moreover, considering the interlinkages between action areas, one could argue that categorizing each of them in one of the six action areas was rather limiting. This is true. Cross-area linkages, synergies, comprehensiveness and breaking silos is what is really needed. The Nutrition Decade should foster that.

WHAT DO WE NEED TO REALIZE THE VISION OF THE NUTRITION DECADE?

So what is required to realize the vision of the Nutrition Decade? We know one out of three people is malnourished and that this number is not declining. We know that we must not leave anyone behind; hence, we need to know why there is a persistent group of people not being reached by the regular policies or programmes. ICN2 outcome documents are the basis for the Nutrition Decade, so there is no need to reinvent the wheel, nor renegotiate it. However, we need to prioritize and adapt the general recommendations to the local context and towards achieving more sustainable and resilient systems that respond to people's needs. Therefore, we should work towards a wide spectrum of local food systems that are built on sustainable, agro-ecological agriculture, nourishing people according to their local customs and preferences. This requires an enabling political environment, supported by rights-based and courageous policies.

The papers in this publication reflect medium- and long-term views and provide an interesting assortment of recommendations for action. We need this collective thinking and joint action towards one common goal in order to reach the tipping point that leads to transformative and systemic change as FAO and WHO call for in the Foreword. In the spirit of the 2030 Agenda and the Nutrition Decade, we need to move beyond 'fixing the system'; we need to transform it. Many authors in this publication also outline the urgency of the problem by describing the scale and the scope of the malnutrition.

Urgent action is needed to achieve zero malnutrition by 2030. Efforts need to be made to ensure that, by the end of the Nutrition Decade, systems are in place that nourish people instead of merely feed them. In order to 'leave no one behind', it is equally important that food systems be transformed so as to ensure that vulnerable or marginalized people are equal actors. This requires a solid rights-based framework at the basis of the food systems.

Several papers provide opinions and insights highlighting the failures of the current system. The current food systems are actually moving in the opposite direction from the targets, rather than working towards them. How can we address the "lock ins" or bottlenecks in the system? To curb this negative trend, the Nutrition Decade should foster commitment and positive actions for and by the people. Civil society should continue to be strongly engaged in advising governments on the impact of policies and actions on the ground as well as convince them to make firm and concrete commitments to tackle malnutrition in all its forms. Their "Manifesto" in this publication points out five key expectations to be taken into account by Member States and UN agencies.

Just before this UNSCN News was sent for printing, Brazil and Ecuador became the first countries to make specific, measurable, achievable, relevant, and time bound (SMART) commitments to the Nutrition Decade. Both set of commitments can be found on the UNSCN website.^{1,2} UNSCN will publish more commitment as they come in, including those from non-state actors.

Commitments need to be followed by action. One of the papers highlights that despite policies being in place, implementation lags behind. It is therefore important for nutrition to be better integrated in the national and local planning, leading to sensible and nutrition sensitive investments. Another paper complements this by stating that this will only lead to real and lasting action if there is sufficient capacity on the ground. The first Global Nutrition Report (GNR 2014) showed the importance of nutrition frontline workers, who contribute to the significant reduction of stunting in a numbers of countries. In this issue of UNSCN News, the case is made for agricultural extension workers to integrate nutrition messaging into the agricultural extension, as well as for health workers to better integrate nutrition in health services. Although without any direct reference to investments, these two above-mentioned papers indicate that human capacity might be one of the areas for investment. Several editions of the GNR show that investments in nutrition are worthwhile, providing a high return (at a mean of 1:16). Nutritionists, as well as other experts, can use this economic argument to convince budget holders to invest in nutrition.

¹ <https://www.unscn.org/en/topics/un-decade-of-action-on-nutrition/action-and-commitments?idnews=1684>.

² <https://www.unscn.org/en/topics/un-decade-of-action-on-nutrition/action-and-commitments?idnews=1685>.

Trade and investment agreements affect how the food system functions at global, regional, national and local levels, influencing food prices, availability, access and consumption as well as nutrition outcomes, food safety and dietary options. One paper in this issue highlights the trade debate and the potential impact on agricultural production and the food system.

As can be noted while browsing through the publication, many papers fall under Action Area 1: Sustainable and resilient food systems for healthy diets. This is not surprising considering that 'food system thinking' is relatively new and takes into account more complex relations. Food systems cannot be seen as static entities that cannot be influenced. Research has shown that food systems tend to follow certain patterns in their own transformation. These patterns are helpful for understanding their transformation. In addition, the underlying socio-economic drivers of these developments should be analyzed. Good insight into these underlying drivers will help prevent unwelcome developments and stimulate positive developments, which will lead to more sustainable food systems. Considering all of the actors and sectors that are involved in a food system, how can we ensure that it would work better for nutrition?

The Nutrition Decade partly overlaps with the UN Decade on Biodiversity (2011-2020). While not the only component of a sustainable food system, a sustainable food system cannot exist without agricultural biodiversity. This issue points out that research has been biased to a limited number of crops, while neglecting the potential of others. Many authors call for biodiversity in order to promote dietary diversity, thus halting the worldwide trend toward more monotonous, unhealthy diets. This calls for diverse production systems and also calls on consumers to change their dietary patterns and thus provide the push factor that leads to more diverse production. Other authors agree but add the importance of putting nutrition at the centre of the climate debate and vice versa. The core of both claims is an appeal for sustainable diets that contribute to healthier people and a healthier planet. The paper on biofortification takes into account the timespan of the Nutrition Decade and makes the point that

considering the time one needs to switch from one (broken) system to another, bio fortification could serve as a good intermediate solution.

The papers in this issue reiterate the important role of diets, what they do and how they can be improved, in addition to what efforts are needed to foster sustainable and healthy diets. Diets are the connecting point between consumers, their environment and the food system. Diets may or may not be sustainable and therefore contribute to people, planet and prosperity, or not. If unsustainable, they will continue to contribute to climate change, loss of biodiversity, undernourishment and non-communicable diseases. Following the ICN2 outcome documents and supported by many authors in this issue, diets make a good entry point for action.

The article about food-based dietary guidelines (FBDGs) reminds us that FBDGs can be instrumental in advocating for change. FBDGs encourage consumers to adopt nutrition-focused behaviour and policy makers to adopt policies that create an enabling environment for sustainable diets, both of which would lead production systems to perform better by producing a more diverse range of products in a sustainable manner. Another paper provides examples showing how Food and Nutrition Education (FNE) in Brazil helps connect the consumption and production areas, and ensures coherence between sustainable consumption and production.

Key to the Nutrition Decade is the involvement and engagement of a broad range of actors and stakeholders. Indeed, the United Nations General Assembly resolution calls for the involvement of all relevant actors, including governments, civil society, parliamentarians and private sector. This requires good governance in order to reach the target of eliminating all forms of malnutrition and leaving no one behind. The sixth action area of the Decade specifically looks at strengthened governance and accountability for nutrition. Authors recall the UN Guiding Principles on Business and Human Rights (2011) as well as the annual UN forum on the same topic. Although there is increased interest in business and human rights, the work to include nutrition in the framework proposed by the UN Guiding Principles for Business and Human Rights is still in its infancy. Given its history and scope of work, the UNSCN can fully play an advocacy and harmonizing role in this context.

UNSCN, as a UN committee, is and will continue to be dedicated to advocating for human rights as one of the underlying principles of its work, as it has always been. This will be done in the context of the Nutrition Decade whose Work Programme³ states:

The Nutrition Decade provides an enabling environment such that national, regional and international policies and programmes respect, protect and fulfil 'the right of everyone to have access to safe, sufficient, and nutritious food, consistent with the right to adequate food, the fundamental right of everyone to be free from hunger consistent with the International Covenant on Economic, Social and Cultural Rights and other relevant United Nations instruments.

Michael Mordasini, the UNSCN Chair, commented in his Roundup that the UNSCN will continue to maximize policy coherence and advocacy among the UN agencies and will support consistent and accountable delivery by the UN system. One way to achieve this is by facilitating information and knowledge sharing amongst members and all other interested stakeholders. This UNSCN News is one result of that work.

It is important to keep the momentum and to inform more people about, and engage them in the Nutrition Decade. Although the nine years that remain of the Nutrition Decade seem to be a short span of time, great progress can be made if we set the priorities right. The authors provide us with ideas and insights. It is now up to governments and other actors to make firm and concrete commitments to build the structures that ensure sustainable transformation towards the elimination of all forms of malnutrition.

Stineke Oenema

UNSCN Coordinator

³ https://www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf



STINEKE OENEMA is nutritionist (Wageningen University, 1993) and agricultural economist (London University, 2005). She has worked several years for FAO and UNICEF, after which she worked for considerable time with civil society (ICCO, Netherlands) where she was in charge of food and nutrition security policy and programme development. During this period she was member of the editorial board of the Right to Food and Nutrition Watch. She chaired the European Food Security Group and was part of the Coordinating Committee of the Civil Society Mechanism for the CFS, facilitating participation of Western European CSOs, as well as the nutrition-working group. In the Netherlands she has been chair of the Netherlands Working Group on Nutrition, a working group of NGOs, private sector actors and knowledge institutes. Early 2014, she became member of the Independent Expert Group for the development of the Global Nutrition Report. In 2015, she worked at Wageningen University, the Centre for Development Innovation. Since January 2016, Mrs Oenema is Coordinator of the United Nations System Standing Committee on Nutrition (UNSCN). In this function she contributes to maximising nutrition policy, advocacy and programming coherency and consistency in the UN system.

Foreword

Our Decade to end malnutrition

ANNA LARTEY

Nutrition and Food Systems Division, Food and Agriculture Organization of the United Nations (FAO)

FRANCESCO BRANCA

Director, Nutrition for Health and Development, World Health Organization (WHO)

We are facing a global nutrition crisis. Despite progress in reducing hunger over the past two decades, almost 795 million people around the world still go to bed hungry, and more than 2 billion wake up deficient in crucial vitamins and minerals (FAO, IFAD and WFP 2015; FAO and WHO 2014). In 2015, 156 million children under five were stunted (too short for their age – a sign of chronic malnutrition) and 50 million were wasted (much too thin for their height – a sign of acute undernutrition) (UNICEF, WHO and World Bank 2016). In addition, changes in our food systems as well as urbanization have brought unprecedented shifts in people's diet and physical activity patterns, resulting in 42 million children becoming overweight even before reaching their fifth birthday and a staggering 1.9 billion overweight or obese adults (UNICEF, WHO and World Bank 2016; GBD 2015 Risk Factors Collaborators 2015; WHO 2016). Unhealthy diet is now the leading risk factor for the global burden of disease among both men and women (WHO 2016).

No country is immune from the health, social and economic burdens posed by malnutrition. The various forms of malnutrition affect people within the same countries and communities – sometimes even the same household or individual. The impacts of this global burden are serious and often long-lasting. Malnutrition increases health care costs, reduces productivity and slows economic growth. It perpetuates a cycle of disease and poverty.

THE UN DECADE OF ACTION ON NUTRITION

- ADDRESSES ALL FORMS OF MALNUTRITION;
- INVITES AND INCLUDES ALL NATIONS;
- IS LED BY THE UN AND DRIVEN BY MEMBER STATES;
- FOCUSES ON SMART POLICY COMMITMENTS AND IMPACT;
- ALIGNS WITH AND SUPPORTS THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT;
- PROVIDES THE HIGHEST LEVEL OF ACCOUNTABILITY.

UNITED NATIONS DECADE OF **ACTION ON NUTRITION**



2016-2025

Ending hunger, achieving adequate nutrition for all, reducing foodborne diseases and diet-related non-communicable diseases (NCDs) such as stroke, diabetes and cancer, and ensuring resilient, sustainable food systems are vital to sustainable development and prosperity.

A DECADE TO ACT

Building on the success of the 2014 Second International Conference on Nutrition (ICN2) and in the framework of the 2030 Agenda for Sustainable Development, world leaders at the United Nations General Assembly proclaimed the UN Decade of Action on Nutrition from 2016 to 2025 (UN 2016a; UN 2016b).¹

Unprecedented in nature, the Nutrition Decade marks a new vision, momentum and direction in global action to address nutrition challenges.

Member State-led and -driven, the Nutrition Decade represents a unique, collective opportunity for achieving better nutrition for all people, at all times of their lives, through access to affordable, diversified, safe, sustainable and healthy diets.

The Nutrition Decade's Work Programme provides a clear, time-bound framework to increase alignment and collaboration.² Through commitments, action areas and action networks, the Nutrition Decade presents an opportunity for countries to commit to address all forms of malnutrition, and effectively translate the ICN2 commitments and the Sustainable Development Goals (SDGs) into concrete, nationally determined policies and programmes. It will promote coherence between national, regional and international policies across multiple sectors, including through improved monitoring and reporting. It will help mobilize policy and financial commitments to reach global nutrition and diet-related NCD targets endorsed by ICN2 and the SDGs. Finally, and crucially, it will see the establishment of a global accountability framework and mechanism across sectors and constituencies, building upon existing mechanisms, processes and tools.

A DECADE FOR ALL

As a global, collective effort, the Nutrition Decade belongs to everyone. All countries are invited to accelerate action, regardless of income levels, the nature of their malnutrition challenges, and the characteristics of their food and health systems. The Nutrition Decade provides a common, inclusive umbrella for every government, every sector, and any initiative or stakeholder with a role to play in ending all forms of malnutrition. Urban and rural communities, parliamentarians, regional political and economic entities, farmers, youth groups, scientists, businesses, consumers, women and men should all feel ownership of this Nutrition Decade.

The Nutrition Decade is also an opportunity to spark society-wide discussion and support for national policy change.

The Nutrition Decade provides a concrete deadline for making specific commitments, tracking them, and achieving outcomes and impact in support of all the SDGs, particularly SDG2 (end hunger, achieve food security and improved nutrition, and promote sustainable agriculture) and SDG3 (ensure healthy lives and promote well-being for all at all ages).

Finally, FAO and WHO, in close collaboration with other United Nations agencies, will work with all countries and nutrition stakeholders to establish and strengthen transparent mechanisms for tracking progress and ensuring mutual accountability for commitments made. This will include biennial reporting to the UN General Assembly, governing bodies of FAO and WHO, Committee on World Food Security and other relevant intergovernmental bodies and multi-stakeholder forums.

SMART COMMITMENTS FOR IMPACT

At the heart of the Nutrition Decade is a platform and process for making commitments towards ending malnutrition in all its forms. All stakeholders, including those who are new to the nutrition community, are encouraged to set SMART (specific, measurable, achievable, relevant and time-bound) commitments.

While this is a Nutrition Decade for all, reducing and ending malnutrition will, first and foremost, require strong, sustained policy commitment from governments. As such, the Nutrition Decade calls most especially on policymakers to review existing and make additional bold commitments.

¹ The UN Sustainable Development Agenda is available online at: www.un.org/sustainabledevelopment/development-agenda.

² United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.

To assist and guide this process, the Nutrition Decade offers six cross-cutting, integrative Action Areas: creating sustainable, resilient food systems for healthy diets; aligning health systems and providing universal coverage of essential nutrition actions; ensuring social protection and nutrition education for all; ensuring trade and investment policies improve nutrition; providing safe and supportive environments for nutrition at all ages; and strengthening governance and accountability for nutrition.

Governments and others that make formal commitments and work towards achieving them will become Nutrition Decade champions, frontrunners for the global movement to improve populations' nutrition and health.

LOOKING TOWARDS 2025

The Decade sets the stage for unprecedented action and impact on nutrition.

While it does not seek to establish new structures or duplicate current efforts, it cannot simply be “business as usual”. It is a once-in-a-lifetime window for rapidly accelerating action so we can reach a tipping point for systemic change.

In the remaining nine years, we invite all stakeholders to join us, so that together, we may realize the vision of a world free from malnutrition.

References

Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) (2015) *The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress*. FAO: Rome. <http://www.fao.org/3/a-i4646e.pdf>.

FAO and World Health Organization (WHO) (2014) *Second International Conference on Nutrition Conference Outcome Document: Framework for Action*. www.fao.org/3/a-mm215e.pdf.

Global Burden of Disease (GBD) 2015 Risk Factors Collaborators (2015) Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 388(10053): 1659–724. <https://www.ncbi.nlm.nih.gov/pubmed/27733284>.

The United Nations Children's Fund (UNICEF), WHO and World Bank (2016) *Levels and trends in child malnutrition*. UNICEF/WHO/World Bank Group joint malnutrition

estimates. Key findings of the 2016 edition. UNICEF/WHO/World Bank Group: New York/Geneva/Washington DC. www.who.int/nutgrowthdb/estimates2015/en.

United Nations (UN) (2016a) *United Nations Decade of Action on Nutrition*. Seventieth session of the United Nations General Assembly. Agenda item 15 (A/RES/70/259). UN: New York. http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259.

UN (2016b) *United Nations Decade of Action on Nutrition*. Seventieth session of the United Nations General Assembly. Agenda item 15 (A/RES/70/259). UN: New York. http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259.

UN (n.d.) The Sustainable Development Agenda. www.un.org/sustainabledevelopment/development-agenda.

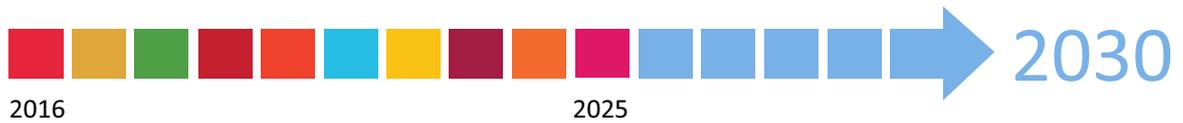
UN Decade of Action on Nutrition (2016-2025) (2017). Work Programme. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.

WHO (2016) *Obesity and overweight*. Fact sheet. www.who.int/mediacentre/factsheets/fs311/en.



When

NUTRITION DECADE



What

WHA targets



NCD targets



SUSTAINABLE
DEVELOPMENT
GOALS



How

ICN2 Framework for Action

- Sustainable, resilient food systems for healthy diets.
- Aligned health systems providing universal coverage of essential nutrition actions.
- Social protection and nutrition education.
- Trade and investment for improved nutrition.
- Safe and supportive environments for nutrition at all ages.
- Strengthened governance and accountability for nutrition.

Setting the content of the Decade

Nine years left to transform nutrition

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The first year of the Decade for Nutrition is already over. We have roughly nine years left until 2025, and we have much to achieve in these few years. We need to transform food systems – completing changes in the way that we generate, distribute and make food available to all people to help them achieve healthy, sustainable diets and improve nutrition.

This is no small challenge, but nine years is quite a long time. Just think that in 1960, the Apollo Space Programme was just a twinkle in the eye of engineers, but nine years later, they put a man on the moon. In 1966, India was importing more than 1 million tonnes of rice, but nine years later had cut that by about 90 percent, to roughly 100 000 metric tonnes. This was largely due to investments in agricultural productivity and output. In the last nine years, we have seen huge gains in poverty reduction. In just the last nine years, we have seen roughly a halving of the number of people living on less than US\$1.90 per day. This shows the potential of what can be achieved in nine years – when people are committed. Since the 1990s, there have been declines in poverty, maternal mortality and illiteracy. Famine no longer stalks the earth as it did just 25 years ago.

But malnutrition is an outlier; in all its forms combined, malnutrition is increasing. One in three people is affected

by one of the many forms of malnutrition. If this situation continues, it will be one in two people by 2025. This is the challenge facing us in the next nine years.

This challenge is present in every country on the planet. Around 800 million people are still undernourished, billions of people face vitamin and mineral deficiencies, and problems of overweight and obesity are growing fast and fuelling an epidemic of diet-related non-communicable diseases. Malnutrition is therefore no longer a poor-country problem. Low-quality diets underpin all forms of malnutrition. Indeed, dietary risk factors (eating too many unhealthful foods and not enough healthy foods) have become the single largest contributor to the global burden of disease. Our diets are no longer helping us – they are hindering our health and nutrition.

Dietary patterns are shifting in the wrong direction globally. This change is occurring fast and carrying huge health and economic costs. We cannot just “grow out of” malnutrition at a national level. Low-quality diets linked to unsustainable food systems and to poor food choices underpin today's planet-wide malnutrition challenge. The answer is not to rely on poverty reduction. The answer is not to grow more grains. We have to nourish the world, not just feed it.

The Second International Conference on Nutrition (ICN2) framework is a great place to start. Many of its recommendations are essential: to adequately cost national plans for nutrition, increase domestic finance for nutrition, and implement guidelines for healthy nutrition. But more specificity is needed – not in terms of what needs to be done, but how. Tinkering at the margins will not suffice in the face of the scale of the problem; a radical transformation of our food systems is essential.

What steps are needed to achieve this? First, implement what works. We have accumulating evidence on targeted nutrition interventions and other nutrition-sensitive programmes (including in agriculture, health care, education and social protection) that can make a significant difference in treating and preventing many forms of malnutrition – if implemented at scale. Their cost is not small, but the economic and social cost of not acting is many times greater.

Second, many countries spend huge sums on subsidies to trade and agriculture. A small portion of that would cover all the costs relating to actions for nutrition. For example, 50 countries today spend almost US\$700 billion on agriculture subsidies and sector support. Most subsidies do not support the production and distribution of nutrient-rich foods.

Third, most publicly funded research in agriculture supports just three grains: wheat, rice and maize. Far less research concerns nutrient-rich foods such as fruits and vegetables, lentils, pulses and animal-source foods, including aquatic products. These are choices. Is this the appropriate configuration of support given the transformation in food systems that we want to achieve and the kinds of foods we want to be available worldwide?

Fourth, trade matters immensely to diets and will matter more as calls grow for universal, year-round access to nutrient-rich foods, which tend to be seasonal and perishable. We cannot assume that every country can grow all it needs for quality diets. Trade agreements are important in establishing what is available in both the global and local marketplace to improve diets.

Fifth, trade is increasingly based on transformed or processed foods, rather than their raw constituents. Not all processed foods are inherently detrimental to healthy

diets – it is ultra-processed foods that are of concern. If we are going to make trade more nutrition-sensitive, we have to understand and better manage the incentives or disincentives influencing how foods are processed and what products support nutrient-rich, healthy diets.

Sixth, consumers make food choices based on a wide range of parameters such as affordability, convenience, desirability and habit. Choices can be modified, as retail advertising makes clear. Governments should play a more active role in shaping food environments in ways that are conducive to informed consumer choice. This is not only about relative prices, but about information, regulation and food safety.

Seventh, consumer choice can be better informed through more accessible and credible food-based dietary guidelines, but these should be reframed everywhere to guide policymakers not consumers.

Eighth, better data are needed to meet the global challenge. While diets are the top risk factor for the global burden of disease, we know surprisingly little about actual diets. We do not know what people are eating, yet we want to change what they eat. There are no global databases on diet. Diet quality is not even a Sustainable Development Goal, in part because there is no agreed metric.

Ninth, our failing food systems represent a planetary problem on the scale of HIV/AIDS, tobacco and now climate change. The threats posed by changing climates are many, with temperature and moisture being two of the main ecological challenges to producers and transporters of perishable nutrient-rich foods. This requires that quality of diet be taken up in the same way by policymakers, not as a localized problem, but as a global challenge.

Since our food systems are not fit-for-purpose – the purpose being healthy, well-nourished people – we have to demand that policymakers take this seriously. We have to act now. Malnutrition has re-emerged as a major public health problem. Since diets are modifiable risk factors, we can modify them. We need radical transformation in our thinking, in the way we act, and in what we demand from our food systems.

We cannot wait another nine years.

Action Area 1

SUSTAINABLE, RESILIENT FOOD SYSTEMS FOR HEALTHY DIETS

Creating sustainable, resilient food systems for healthy diets

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INTRODUCTION

Food production globally has a greater impact on water, soil, biodiversity, and greenhouse gases (GHG) than any other human activity (MA 2005; IPCC 2007 and 2013; IAASTD 2009; Rockström et al. 2009; Foley et al. 2011; West et al. 2014). Overall, food production, together with other activities of the food system including food processing, distribution, storage, preparation and waste, contribute to some 20-30 per cent of anthropogenic GHG emissions (IPCC 2007 and 2013; UNEP 2016). While the global food system contributes directly to climate change, it is also directly impacted by climate change in a vicious circle that exacerbates many of the sustainability challenges of the food system.¹ Furthermore, approximately

four billion metric tonnes of food are produced globally per year, yet an estimated 30–50 per cent (or 1.2–2 billion tonnes) of it are never consumed (IME 2013). At the same time, many people lack adequate diets to support healthy and active lives. Every country on earth has a significant public health burden of malnutrition (IFPRI 2016) – often multiple burdens including undernutrition, micronutrient deficiencies, overweight, obesity and diet-related non-communicable diseases (NCDs). Poor diets are now identified as the number one risk factor contributing to the global burden of disease (GBD 2013 Risk Factor Collaborators 2015).

Vast resources are spent to produce an aggregate of food that does not adequately nourish people, much of which is wasted at an enormous environmental cost. Issues of food affordability and equitable distribution linked to socio-cultural and political factors further present challenges for achieving healthy diets. The UN Decade of Action on Nutrition is a window of opportunity to transform our current food system into one that is sustainable, resilient, and provides healthy diets for all.

¹ For example, changes in food supply and quality, increased food contamination, volatility of food prices, and disruption of food supply chains (Campbell et al. 2016; FAO 2016). Increasing temperatures, unreliable rains, extreme droughts and flooding, increase not only the challenge of food production, but also of dietary quality and safety (Medina, Rodriguez and Magan 2014; Springmann et al. 2016a; Myers et al. 2017).

HEALTHY AND NON-HEALTHY DIETS

A healthy diet is one that “helps protect against malnutrition in all its forms, as well as [diet-related] noncommunicable diseases”.² A recent review of national and international dietary guidelines, as well as epidemiologic research on role of diets in the global burden of disease show agreement on the key hallmarks of healthy diets: (i) consumption of abundant diverse plant foods (fruits, vegetables, legumes, nuts, seeds); (ii) low or no consumption of ultra-processed foods; and (iii) consumption of other foods as culturally appropriate and desired to meet energy and nutrient needs (Herforth 2016).

Most people’s diets around the world fail to meet the ideal for healthy diets. It is estimated that “poor diets are responsible for more of the global burden of ill health than sex, drugs, alcohol and tobacco combined” (Haddad et al. 2016, p. 30). Only 36 per cent of children are fed minimum dietary diversity (four or more food groups), based on representative data from 60 countries (IFPRI 2016). Nearly 800 million people are undernourished, while 2.1 billion are overweight or obese (FAO, IFAD and WFP 2015; IFPRI 2016). The Global Burden of Disease Study estimates that the top dietary factors associated with the highest global burden of disease are low fruit, vegetables, whole grains, nuts and seeds, omega-3 fatty acids and fibre, together with high sodium and processed meat (GBD 2013 Risk Factor Collaborators 2015). It is precisely those foods that protect health that are the most underconsumed. Trend data indicate that, in many countries, unhealthy components in the diets are increasing more rapidly than healthy components (Imamura et al. 2015).

SYSTEMIC DRIVERS OF DIETS: CHANGES IN FOOD ENVIRONMENTS AND FOOD SYSTEMS

Key systemic drivers of observed dietary patterns globally are food environments that increasingly offer more unhealthy foods and fail to offer adequate healthy foods. Food environments include the availability, affordability, convenience, and desirability of various foods and strongly influence dietary consumption (Herforth and Ahmed 2015).

In the past few decades, there has been a dramatic increase in the availability, affordability, convenience and marketing of unhealthy foods, such as calorie-dense, ultra-processed foods, whereas growth in nutrient-dense foods, such as fruits, vegetables and legumes, has not kept pace and moreover, is not projected to meet future demands (Global Panel 2016; Remans et al. 2014; Monteiro et al. 2013; Gómez et al. 2013). Many of these changes in the consumer food environment are mirrored in agricultural production systems at large. For example, there has been a notable rise in the agricultural production of energy-dense crops, such as oilseeds and starchy staples (Khoury et al. 2014), which are transformed into ingredients that form the basis of ultra-processed foods: industrial formulations of sugar, salt, oils, fats and other substances that are not conventional culinary ingredients that contain little or no intact foods (Monteiro et al. 2016). Despite improved food conservation technologies and efficient global trade systems decoupling the availability of fresh foods from seasons (Kearney 2010), the availability of fruits, vegetables and legumes falls far short of global need (Siegel et al. 2014; Herforth 2015).

Over the past 50 years, per capita food supplies have expanded in calories, protein and fat, with increased proportions from energy-dense foods, while national food supplies worldwide have become more similar in composition, correlated with an increased supply of a small number of cereal and oil crops (Khoury et al. 2014). This food environment can be associated with human health when considering low-risk diets or diets with ingredients that reduce the risk of diet-related NCDs. Considering Khoury et al’s (2014) observations of changes in crop production, the authors note that the crops with the greatest increase in spread and abundance over the last decades include several crops categorized as “harmful” in the low-risk diet concept (Khoury et al. 2014; Murray 2014). Treenuts and vegetables, which are classified as “protective”, are currently underproduced, but are represented in the top ten crops produced with some signs of growth in abundance and spread, although at rates much lower than seed crops. Many of these production trends are driven by economic, cultural and socio-political factors that have driven global food systems to unsustainable modes of production with heightened consumption of resources (Breggin and Myers 2013; de Wit and Iles 2016; Gomiero, Pimentel and Paoletti 2011). Subsidies and research and development (R&D) globally generally emphasize commodities (rice, maize, wheat and oil crops) (Pingali 2015; Siegel et al. 2016). Urbanization, marketing, increased income, migration, international trade policies, and globalization of transnational fast food corporations have also influenced trends in food consumption and facilitated a global dietary transition (Kearney 2010).

2 World Health Organization (WHO) (2015) *Healthy Diet*. WHO Fact Sheet No. 394. www.who.int/mediacentre/factsheets/fs394/en/.

Table 1. TOP TEN SPECIES IN TERMS OF THEIR INCREASE IN ABUNDANCE IN NATIONAL FOOD SUPPLIES, 1961 TO 2009

Crop*	Increase in relative abundance and contribution to calories (rank)	Change in spread (rank)	Risk category
Soybean	1	2	Harmful**
Palm oil	2	5	Harmful
Sunflower	3	3	Neutral
Wheat	4	35	Neutral
Rape and mustard	5	6	Neutral
Rice	6	15	Neutral
Sweeteners	7	4	Harmful
Vegetables	8	-	Protective
Cacao beans	9	17	Neutral
Treenuts	10	26	Protective

Notes:

* These top ten species are ranked in terms of increase of spread (Khoury et al. 2014), and dietary risk (Murray 2014). Khoury et al. (2014) did not analyze animal-source foods. The geographic spread is defined as the change over time in a country's food supply in each year; a higher number indicates less change in geographic spread relative to other crops.

**Soybeans themselves would be in the "protective" risk category, but the increase in their production is mostly for livestock feed to produce red meat destined for middle- and high-income countries, which is classified as "harmful" with relation to the global burden of disease.

Sources: Derived from Figures 1A and 1B in Khoury et al. (2014) and Murray (2014).

SUSTAINABLE, RESILIENT FOOD SYSTEMS AND DIETS

Food systems and diets can be characterized on the basis of their sustainability, including environmental, economic, socio-cultural, and human health dimensions (Gussow and Clancy 1986; Johnston, Fanzo and Cogill 2014). Sustainable food systems can be defined as the complex interconnected web of resources, people and processes that encompass all aspects involved in providing adequate and desirable nourishment for human health while maintaining the ecological integrity of natural resources, as well as supporting socio-cultural and economic factors. Resilience refers to the capacity of a system to absorb disturbance and re-organize while undergoing change so as to maintain the same function, identity and feedbacks (Walker et al. 2004). A resilient food system is one that supports sustainability by absorbing shocks such as climate variability and price fluctuations while still providing healthy food to nourish people.

Drawing from the multi-faceted concept of sustainability, sustainable diets are defined as those that support nutrition and environmental outcomes while also encompassing the economic, cultural and socio-political aspects of sustainability (Johnston, Fanzo and Cogill 2014). Jones et al. (2016) identified over 30 facets of sustainability that have been discussed in the literature on sustainable diets. The most commonly measured were GHG emissions, followed by land use, consumption of animal-source foods, diet quality,

energy use, and water consumption involved in producing and processing foods (Jones et al. 2016). Other less frequently measured characteristics included social justice, animal welfare, biodiversity and cultural appropriateness.

These multiple facets of sustainability imply not just dietary choices, but also a more systemic approach than can or would usually be taken by individuals. A diet is something consumed by an individual, while a food system covers all activities and institutions from production to consumption. Similarly, sustainable diets imply consumption choices by individuals, and a sustainable food system involves food production, processing, distribution, consumption and waste management and all the steps in between. Given the differences in scales of diets and food systems, it is important to design action steps that can be taken at both the individual (diet) and policy and production (food system) levels.

SUSTAINABLE DIETS: WHAT STEPS INDIVIDUALS CAN TAKE

Sustainable diets are by definition healthy diets as human health and nutrition are core parts of sustainability. Dietary guidelines, in general, are a good starting point for sustainable diets; they are designed to ensure health and are generally aligned with two other rules of thumb for sustainable diets: a diversified, largely plant-based diet, and low consumption of ultra-processed foods.

One way to conceptualize resource-intensiveness of diets is the trophic level of the diet, a basic ecological metric that describes the number of intermediaries between plants and consumers (Bonhommeau et al. 2013). As omnivores, humans can eat foods that are higher or lower on the food chain. Intakes higher on the food chain generally are more resource-intensive, although there are some exceptions based on how the animal or plant foods are produced.

The same food can be produced at varying levels of environmental and social impact. Industrialized production of meat and dairy is a primary culprit in GHG emissions, pollution, and questionable practices concerning human and animal rights. However, in some contexts and often under smaller-scale production, livestock production is not only harmless, but is positive for the nitrogen cycling and biodiversity.

A greater reliance on plant source foods reduces the trophic level of the diet and often increases its healthfulness. Depending on how they are produced and sold, however, vegetables and fruits may also be highly intensive in terms of agrochemical use, energy consumption to operate greenhouses, and packaging material; they may entail agrochemical exposure risks for labourers, who require long working hours.

A large portion of sustainable diet research, concordantly, has estimated the environmental impacts of diets according to whether they are more vs. less plant-based (Tilman and Clark 2014; Auestad and Fulgoni 2015; Jones et al. 2016; Springmann et al. 2016b). GHG emissions of different food groups and food production processes vary widely, but in general, meat and dairy contribute the most to GHG emissions in the diet (Carlsson-Kanyama and Gonzalez 2009; Wallén, Brandt and Wennersten 2004; Millward and Garnett 2010; MacDiarmid et al. 2012). A recent systematic review suggests that dietary change in areas with affluent diets has a potential for reducing GHG emissions and land use demand of current diets by up to 50 per cent, largely by

reducing meat consumption (Hallström, Carlsson-Kanyama and Börjesson 2014).

The sustainability of diets can also be enhanced through lower levels of consumption of ultra-processed food. High levels of processing are often intended to increase convenience or profit margin of foods, but often diminish nutritional value and increase resource use. Foods are often consumed at different levels of processing, from unprocessed and minimally processed (e.g. milled rice), to processed (e.g. vegetable oil), highly processed (e.g. boxed breakfast cereal) and ultra-processed (e.g. soft drinks). Ultra-processed foods are increasing fastest in sales and consumption in low- and middle-income countries (Monteiro, Gomes and Canoon 2010). Studies have shown that greater consumption of ultra-processed food products is associated with obesity and lower micronutrient adequacy of diets (Louzada et al. 2015a and 2015b; Martínez Steele et al. 2015). Highly processed food also uses significant packaging; for example, in the United States of America, food packaging accounts for the majority of packaging waste, causing increased pressure on landfills or from burning it, which may cause pollution with toxic chemicals (Marsh and Bugusu 2007).

Diets lower in both trophic level and highly processed food are likely to be consistent with dietary guidelines, but many nations are taking the additional step of designing dietary recommendations explicitly to include sustainability. Brazil, Qatar, Germany, Sweden, the Netherlands, the United Kingdom and Nordic Nutrition Recommendations explicitly promote sustainability in their dietary guidelines (Fischer and Garnett 2016). Some of the key recommendations in dietary guidelines that support sustainable diets are: promotion of plant-based diets; consumption of a diversity of food groups, food species and varieties; energy limitation; consumption of less meat; consumption of local and seasonal foods; conservation of biodiversity; reduction of food waste; and the encouragement of food processes with low GHG emissions.

SUSTAINABLE FOOD SYSTEMS: WHAT IS NEEDED AT A MORE SYSTEMIC LEVEL

In addition to steps that individuals can take to enhance sustainability, it is critical for policy makers and other stakeholders of the food system to design and implement plans to support the transformation of the food system to one that is more sustainable and resilient in providing healthy diets for all. Several key actions are needed at this level.

1. Improved production policies and practices for human and environmental health

Policies need to be implemented that support diets for both people's health and planetary health, including those rich in diverse plant foods, moderate in animal-source foods, and low in ultra-processed foods. Action needs to be taken to reverse the trend of the growing supply of a few crops and foods that are harmful to dietary quality and to the environment, and increase productivity and support for a diversity of food items that are missing in diets throughout the world, namely vegetables, fruits and legumes. In addition, policies and programmes need to support not only what is grown, but how it is grown. Specifically, sustainable agricultural policies and practices need to support biodiversity and ecosystem services, promote soil conservation, protect watersheds, limit the use of agrochemicals, utilize clean energy, prevent deforestation, and have relatively low GHG emissions. These environmental outcomes need to be complemented with an equal set of criteria setting the social foundation (Raworth 2012). Agriculture and the global food systems support more than 40 per cent of jobs globally; these livelihoods need to support the well-being of those working in the food system.

2. Improved Information to consumers

Consumer choices can drive the private sector toward sustainable practices. This trend is likely to increase as consumers place heightened value on sustainability.³ Labelling for both nutritional content and sustainability practices would allow consumers to choose food that is sustainably produced. In addition, labels can help consumers make healthy choices. For example, in Brazil, legislative actions for healthy diets have included mandatory labelling on 'nutritionally adequate serving sizes', the world's first such initiative to reinforce healthy eating patterns and provide nutrition information on raw and unpackaged foods (Coitinho, Monteiro and Popkin 2002).

3. Improved information to policymakers: expanded set of sustainable food system metrics

Food system metrics need to move beyond current metrics that focus on calories per capita, prices of commercially important commodities and basic productivity. The metrics need to match the vision of food that nourishes people, supports decent livelihoods, and has minimal negative environmental externalities. We need better information on availability and prices of nutritious diets, and on diet quality. Additionally, metrics on sustainable diets and food

systems should include life cycle analyses of commodities that examine a suite of environmental indicators from cradle to grave (water, land, eutrophication), as well as metrics on biodiversity of landscapes including crop species richness (CSR) and the modified functional attribute diversity (MFAD) index. Other indicators of food safety, loss and waste should also be developed and assessed as part of sustainable food system metrics (Remans et al. 2014; Gustafson et al. 2016).

CONCLUSION

The discussion on sustainability must include diets and food systems. The Sustainable Development Goals have no indicator of diet quality or patterns, which is a major oversight for sustainability in terms of diets' impact on both human health and the environment. The UN Decade of Action on Nutrition, however, highlights the need and opportunity to make changes toward sustainable, resilient food systems that promote healthy diets that nourish all people. Actionable principles to foster sustainable food systems and sustainable diets include those discussed here.

Principles of sustainable and resilient food systems and diets

Sustainable diets (individual level choices)

1. Follow dietary guidelines, including adequate diversity and nutrient intakes.
2. Are plant-based; low trophic level.
3. Contain low consumption of highly processed and packaged food.
4. Produce low food waste.

Sustainable, resilient food systems (supported by policies and production practices)

1. Shift incentives toward the foods that are most lacking in diets globally (fruits, vegetables, legumes).
2. Implement environmentally sound production practices:
 - a. Mainstream biological diversity throughout the food system – in production landscapes, value chains, markets, consumption and relevant policies.
 - b. Minimize GHG emissions related to food production, transport and consumption.
 - c. Control, minimize or avoid chemical pollution of soil and water ecosystems during food production, processing and waste management.
 - d. Have a low water footprint.

³ John Hopkins Center for a Livable Future. n.d. *The Emergence of the Food Voter*. www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/_pdf/briefs/data/food-voter.pdf.

- e. Minimize food waste and loss, optimize recycling of nutrients.
 - f. Ensure the humane treatment of animals.
3. Ensure food safety.
 4. Support the rights of workers and farming households throughout the food system, including their rights to food, water, health and decent work conditions.
 5. Provide transparent information:
 - a. to consumers (labeling): nutrition information and production practices.
 - b. to policy-makers (monitoring indicators): access to adequate, nutritious food, diet quality, food safety and environmental impact indicators on the above.

6. Adapt production systems for resilience to local and changing conditions.

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References

Auestad N and Fulgoni VL (2015) What current literature tells us about sustainable diets: Emerging research linking dietary patterns, environmental sustainability, and economics. *Advances in Nutrition* 6: 19-36. <http://advances.nutrition.org/content/6/1/19.full>.

Bonhommeau S, Dubroca L, Le Pape O, Kaplan DM, Chassot E and Nieblas A-E (2013) Eating up the world's food web and the human trophic level. *Proceedings of the National Academy of Science of the United States of America* 110(51): 20617-20. <https://www.ncbi.nlm.nih.gov/pubmed/24297882>.

Breggin L and Myers Jr. DB (2013) Subsidies with responsibilities: Placing stewardship and disclosure conditions on government payments to large-scale commodity crop operations. *Harvard Environmental Law Review* 37: 487.

Campbell BM, Vermeulen SJ, Aggarwal PK, Corner-Dolloffa C, Girvetza E, Loboguerrero AM, Ramirez-Villegasa J, Rosenstock T (2016) Reducing risks to food security from climate change. *Global Food Security* 11: 34-43. <http://www.sciencedirect.com/science/article/pii/S2211912415300262>.

Carlsson-Kanyama A and Gonzalez AD (2009) Potential contributions of food consumption patterns to climate change. *American Journal of Clinical Nutrition* 89(5): 1704S-09S. <https://www.ncbi.nlm.nih.gov/pubmed/19339402>.

Coitinho D, Monteiro C and Popkin B (2002) What Brazil is doing to promote healthy diets and active lifestyles. *Public Health Nutrition* 5(1A): 263-7. <https://www.ncbi.nlm.nih.gov/pubmed/12027293>.

de Wit MM and Iles A (2016) Toward thick legitimacy: Creating a web of legitimacy for agroecology. *Elementa* 4(1): 000115. <https://www.elementascience.org/articles/10.12952/journal.elementa.000115/>.

Food and Agriculture Organization of the United Nations (FAO) (2016) *The State of Food and Agriculture 2016: Climate change, agriculture, and food security*. FAO: Rome. <http://www.fao.org/3/a-i6030e.pdf>.

FAO, International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) (2015) *The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress*. FAO: Rome. <http://www.fao.org/3/a-i4646e.pdf>.

Fischer CG and Garnett T (2016) *Plates, Pyramids, and Planets: Developments in National Healthy and Sustainable Dietary Guidelines: A State of Play Assessment*. FAO/The Food Climate Research Network at The University of Oxford: Oxford. <http://www.fao.org/3/a-i5640e.pdf>.

Foley JA, Ramankutty N, Brauman KA, Cassidy ES, Gerber JS, Johnston M, Mueller ND, O'Connell C, Ray DK, West PC, Balzer C, Bennett EM, Carpenter SR, Hill J, Monfreda C, Polasky S, Rockström J, Sheehan J, Siebert S, Tilman D and Zaks DPM (2011) Solutions for a cultivated planet. *Nature* 478: 337-42. <http://www.nature.com/nature/journal/v478/n7369/full/nature10452.html>.

Global Burden of Disease (GBD) 2013 Risk Factor Collaborators (2015) Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 386(10010): 2287-323. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)00128-2/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)00128-2/abstract).

Global Panel on Agriculture and Food Systems for Nutrition (Global Panel) (2016) *Food Systems and Diets: Facing the Challenges of the 21st Century*. Global Panel on Agriculture and Food Systems for Nutrition: London. <https://www.glopan.org/foresight>.

Gómez MI, Barrett CB, Raney T, Pinstrup-Andersen P, Meerman J, Croppenstect A, Carisma B and Thompson B (2013) Post-green revolution food systems and the triple burden of malnutrition. *Food Policy* 42: 129-38.

Gomiero T, Pimentel D and Paoletti M (2011) Is there a need for more sustainable agriculture? *Critical Reviews in Plant Sciences* 30(1-2): 6-23.

Gussow JD and Clancy K (1986) Dietary guidelines for sustainability. *Journal of Nutrition Education* 18(1):1-5.

Gustafson D, Gutman A, Leet W, Drewnowski A, Fanzo J and Ingram J (2016) Seven food system metrics of sustainable nutrition security. *Sustainability* 8(3): 196. <http://www.mdpi.com/2071-1050/8/3/196>.

Haddad L, Hawkes C, Webb P, Thomas S, Beddington J, Waage J and Flynn D (2016) A new global research agenda for food. *Nature* 540(7631): 30-2. <https://www.ncbi.nlm.nih.gov/pubmed/27905456>.

- Hallström E, Carlsson-Kanyama A and Börjesson P (2014) Environmental impact of dietary change: a systematic review. *Journal of Cleaner Production* 91: 1–11.
- Herforth A (2015) Access to adequate nutritious food: new indicators to track progress and inform action. In Sahn D (ed.) *New directions in the fight against hunger and malnutrition*. New York, Oxford University Press.
- Herforth, A (2016) Seeking indicators of healthy diets. *The Gallup Blog*, 14 December 2016. <http://www.gallup.com/opinion/gallup/199436/defining-measuring-diet-quality-worldwide.aspx>.
- Herforth A and Ahmed S (2015) The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions. *Food Security* 7(3): 505-20.
- Imamura F, Micha R, Khatibzadeh S, Fahimi S, Shi P, Powles J and Mozaffarian D (2015) Global Burden of Diseases Nutrition and Chronic Diseases Expert Group (NutriCoDE). Dietary quality among men and women in 187 countries in 1990 and 2010: a systematic assessment. *Lancet Global Health* 3(3): e132-42. <https://www.ncbi.nlm.nih.gov/pubmed/25701991>.
- Institution of Mechanical Engineers (IME) (2013) *Global Food: Waste Not, Want Not*. IME: London. www.campaignforrealfarming.org/wp-content/uploads/2013/01/IME-Global-Food-Report.pdf.
- Intergovernmental Panel on Climate Change (IPCC) (2007) *Fourth Assessment Report: Climate Change 2007*. Cambridge University Press: Cambridge.
- IPCC (2013) *Fifth Assessment Report: Climate Change 2013*. Cambridge University Press: Cambridge. <http://www.ipcc.ch/report/ar5/wg1/>.
- International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) (2009) *Agriculture at a Crossroads: Findings and recommendations for future farming*. Island Press: Washington DC.
- International Food Policy Research Institute (IFPRI) (2016) *Global Nutrition Report*. IFPRI: Washington DC. <http://www.ifpri.org/blog/2016-global-nutrition-report>.
- John Hopkins Center for a Livable Future. n.d. *The Emergence of the Food Voter*. http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/about/program_areas/public-support-for-food-sustainability.html.
- Johnston JL, Fanzo JC and Cogill B (2014) Understanding sustainable diets: a descriptive analysis of the determinants and processes that influence diets and their impact on health, food security, and environmental sustainability. *Advances in Nutrition* 5(4): 418-29. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4085190/>.
- Jones AD, Hoey L, Blesh J, Miller L, Green A and Fink Shapiro L (2016) A systematic review of the measurement of sustainable diets. *Advances in Nutrition* 7: 641-64. <http://advances.nutrition.org/content/7/4/641.full>.
- Kearney J (2010) Food consumption trends and drivers. *Philosophical Transactions of the Royal Society B: Biological Sciences* 365(1554): 2793–807. <https://www.ncbi.nlm.nih.gov/pubmed/20713385>.
- Khoury C, Bjorkman AD, Dempewolf H, Ramirez-Villegasa J, Guarino L, Jarvisa A, Rieseberg LH and Struik PC (2014) Increasing Homogeneity in Global Food Supplies and the Implications for Food Security. *Proceedings of the National Academy of Sciences of the United States of America* 111(11): 4001-6. www.pnas.org/cgi/doi/10.1073/pnas.1313490111.
- Louzada ML, Baraldi LG, Martínez Steele E, Martins AP, Canella DS, Moubarac JC, Levy RB, Cannon G, Afshin A, Imamura F, Mozaffarian D and Monteiro CA (2015a) Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. *Preventive Medicine* 81: 9-15.
- Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, Moubarac JC, Cannon G and Monteiro CA (2015b) Impact of ultra-processed foods on micronutrient content in the Brazilian diet. *Revista Saude Publica* 49: 1-8. <https://www.ncbi.nlm.nih.gov/pubmed/26270019>.
- MacDiarmid JI, Kyle J, Horgan GW, Loe J, Fyfe C, Johnstone A and McNeill G (2012) Sustainable diets for the future: Can we contribute to reducing greenhouse gas emissions by eating a healthy diet? *American Journal of Clinical Nutrition* 96(3): 632-39. <https://www.ncbi.nlm.nih.gov/pubmed/22854399>.
- Marsh K and Bugusu B (2007) Food packaging - roles, materials, and environmental issues. *Journal of Food Science* 72(3): R39-55. <http://onlinelibrary.wiley.com/doi/10.1111/j.1750-3841.2007.00301.x/full>.
- Martínez Steele E, Baraldi LG, Louzada ML, Moubarac JC, Mozaffarian D and Monteiro CA (2015) Ultra-processed foods and added sugars in the US diet: Evidence from a nationally representative cross-sectional study. *BMJ Open* 5: e009892. doi:10.1136/bmjopen-2015-009892.
- Medina A, Rodriguez A and Magan N (2014) Effect of climate change on Aspergillus flavus and aflatoxin B1 production. *Frontiers in Microbiology* (5): 348. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4106010/>.
- Millennium Ecosystem Assessment (MA) (2005) *Ecosystems and Human Well-being*. Island Press: Washington DC.
- Millward DJ and Garnett T (2010) Plenary Lecture 3: Food and the planet: nutritional dilemmas of greenhouse gas emission reductions through reduced intakes of meat and dairy foods. *Proceedings of the Nutrition Society* 69(1): 103-18. <https://www.ncbi.nlm.nih.gov/pubmed/20003639>.
- Monteiro C, Cannon G, Levy R, Moubarac JC, Jaime P, Martins AP, Canella D, Louzada M and Parra D (2016) Food classification, Public health: NOVA. The star shines bright. *World Nutrition* 7(1-3): 28-38. <http://wphna.org/worldnutrition/> [last access 17 May 2017].
- Monteiro CA, Gomes FS and Cannon G (2010) The snack attack. *American Journal of Public Health* 100(6): 975–81.
- Monteiro C, Moubarac J, Cannon G, Ng S and Popkin B (2013) Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews* 14(Suppl. 2): 21-8. <https://www.ncbi.nlm.nih.gov/pubmed/24102801> [last access 17 May 2017].
- Murray C (2014) *Metrics for healthy and sustainable food systems*. Presentation at the EAT Forum, Stockholm. 27 May 2014.
- Myers SS, Smith MR, Guth S, Golden CD, Vaitla B, Mueller ND, Dangour AD and Huybers P (2017) Climate Change and Global Food Systems: Potential Impacts on Food Security and Undernutrition. *Annual Review of Public Health* 38: 259-77. <https://www.ncbi.nlm.nih.gov/pubmed/28125383>.
- Pingali P (2015) Agricultural policy and nutrition outcomes – getting beyond the preoccupation with staple grains. *Food Security* 7(3): 583-91.
- Raworth K (2012) *A safe and just space for humanity: Can we live within the doughnut?* Oxfam Discussion Paper. Oxfam: London. <https://www.oxfam.org/sites/www.oxfam.org/files/dp-a-safe-and-just-space-for-humanity-130212-en.pdf>.
- Remans R, Wood SA, Saha N, Anderman TL and DeFries RS (2014) Measuring nutritional diversity of national food supplies. *Global Food Security* 3(3-4): 174-82. <https://www.biodiversityinternational.org/e-library/publications/detail/measuring-nutritional-diversity-of-national-food-supplies/>.
- Rockström J, Steffen W, Noone K, Persson Å, Chapin FS, Lambin EF, Lenton TM, Scheffer M, Folke C, Schellnhuber HJ, Nykvist B, de Wit CA, Hughes T, van der Leeuw S, Rodhe H, Sörlin S, Snyder PK, Costanza R, Svedin U, Falkenmark M, Karlberg L, Corell RW, Fabry VI, Hansen J, Walker B, Liverman D, Richardson K, Crutzen P and Foley JA (2009) A safe operating space for humanity. *Nature* 461: 472–75. <https://www.nature.com/nature/journal/v461/n7263/full/461472a.html>.

Siegel KR, Ali MK, Srinivasia A, Nugent RA and Narayan KM (2014) Do we produce enough fruits and vegetables to meet global health need? *PLOS One*. <https://doi.org/10.1371/journal.pone.0104059>.

Siegel KR, Bullard KM, Ali MK, Stein AD, Kahn HS, Mehta NK, Webb Girard A, Venkat Narayan KM and Imperatore G (2016) The contribution of subsidized food commodities to total energy intake among US adults. *Public Health Nutrition* 19(8): 1348-57. <https://www.ncbi.nlm.nih.gov/pubmed/26322920>.

Springmann M, Godfray HC, Rayner M and Scarborough P (2016a) Analysis and valuation of the health and climate change cobenefits of dietary change. *Proceedings of the National Academy of Science of the United States of America* 113(15): 4146-51. <https://www.ncbi.nlm.nih.gov/pubmed/27001851>.

Springmann M, Mason-D'Croz D, Robinson S, Garnett T, Godfray HC, Gollin D, Rayner M, Ballon P and Scarborough P (2016b) Global and regional health effects of future food production under climate change: a modelling study. *Lancet* 387(10031): 1937-46. <https://www.nature.com/nature/journal/v515/n7528/full/nature13959.html>.

Tilman D and Clark M (2014) Global diets link environmental sustainability and human health. *Nature* 515(7528): 518-22. <https://www.nature.com/nature/journal/v515/n7528/full/nature13959.html>.

United Nations Environment Programme (UNEP) (2016) *Food Systems and Natural Resources*. A Report of the Working Group on Food Systems of the International Resource Panel, by Westhoek H, Ingram J, Van Berkum S, Özay L and Hajer M. United Nations Educational, Scientific and Cultural Organization (UNESCO): Roma.

Walker BH, Holling CS, Carpenter SR and Kinzig AP (2004) Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society* 9(2): 5. <https://www.ecologyandsociety.org/vol9/iss2/art5/>.

Wallén A, Brandt N and Wennersten R (2004). Does the Swedish consumer's choice of food influence greenhouse gas emissions? *Environmental Science and Policy* 7: 525-35.

West PC, Gerber JS, Engstrom PM, Mueller ND, Brauman KA, Carlson KM, Cassidy ES, Johnston M, MacDonald GK, Ray DK and Siebert S (2014) Leverage points for improving global food security and the environment. *Science* 345 (6194): 325-8. <https://www.ncbi.nlm.nih.gov/pubmed/25035492>.

World Health Organization (WHO) (2015) *Healthy Diet*. WHO Fact Sheet No. 394. www.who.int/mediacentre/factsheets/fs394/en/.



Leveraging agrobiodiversity to create sustainable food systems for healthier diets

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ABSTRACT

The current ways that planetary resources are used to produce and consume food are raising significant concerns about the impact on nutrition, health and sustainability. A major reorientation of our food systems is needed in terms of both activities and governance. This paper describes the important contributions agricultural biodiversity makes achieving healthy diets and sustainable food systems and highlights a number of key actions needed to maximize those contributions.

Dietary factors are the number one risk factor in the global burden of disease. At the same time, many of the ways in which food systems operate, from production to sales and consumption, are causing significant environmental damage, including loss of biodiversity and of the beneficial services that biodiversity in ecosystems provides to humanity.

This paper argues that focusing on increasing agricultural biodiversity in landscapes, food systems and diets is an important part of the solution to creating healthier diets from sustainable food systems. For instance, a healthy diet should be based on whole grains, fruit, vegetables, legumes, nuts and seeds, and be limited in added sugar and sodium. Agrobiodiversity can ensure these essential ingredients are present in our food system, and so support healthy diets. In terms of increased sustainability of food systems, agricultural biodiversity can boost yields, provide pollination services and pest and disease control, reduce the need for inorganic fertilizers and synthetic pesticides, and provide protection to natural habitats. Agrobiodiversity can also contribute to breeding of crops and animals that are more capable of coping with climate change. Good governance is key to achieving positive outcomes from promotion of agrobiodiversity. Food systems arise from complex agronomic, economic, political,

institutional and social interrelationships. Good governance must drive the enabling environment that influences multiple actors operating in these systems and the actions they can take that will impact on the sustainability of food systems and the creation of healthy diets. Promoting agricultural biodiversity can be a practical investment for healthier diets through four main avenues: local and more nutritious value chains; public or institutional procurement; increased availability of fruits and vegetables; and appropriate policy incentives and coherence for diversification of production and consumption. We use examples from a number of contexts to illustrate potential actions that other countries may follow.

INTRODUCTION

Sustainable food systems and healthy diets, a pillar of the Second International Conference on Nutrition (ICN2) Framework for Action, are key to delivering on most of the Sustainable Development Goals (SDGs), not just SDG 2 (Bioversity International, 2016). The UN Decade of Action on Nutrition (2016-2025) offers an important opportunity to strengthen implementation and commitment to achieving improved nutrition outcomes. Similarly, the overlap with the UN Decade on Biodiversity (2011-2020) provides a unique opportunity to break silo thinking and bring together biodiversity with nutrition.

The ways in which food is produced, distributed and consumed are causing huge environmental damages, likely pushing beyond certain planetary boundaries needed for sustainable development (Rockström et al. 2009; Steffen et al. 2015), which then undermines the capacity for future food production (Garnett 2014). It is estimated that food systems today contribute between 20 and 30 per cent of

anthropogenic green-house gas emissions (Vermeulen, Campbell and Ingram 2012) and agriculture accounts for 70 per cent of all water utilization (UN Water 2013). Deleterious effects of food systems include land degradation, deterioration of natural habitats, and losses of biodiversity and of the beneficial services that ecosystems provide to humanity. They can also contribute to considerable production and use of chemical fertilizers, pollution and contamination of soil and water (Parris 2011), all of which have significant impacts on human health (Hodgkin et al. 2015). In addition, the increasing uniformity and reduction of agricultural biodiversity in global food systems poses one of the greatest, but often overlooked, challenges to achievement of sustainable food systems and healthy diets (IPES-Food 2016).

In this paper, the proposal to increase agricultural biodiversity in landscapes, food systems and diets is used as an important part of the solution to the challenges to agriculture, the environment, and nutrition faced in the era of the 2030 Sustainable Development Agenda. Mainstreaming biodiversity in food systems offers multiple benefits, not just for diets and nutrition. While not the only component of a sustainable food system, a sustainable food system cannot exist without agricultural biodiversity.

THE ROLE OF AGROBIODIVERSITY IN SUSTAINABLE FOOD SYSTEMS AND HEALTHIER DIETS

Agrobiodiversity is defined as the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems (FAO and Bioversity International, 2017). A sustainable food system is defined as a food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised (HLPE, 2014). Greater utilization of agrobiodiversity within food systems is a promising approach to help achieve complex, inter-connected goals that span nutrition, environment and health (Romanelli et al., 2015).

Although over 5,500 species have been counted as food used by humans (Royal Botanic Gardens Kew 2016), three species – rice, wheat and maize – dominate our global diet and provide the majority of the world's plant-derived calories. Relying so heavily on such a narrow resource base is a risky strategy for the sustainability of the planet, for individual livelihoods and for achieving a healthy diet (Bioversity International, 2016). Expert opinions on the components of healthy diets consistently agree on the need for dietary diversity of healthy foods and for diets to be based upon whole grains, fruit, vegetables, legumes, nuts and seeds, and limited in added sugar and sodium (WHO, 2015; USDHHS, 2015; Imamura et al., 2015; Gallup and Swiss Agency for Development Cooperation, 2016). Considering the global burden of disease and the global needs for minimum diet-related risks to address them, our global food system reflects gaps in food availability of 44 per cent for fruits, 11 per cent for vegetables, and 58 per cent for nuts and seeds (Murray, 2014).

The evidence base for the role of biodiversity in food and nutrition security is growing. For example, Wittman and colleagues demonstrate the linkages between food security and biodiversity across a range of socio-ecological properties and across global, regional, landscape and household scales, and document the evidence base for the biophysical as well as social connections between the two (Wittman et al., 2016). In relation to nutrition security, significant and positive relationships between crop diversity and dietary diversity were found for a majority of contexts (Powell et al., 2015), and the diversification of agricultural production towards fruit, vegetables and aquaculture was seen to improve diet diversity and intake of specific nutrients (Pandey, Dev and Jayachandran, 2016). The role of the provision of food and essential micronutrients year-round is another well-documented association between greater use of biodiversity and food and nutrition security (Powell et al., 2015).

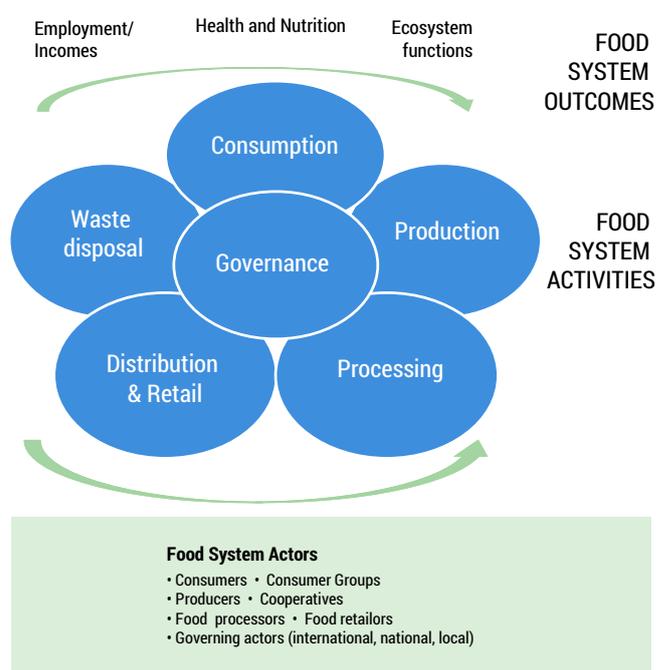
In terms of greater environmental sustainability, we know that agricultural biodiversity in production systems can boost yields, provide pollination services and pest and disease control, improve soil function and reduce the need for inorganic fertilizers and synthetic pesticides (Bioversity International 2016). Biodiversity also provides the base for traits for breeding stress-tolerant, nutritious crops and animal breeds that can help improve farmers' resilience in coping with climate change. Biodiversity is also essential to securing sustainable agricultural production through the provisioning of diverse raw material to markets and industry, supporting diversification of value chains, self-reliance of local economies and the empowerment of marginalized groups (Padulosi et al. 2015; IPES-Food 2016).

ACTIONS WITHIN A FOOD SYSTEM FRAMEWORK TO CREATE HEALTHIER DIETS FROM MORE SUSTAINABLE FOOD SYSTEMS

Food system activities encapsulate consumption, production, processing, distribution and retail, waste management and governance (Figure 1). The central role of governance within the framework is important because it drives the enabling environment that can in turn influence all other food system activities. Good governance is key to positive outcomes in this complex system of agronomic, economic, political, institutional and social interrelationships. Food system actors are individuals or bodies that play a specific role within specific food system activities. Food system actors include consumers, consumer groups, farmers, farmer co-operatives, food distributors, food manufacturers and food retailers. Food system activities and the actors that carry them out operate at different levels, i.e. international, national and local. The potential spheres of influence are highly complex and linked. As research on food systems has shown, the outcomes of food systems can be either positive or negative (IPES-Food 2016); the aim of a sustainable food system would clearly be to draw out the greatest number of positive outcomes for the system as a whole.

The most critical aspect related to making food systems more sustainable and diets healthier is to translate theory into practical, feasible actions. In order to work toward healthier

Figure 1. FOOD SYSTEM OUTCOMES, ACTIVITIES, ACTORS AND DRIVERS



Source: Adapted from Eakin et al. (2016).

diets and food systems to achieve the desired positive dual outcomes of improved nutrition and environmental outcomes, actions need to be taken by key food system actors. Table 1 provides suggestions for different groups of food systems actors by food system activity for moving toward both healthier and more sustainable diets.

Table 1. FOOD SYSTEM ACTORS AND POSSIBLE ACTIONS/CHOICES THAT CAN BE TAKEN FOR HEALTHY DIETS AND THE SUSTAINABILITY OF FOOD SYSTEMS

Food system activity	Actors	Healthy diet actions/choices	Sustainability actions
Governance	Governance bodies	<p>Ensure coherence of policies across line Ministries (eg. Health, Agriculture and Education) and across jurisdictions (national to local).</p> <p>Form multi-sectoral bodies that have a mandate to review and discuss implications of current and new policies on healthy diets.</p> <p>Promote consumption of agrobiodiversity that can contribute to healthier diets.</p>	<p>Ensure coherence of policies across line Ministries (eg. Agriculture, Natural Resource Management, Energy) and across jurisdictions (national to local).</p> <p>Form multi-sectoral bodies that have a mandate to review and discuss implications of current and new policies on environmental sustainability.</p>
	Consumers, producers and consumer/producer groups	Lobby for legislation that increases access, availability, affordability and convenience of healthy food choices.	Lobby for legislation that increases sustainable agriculture and natural resource management.

(Continued...)

Food system activity	Actors	Healthy diet actions/choices	Sustainability actions
Consumption	Consumers	Daily decisions on the types of foods (whole cereals, fruit, vegetables, legumes, seeds/nuts, processed foods, sugar and red meat) consumed and level of processing (raw, minimally processed or ultra-processed) to consume.	Decisions on what food to consume/purchase and the level of processed and packaged food to purchase. Decisions on where to purchase (from which type of retail and level of certification). Homestead fruit and vegetable production.
	Consumer awareness groups	Advocacy on healthy food choices.	Advocacy on sustainable food choices.
	Governance bodies	Legislation to ensure healthy food in social programmes that supply food (food aid, school feeding). Disincentives (e.g. taxes) for unhealthy food. Incentives for healthier food. Develop food-based dietary guidelines that valorize native agrobiodiversity.	Legislation to ensure sustainability of food in social programmes. Development of food-based dietary guidelines that include sustainable consumption practices.
Production	Farmers	Decisions on the level of crop diversity planted (species and cultivars) planted and balance between own consumption for dietary diversity and sale for income. Increase fruit and vegetable production.	Decisions about crop production diversity that also consider nutritional properties. Sustainable production practices such as mixed and rotational cropping (modify soil pH to make nutrients better available to plants).
	Farmers' cooperatives	Influence types of foods and cultivation practices managed collectively.	Influence crop diversity and sustainable production practices; selling of diverse nutrient-dense food in markets close to consumers; stewardship of community natural resources.
	Governance bodies	Policies in support of producing the types of food needed for healthier diets.	Policies to reduce unsustainable production practices (e.g. mono-crop/mono-variety cultivations; excessive use of pesticides); incentives to promote sustainable practices (e.g. greater use of diverse nutritious-dense and resilient crops).
Processing, storage and packaging	Food industry (small- and large-scale)	Use of nutrient-saving processing methods; use of whole cereals and diversity-rich food mixtures; use of neglected and under-utilized crops as main/secondary ingredients; adequate storage and packaging for safeguarding nutrients in raw/processed food; decisions on quantity and quality of ingredients used in processed foods.	Decisions on nutrient-sparing processing technologies, new products that leverage nutritious-dense crops, environmentally friendly packaging (also to relate to reduced food waste below); strengthen local procurement of raw ingredients and reduce reliance on ingredients that require long transportation routes.

(...Continued)

Food system activity	Actors	Healthy diet actions/choices	Sustainability actions
Processing, storage and packaging	Governance bodies	Legislation related to food labels and guidelines on promotion of healthy foods.	Legislation related to sustainability standards and incentives for use of environment friendly food processing, storage and packaging methods.
Distribution and retail	Food retailers (small- and large-scale)	Decisions on types, amount and price of healthier and less health foods for sale in retail outlets.	Location of stores. Distance between origin of production and retail.
Waste	Consumers	Decisions on amount of food to purchase and actions to reduce food waste after purchase.	Decisions on household food and waste management (recycling). Decisions on how much packaged food to purchase.
	Consumer awareness groups	Awareness raising among consumers on food waste.	Awareness raising among consumers about recycling and composting.
	Governance bodies	Establishment of programmes (e.g. food bank/food pantry) to redistribute surplus healthy food efficiently.	Provide access and manage recycling and composting programmes.

Consumers, numbering over seven billion and rising, are undoubtedly the most influential actors with regards to sustainable food systems and can also be proactive rather than only reactive to their food environment. The United Nations website for the Sustainable Development Goals provides some very practical actions for an everyday citizen (mostly applicable to a high-income country) to enable them to become more proactive in making more sustainable dietary choices.

RECOMMENDATIONS TO LEVERAGE AGROBIODIVERSITY FOR MORE SUSTAINABLE FOOD SYSTEMS AND HEALTHIER DIETS

Four actions are recommended in several recent reports (FAO and WHO, 2014; UNSCN, 2016a; IPES-Food, 2016; Global Panel on Agriculture for Food Systems and Nutrition, 2016) for more sustainable food systems and healthier diets: support of shorter supply chains for local produce; public and private procurement programmes for agrobiodiversity; promotion of fruits and vegetables; and

policy incentives and coherence for diversified production and consumption. Examples of how these actions can be used to promote agrobiodiversity and create healthier diets from more sustainable food systems are provided below.

1. Short supply chains; linking local farmers to consumers

Relevant recommendations:

- Strengthen local food production and processing, especially by smallholder and family farmers, giving special attention to women's empowerment, while recognizing that efficient and effective trade is key to achieving nutrition objectives (FAO and WHO, 2014).
- Invest specifically in nutrition-sensitive value chains and opportunities for crop diversity (UNSCN 2016a).
- Create demand and improve access to locally produced food as an investment for improving nutrition through consumption (UNSCN 2016a).
- Support short supply chains and alternative retail infrastructures (IPES-Food 2016).

The existence of many intermediaries in food supply chains is a recurrent theme that challenges efficient and nutrition-sensitive food systems, especially for nutrient-dense products such as fruit and vegetables. The shortening of food supply chains has a positive impact for both farmers and consumers in economic, social and cultural terms

(UNSCN, 2016b). Positive effects are also recorded in terms of growth in trust and equality and increase in sustainability in all its dimensions, including environmental, health and wellbeing, social and economic (Marsden, Banks and Bristow, 2000; Galli and Brunori, 2013). While helping to strengthen rural-urban linkages and contributing to sustainable development of rural areas, such interventions contribute as well to the provisioning of local fresh produce at lower prices from nearby farms with less environmental impact due to reduced transportation. Furthermore, farmers have opportunities for higher economic returns and for bringing to clients potentially neglected or underutilized crops that are usually excluded from marketing channels dominated by mainstream commodities. Examples of such crops include: cleome, baobab or corchorus leaves and moringa fruits in sub-Saharan Africa; chaya leaves in Central America; peach palm in South America; taro flowers, amaranth leaves, jackfruit and garcinia in Asia; chicory, beet leaves or figs in Europe. Short food supply chains (SFSCs), which have emerged as alternatives to the increasingly dominating global value chains, can be developed in different ways (e.g. farmers' markets, on-farm selling, consumer cooperatives, community-supported agriculture, solidarity purchase groups, Internet sales, mail order, home delivery, box schemes, etc.) and are seen as mechanisms to strengthen resilience of family farms (Galli and Brunori 2013). With regard to the development of local markets or farmers' markets in particular, SFSC can be established with the support of farmers' and consumers' associations. Active groups for short supply chains in Europe include: Associations pour le maintien de l'agriculture paysanne (France), Groupes d'achat solidaire de l'agriculture paysanne (Belgium) and Gruppi di acquisto solidaire (Italy). In developing countries, SFSCs require interventions to build capacities of farmers in delivering produce of high quality, in regular supply and in respect of safety standards. Lack of infrastructure and poorly organized farmers or consumers associations are often recurrent barriers in these countries (FAO, 2015b). Successful examples, however, do exist, as in the case of "Harvest of Hope" project from South Africa. This initiative is run by Abalimi Bezekhaya (Farmers of the Home), a non-profit organization that connects home and community gardens throughout the townships of Cape Town City.¹ This project aims at strengthening food and nutrition security by encouraging residents of townships to grow their own vegetables, which are then sold to markets. This produce is planned to match the market's demand for locally grown vegetables, free of chemicals and pesticides. Support to growers in accessing seeds, production planning, soil preparation, harvest, transportation, and financial services is also provided by the organization.

2. Public procurement, institutional markets and sustainable sourcing for healthy diets

Relevant recommendations:

- Establish food or nutrient-based standards to make healthy diets and safe drinking water accessible in public facilities such as hospitals, childcare facilities, workplaces, universities, schools, food and catering services, government offices and prisons, and encourage the establishment of facilities for breastfeeding (FAO and WHO, 2014).
- Use public procurement to support local agroecological produce (IPES-Food, 2016).
- Institutionalize high-quality diets through public sector purchasing power, including food provision in schools and hospitals (Global Panel on Agriculture and Food Systems for Nutrition, 2016).

In Brazil, strategic lobbying and advocacy by key actors involved in the implementation of the Food Acquisition Programme (PAA) and the National School Feeding Programme (PNAE) as well as strengthening the knowledge base to demonstrate the nutritional value of native food biodiversity has established a strong platform for mainstreaming underutilized nutrient-rich food biodiversity into both programs (Beltrame et al., 2016). Both the PAA and PNAE provide incentives for linking local farmers and agricultural biodiversity including a law passed in 2009, which states that 30 per cent of food procured for school feeding under the PNAE must be sourced from local family farmers while the PAA pays a premium of 30 per cent for agro-ecological and organic products.

Home-grown school feeding programmes also seek to link to local food procurement, though efforts to date to encourage the integration of underutilized, nutrient-dense food biodiversity have been limited. Pilot interventions in Kenya have demonstrated that underutilized, nutrient-rich African leafy vegetables can play a role in helping link local farmer groups to school markets at the county and district level in Kenya (Wasike et al., 2016), while it has been demonstrated that underutilized minor millets incorporated in school feeding programmes can enhance the nutritional status of school children in certain areas of Karnataka state, India (Bergamini et al., 2013). Although small in scale and scope, these examples do demonstrate the potential for agricultural biodiversity to diversify procurement and school feeding.

¹ For more details on this project, see www.harvestofhope.org.za/home [last access 26 April 2017].

3. Promoting fruits and vegetables

Relevant recommendations:

- Promote the diversification of crops including underutilized traditional crops and apply sustainable food production and natural resource management practices (FAO and WHO, 2014).
- Improve storage, preservation, transport and distribution technologies and infrastructure to reduce seasonal food insecurity, and food and nutrient loss and waste (FAO and WHO, 2014).
- Home gardening as a viable investment for improving nutrition for both production and consumption (UNSCN, 2016a).
- Focus more research investment on fruits and vegetables to increase their availability and affordability (Global Panel on Agriculture for Food Systems and Nutrition, 2016).

Increasing the consumption of fruit and vegetables has important positive health and environmental implications. This goal requires interlinked and interdisciplinary interventions along the value chain of target crops, together with measures addressing the food system. The departure point is a re-visitation of the pathways to nutrition in terms of production of more diverse, nutrient-dense foods. Local crops provide a reservoir of untapped diversity to pursue this goal. According to the Royal Botanic Gardens Kew (2016), there are more than 5,000 food crops, with Africa ranking as the most diverse region in the world (539 vegetables and 645 fruit indigenous species) (PROTA, 2010) in terms of wild or cultivated foods. An entry point to leverage this diversity is to better document the nutritional values and promote the conservation of these genetic resources, many of which are currently under threat due to marginalization from markets and environmental degradation. Fruits and vegetables for household consumption can be promoted through home gardens and family farms, whereas sustainable marketing may require efforts towards building better organized and efficient value chains (Padulosi et al., 2014). Value chains can be strengthened through more effective cold chains and enhanced processing methods; marketing strategies, including nutrition labelling or the provision of nutrition information for fresh produce; the introduction of Protected Designation of Origin (PDO) or Geographic Indication (GI); and the establishment of multi-stakeholder collaborative platforms (Polar et al., 2010). Education also plays a fundamental role in changing food habits of consumers starting at early ages, hence schools can serve as platforms to support parallel nutrition awareness campaigns targeting other members

of the family, especially women, or the community at large. School meals programmes also represent an excellent entry point for awareness raising and sensitization of youth to nutritious foods and diverse, balanced and healthy meals. Public awareness campaigns targeting consumers at large are also needed for the promotion of healthy diets and sustainable food systems. However, a robust and wide impact can only be achieved with the involvement of the multitude of private sector actors who participate in activities throughout the food system, from production to consumption.

4. Policy incentives and policy coherence for diversification

Relevant recommendations:

- Integrate nutrition objectives into food and agriculture policies, programme designs and implementation at multiple levels to ensure coherent food policies from production to consumption, enhance nutrition sensitive agriculture, ensure food security and enable healthy diets (FAO and WHO, 2014; IPES-Food, 2016).
- Create policy incentives for diversification and agroecology (IPES-Food, 2016).

One of the key actions a country can take to make underutilized, nutrient-rich fruits, vegetables, nuts and pulses more widely available is to develop policies that support and mainstream agricultural biodiversity. Brazil is one country that has made good progress in promoting agricultural biodiversity by taking advantage of the multisectoral governance mechanisms already in place under the Fome Zero (Zero Hunger) strategy. Brazilian policies and programmes such as the Food Acquisition Programme (PAA), the National School Meals Programme, the Minimum Price Guarantee Policy for Biodiversity Products (PGPM-Bio) and the National Plan for Organic Production and Agroecology (PLANAPO) all provide suitable opportunities and entry points for potentially improving nutrition by linking food systems with native agricultural biodiversity (CGIAR Research Program on Agriculture for Nutrition and Health, 2015). Further steps to better utilize Brazilian biodiversity for nutrition and livelihoods continue to be made, such as with the new policy (Ordinance N° 163) signed jointly between the Ministry of the Environment and Ministry of Social Development and Fight Against Hunger in 2016. The ordinance ensures that 64 “Brazilian Sociobiodiversity Native Food Species of Nutritional Value” are officially defined and recognized. Most of the species in the ordinance are nutrient-rich fruits.

CONCLUSIONS

The overlap of the UN Decade of Action on Nutrition with the UN Decade on Biodiversity provides a unique opportunity to break silo thinking and better leverage the benefits of agricultural biodiversity for healthier diets and more resilient and sustainable food systems. Current food systems dominated by few and highly uniform crops are undermining our nutrition, our health and the environment, as well people's cultural identity, self-reliance and options for economic empowerment of agriculturally engaged communities and vulnerable groups, including women. Though complex, when broken down into smaller sets of food system activities and food system actors, several actions can be identified along the food-system continuum to promote both healthier diets and more sustainable food systems. In this paper, concrete suggestions are provided for consumers, consumer awareness groups, farmers, farmers' cooperatives, food industries, food retailers and governance bodies that relate to actions they

can take to foster healthier diets as well as sustainable food systems. Several entry points for leveraging agricultural biodiversity to improve nutrition outcomes and increase the sustainability of food systems have been highlighted here. The highly strategic entry points to address shortcomings of current food systems include: (i) shorter supply chains, particularly for fresh produce, with fewer intermediaries between producers and consumers; (ii) public procurement schemes that link institutions such as schools and other social programs with producers that contribute to agrobiodiversity; (iii) increased fruit and vegetable production and consumption; and (iv) increased policy incentives and policy coherence through inter-sectoral participation (e.g. involving Ministries of Agriculture, Health, Environment and Education) to attain long-lasting and synergistic solutions for food and nutrition security as well as environmental promotion and preservation. Encouraging steps are being taken by some governments, such as Brazil, to embed agrobiodiversity into food-related policies. They should be widely shared, celebrated and replicated in other countries.

References

- Beltrame, D.M., Oliveira, C.N.S., Borelli, T., de Andrade Cardoso Santiago, R., Monego, E.T., Vera de Rosso, V., Coradin, L. & Hunter, D. 2016. Diversifying institutional food procurement – opportunities and barriers for integrating biodiversity for food and nutrition in Brazil. *Revista Raizes*, 36(2): 54-69. http://www.ufcg.edu.br/~raizes/artigos/Artigo_394.pdf.
- Bergamini, N., Padulosi, S., Bala Ravi, S. & Yenagi, N. 2013. Minor millets in India: a neglected crop goes mainstream 2013. Minor millets in India: a neglected crop goes mainstream. In Fanzo, J., Hunter, D., Borelli, T. & Mattei, F. (eds.) *Diversifying Food and Diets: Using Agricultural Biodiversity to Improve Nutrition and Health. Issues in Agricultural Biodiversity*. Earthscan, UK, p. 313-325.
- Bioversity International. 2016. *Mainstreaming Agrobiodiversity in Sustainable Food Systems: Scientific Foundations for an Agrobiodiversity Index – Summary*. Bioversity International, Rome, Italy. <https://www.bioversityinternational.org/e-library/publications/detail/mainstreaming-agrobiodiversity-in-sustainable-food-systems-scientific-foundations-for-an-agrobiodiversity-index-summary/>.
- CGIAR Research Program on Agriculture for Nutrition and Health. 2015. *Biodiversity for food and nutrition in Brazil. A4HN Outcome Note November*. IFPRI, Washington, DC, pp. 1–3. <http://www.ifpri.org/publication/biodiversity-food-and-nutrition-brazil>.
- Eakin, H., Connors, J.P., Wharton, C., Bertmann, F., Xiong, A. and Stoltzfus, J. 2016. Identifying attributes of food system sustainability: emerging themes and consensus. *Agriculture and Human Values*, pp.1-17.
- FAO (Food and Agriculture Organization of the United Nations). 2015. *Food in an urbanised world. The role of city region food systems in resilience and sustainable development*, by Jennings, S., Cottee, J., Curtis, T. & Miller, S. Rome, Italy. <http://www.fao.org/fileadmin/templates/agphome/documents/horticulture/crfs/foodurbanized.pdf>.
- FAO and Bioversity International. 2017. *Guidelines on Assessing Biodiverse Foods In Dietary Intake Surveys*. Rome, Italy. <http://www.fao.org/3/a-i6717e.pdf>.
- FAO and WHO (World Health Organization). 2014. *Second International Conference on Nutrition, Framework for Action*. <http://www.fao.org/3/a-mm215e.pdf>.
- Forouzanfar, M. H., L. Alexander, H. R. Anderson, V. F. Bachman, S. Biryukov, M. Brauer, R. Burnett, D. Casey, M. M. Coates, A. Cohen and K. Delwiche. 2015. Global, Regional, and National Comparative Risk Assessment of 79 Behavioural, Environmental and Occupational, and Metabolic Risks or Clusters of Risks in 188 Countries, 1990–2013: A Systematic Analysis for the Global Burden of Disease Study 2013. *Lancet*, 386 (10010): 2287–2323. <https://www.ncbi.nlm.nih.gov/pubmed/26364544>.
- Galli, F. and Brunori, G. (eds.). 2013. *Short Food Supply Chains as drivers of sustainable development (Evidence Document)*, in: Document developed in the framework of the FP7 project, FOODLINKS, Laboratorio di studi rurali Sismondi, ISBN 978-88-90896-01-9. http://www.foodlinkscommunity.net/fileadmin/documents_organicresearch/foodlinks/CoPs/evidence-document-sfsc-cop.pdf.
- Gallup, Inc. and Swiss Agency for Development Cooperation. 2016. *Seeking Indicators of Healthy Diets. It Is Time to Measure Diets Globally. How? by Herforth A.*
- Garnett (2014) *What is a sustainable healthy diet?* Food Climate Research Network Discussion Paper <http://www.fcrcn.org.uk/fcrn/publications/fcrn-discussion-paper-what-sustainable-healthy-diet>.
- Global Panel on Agriculture and Food Systems for Nutrition. 2016. *Food systems and diets: Facing the changes of the 21st century*. London, UK. <https://www.glopan.org/foresight>.
- HLPE (High Level Panel of Experts on Food Security and Nutrition). 2014. *Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. Rome, Italy. <http://www.fao.org/3/a-i3901e.pdf>.

- Hodgkin, T., Hunter, D., Wood, S. & Demers, N. 2015. Agricultural biodiversity, food security and human health. In *Connecting Global Priorities: Biodiversity and Human Health: a State of Knowledge Review*. Convention on Biological Diversity/World Health Organization. <https://www.biodiversityinternational.org/e-library/publications/detail/connecting-global-priorities-biodiversity-and-human-health/>.
- IFPRI (International Food Policy Research Institute). 2016. Global Nutrition Report 2016: From Promise to Impact – Ending Malnutrition by 2030. Washington, DC. <http://www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030>.
- Imamura, F., Micha, R., Khatibzadeh, S., Fahimi, S., Shi, P., Powles, J., Mozaffarian, D. & Global Burden of Diseases Nutrition and Chronic Diseases Expert Group (NutriCoDE). 2015. Dietary quality among men and women in 187 countries in 1990 and 2010: a systematic assessment. *The Lancet Global Health* 3(3): e132-e142. <https://www.ncbi.nlm.nih.gov/pubmed/25701991>.
- IPES-Food. 2016. From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food Systems. http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf.
- Marsden, T., Banks, J. & Bristow, G. 2000. Food supply chain approaches: exploring their role in rural development. *Sociologia ruralis*, 40(4): 424–438.
- Murray, C.J. 2014. Ted Talk at the Eat Food Forum of 11 November 2014. University of Washington, USA. Available from https://www.youtube.com/watch?v=hg4qBjUS_aM&t=718s.
- Padulosi S., Amaya, K., Jäger, M., Gotor, E., Rojas, W. & Valdivia, R. 2014. Holistic Approach to Enhance the Use of Neglected and Underutilized Species: The Case of Andean Grains in Bolivia and Peru. *Sustainability* 2014, 6(3): 1283-1312. www.mdpi.com/2071-1050/6/3/1283.
- Padulosi, S., Mal, B., King, O.I. & Gotor, E. 2015. Minor Millets as a Central Element for Sustainably Enhanced Incomes, Empowerment, and Nutrition in Rural India. *Sustainability* 2015, 7(7): 8904-8933. <http://www.mdpi.com/2071-1050/7/7/8904>.
- Pandey, V.L., Dev, S.M., & Jayachandran, U. 2016. Impact of agricultural interventions on the nutritional status in South Asia: A review. *Food Policy*, 62, pp.28-40. <http://www.sciencedirect.com/science/article/pii/S0306919216300264>.
- Parris, K., 2011. Impact of agriculture on water pollution in OECD countries: recent trends and future prospects. *International Journal of Water Resources Development*, 27(1): 33-52. <http://www.tandfonline.com/doi/abs/10.1080/07900627.2010.531898>.
- Polar, V., Rojas, W., Jäger, M. & Padulosi, S. 2010. Taller de Análisis Multiactoral para la Promoción del Uso Sostenible del Amaranto. Memorias del Taller realizado en Sucre, Bolivia, 19-20 de noviembre de 2009. Fundación PROINPA y Biodiversity International. Sucre, Bolivia. http://www.nuscommunity.org/uploads/tx_news/Taller_de_An%C3%A1lisis_Multiactoral_para_la_Promoci%C3%B3n_del.pdf.
- Powell, B., Thilsted, S.H., Ickowitz, A., Termote, C., Sunderland, T. & Herforth, A. 2015. Improving diets with wild and cultivated biodiversity from across the landscape. *Food Security*, 7(3): 535-554.
- PROTA (Plant Resources of Tropical Africa). 2010. Promising African plants. A selection from the PROTA Programme. PROTA Foundation, Wageningen, Netherlands/CTA, Wageningen, The Netherlands. 169 pp. <http://www.agromisa.org/shop/prota-promising-african-plants/>.
- Rockström, J., Steffen, W.L., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H., Nykvist, B., De Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P. & Foley, J. 2009. Planetary boundaries: exploring the safe operating space for humanity. <https://www.ecologyandsociety.org/vol14/iss2/art32/>.
- Romanelli, C., Cooper, D., Campbell-Lendrum, D., Maiero, M., Karesh, W.B., Hunter, D. & Golden, C.D. 2015. Connecting global priorities: biodiversity and human health: a state of knowledge review. World Health Organization/Secretariat of the UN Convention on Biological Diversity. <https://www.biodiversityinternational.org/e-library/publications/detail/connecting-global-priorities-biodiversity-and-human-health/>.
- Royal Botanic Gardens Kew, 2016. The State of the World's Plants Report 2016. London, UK. <http://www.kew.org/science/who-we-are-and-what-we-do/strategic-outputs-2020/state-of-the-worlds-plants>.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., & Sörlin, S. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223): 1259855. <https://www.ncbi.nlm.nih.gov/pubmed/25592418>.
- U.S. (United States) Department of Health and Human Services (USDHHS). 2015. 2015–2020 Dietary Guidelines for Americans. 8th edition. <http://health.gov/dietaryguidelines/2015/guidelines>.
- United Nations (UN) Sustainable Development Goals. *The Lazy Persons Guide to Saving the World*. <http://www.un.org/sustainabledevelopment/takeaction/>.
- United Nations System Standing Committee on Nutrition (UNSCN). 2016a. Impact Assessment of Policies to support Healthy Food Environments and Healthy Diets: Implementing the ICN2 Framework for Action. UNSCN Discussion Paper, by Herforth A. www.unscn.org/en/resource-center/UNSCN-Publications?idnews=1279.
- _____. 2016b. Investments for healthy food systems: A framework analysis and review of evidence on food system investments for improving nutrition. UNSCN Discussion Paper. https://www.unscn.org/files/ICN2_TPM/EN_final_Investments_for_Healthy_Food_Systems_UNSCN.pdf.
- UN (United Nations) Water. 2013. Water for Food Fact Sheet. www.unwater.org/fileadmin/user_upload/unwater_new/docs/water_for_food.pdf.
- Vermeulen, S.J., Campbell, B.M. and Ingram, J.S.I. 2012. Climate change and food systems. *Annual Review of Environment and Resources*, 37(2012): 195-222. <http://www.annualreviews.org/doi/abs/10.1146/annurev-environ-020411-130608>.
- Wasike, V., Manjella, A., Buluma, W., Borelli, T. and Hunter, D. 2016. Linking farmers, indigenous vegetables and schools in Western Kenya for improved nutrition. ACIAR Food Security Meeting for Africa. Australian Centre for International Agricultural Research, held on 6 October, in Nairobi, Kenya.
- WHO (World Health Organization). 2015. Healthy diet. WHO Fact sheet No 394. <http://www.who.int/mediacentre/factsheets/fs394/en/>.
- Wittman, H., Chappell, M.J., Abson, D.J., Bezner Kerr, R., Blesh, J., Hanspach, J., Perfecto, I. & Fischer, J. 2016. A social–ecological perspective on harmonizing food security and biodiversity conservation. *Regional Environmental Change*: 1-11. <https://link.springer.com/article/10.1007/s10113-016-1045-9>.



FAO/VYACHESLAV OSELEDKO

The role of agriculture and biofortification in the UN Decade of Action on Nutrition

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Author statement: *The author declared that the paper is highly supportive of biofortification and HarvestPlus activities, in which he was engaged at the time that this paper was submitted.*

The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) correctly assert that current food systems are not delivering on the quality diets needed to sustain optimal health (Work Programme of the UN Decade of Action on Nutrition (2016-2025) (2017), Action Area 1: Sustainable, resilient food systems for healthy diets). In particular, “solutions should include: improved production, availability, accessibility and affordability of a variety of cereals, legumes, vegetables, fruits and animal-source foods, including fish, meat, eggs and dairy products, which should be produced and consumed sustainably” (para. 24).¹ The Second International Conference on Nutrition (ICN2) Framework for Action (FFA) refers to the need for improved local agricultural production, diversification of agriculture, and for reliance on food markets and international trade, including better transport, storage, preservation, and storage (recommendations 9, 10, 11). The FFA also calls for improved intake of micronutrients through consumption of nutrient-dense foods and, where necessary, through fortification and supplementation strategies (recommendation 42).

This article will focus on biofortification, which adds to the supply of minerals and vitamins provided by agriculture by increasing the density of bioavailable nutrients in staple foods. To fully understand and appreciate the role of agriculture in the UN Decade of Action on Nutrition, and the potential impact and comparative advantages of biofortification, it is important to first understand the trends and economic factors that are driving diets in developing countries, in particular, the intakes of food groups that provide dietary

quality – legumes, vegetables, fruits and animal-source foods, which are dense in bioavailable minerals and vitamins. A fundamental argument to be made here is that agricultural systems are the most cost-effective and sustainable sources of minerals and vitamins in the diet (nutrient supply). Thus, the long-term vision should be for governments to invest in agriculture, including nutrition-smart agricultural policies. However, there is a current need to fill the gap between nutrient requirements and nutrient supply (see e.g., Table 1 in Saltzman et al. 2017) through familiar and proven non-agricultural micronutrient interventions, such as supplementation and fortification. As the gap between nutrient requirements and nutrient supply grows smaller (assuming that the agricultural sector responds to the nutrition challenge), these more expensive, gap-filling programmes can be scaled back (although never eliminated). In theory, there would be sufficient funding to cover both investments in agriculture and the gap-filling. In reality, however, there is currently insufficient funding available for both types of investments. Very difficult decisions are being made (implicitly or explicitly) in choosing between short- and long-term welfare.

It is important to note at the outset that the supplies of nutrient-dense foods that are presently available in insufficient amount in any given country (typically the foods that provide dietary quality) in effect are “rationed” to families through the primary driving mechanism of household incomes and food prices. Rising incomes, if equitably distributed, and lower food prices allow the poor to gain a more equal share of available supplies.

¹ United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.

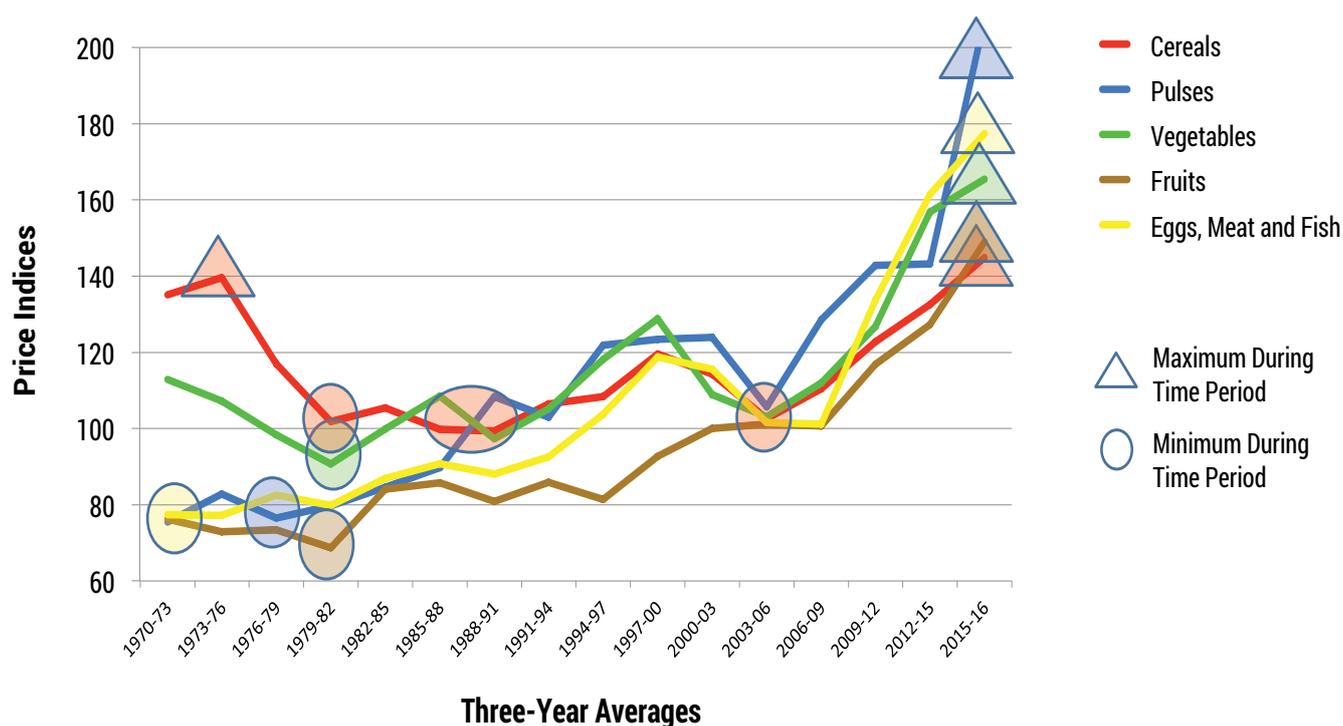
TRENDS IN AGRICULTURE IN DEVELOPING COUNTRIES

There is nothing more fundamental to human behaviour than seeking to avoid hunger, i.e. in securing sufficient dietary energy. During 1960-2000, the Green Revolution successfully addressed a situation of high population growth where limited land was available to expand agricultural production. Through the application of agricultural science, modern, high-yielding varieties of rice, wheat and maize were developed, which were widely adopted by large- and small-scale farmers. Production of cereals increased more rapidly than population growth, and cereal prices declined dramatically (Bouis, Eozenou and Rahman 2011).

Importantly, investments in agricultural research and extension, particularly in staple food groups, were sustained over three decades (around 1960-1990) to achieve this success. Plant breeding is highly effective and cost-effective in increasing agricultural output (and the supply of minerals, vitamins and nutrients contained therein), but its cumulative impacts occur slowly over time (Hurley et al. 2016; Ponniah et al. 2008; Meenakshi et al. 2010; Qaim, Stein and Meenakshi 2007).

However, there were not the same investments in increasing agricultural productivity for non-staple food groups. Consequently, prices for these food groups, which provide dietary quality, rose rapidly, as shown for example in Figure 1 in India. The prices that consumers pay for iron, zinc and provitamin A have increased significantly.

Figure 1. PRICE INDICES BY FOOD GROUP FOR INDIA, 1970-2016, DEFLATED BY NON-FOOD PRICE INDEX



Source: Personal Communication, JV Meenakshi, Delhi School of Economics

ECONOMIC FACTORS THAT DETERMINE DIETARY QUALITY

Tables 1 and 2 show the pattern of consumption, as income increases, of food staples, non-staple plant foods, and animal products for Bangladesh, Kenya and the Philippines. Food staples tend to be poor sources of minerals and vitamins, while animal products are the most dense foods in bioavailable minerals and vitamins. Non-staple plant foods are also good sources of minerals and vitamins.

Consumption of food staples remains more or less constant with income. At very low incomes, the poor are able to secure

sufficient food staples to keep them from going hungry, and then as their income increases, they are able to purchase non-staple plant foods and animal source foods (Bouis, Eozenou and Rahman 2011).

This is the context, then, for the underlying causes of high rates of mineral and vitamin deficiencies – low incomes and rising prices over time for dietary quality. Government policies with respect to agriculture are focused on keeping cereal prices low; however, when cereal prices rise unexpectedly in the short term, there can be considerable political discontent. There is insufficient acknowledgement and priority given by governments to the problem of rising non-staple food prices.

Table 1. PER CAPITA ENERGY INTAKES AND BUDGET SHARES OF FOOD GROUPS IN TOTAL FOOD EXPENDITURES, BY INCOME TERCILE OR QUARTILE, BY BROAD FOOD GROUPS, RURAL BANGLADESH, KENYA AND THE PHILIPPINES

			Per capita energy intake				Food group budget share in total food expenditures			
			Staples	Non-staple plant	All animal	Total	Staples	Non-staple plant	All animal	Total
Bangladesh	Income tercile	1	1 805	281	44	2 130	46	32	22	100
		2	1 903	347	61	2 311	41	35	24	100
		3	1 924	394	89	2 407	36	36	28	100
	All households	1 879	340	64	2 283	40	34	26	100	
Kenya	Income quartiles	1	1 283	256	112	1 651	Data not available			
		2	1 371	348	120	1 839				
		3	1 388	363	161	1 912				
		4	1 394	464	187	2 045				
	All households	1 360	357	145	1 862					
Philippines	Income quartiles	1	1 361	197	67	1 625	43	30	27	100
		2	1 431	229	102	1 762	36	36	28	100
		3	1 454	304	118	1 876	28	39	33	100
		4	1 381	395	207	1 983	24	37	39	100
	All households	1 406	281	124	1 811	33	35	32	100	

Table 2. PER CAPITA FOOD EXPENDITURES, FOOD AND NUTRIENT INTAKES, AND FOOD PRICES TO PURCHASE 1,000 KCAL BY BROAD FOOD GROUP, BY INCOME TERCILE, BY URBAN AND RURAL AREAS, BANGLADESH, 2005

Food Group	Per Capita Consumption Per Day (grams)	Price Paid Per Kilogram (Taka)	Taka Expenditure	Taka to Purchase 1,000 Kcal	Per Capita Kcal Intake	Per Capita Iron Intake (mg)	Per Capita Zinc Intake (mg)	Per Capita Vitamin A Intake (mcg RAE)	Per Capita Consumption Per Day (grams)	Price Paid Per Kilogram (Taka)	Taka Expenditure	Taka to Purchase 1,000 Kcal	Per Capita Kcal Intake	Per Capita Iron Intake (mg)	Per Capita Zinc Intake (mg)	Per Capita Vitamin A Intake (mcg RAE)
	Rural Low Income Tercile								Urban Low Income Tercile							
Staple Foods	473	16.95	8.02	4.74	1,690	1.61	5.90	0.88	417	17.90	7.46	5.02	1,485	1.97	5.74	0.84
Non-Staple Plant Foods	303	13.98	4.23	14.46	292	7.88	1.83	231.07	302	16.24	4.91	14.73	334	8.01	1.92	218.33
Animal and Fish Products	55	50.20	2.77	43.69	63	0.46	0.55	21.70	58	56.07	3.26	47.18	69	0.52	0.63	22.41
Total All Foods	831	18.08	15.02	7.34	2,046	9.96	8.28	253.65	777	20.12	15.63	8.28	1,888	10.50	8.29	241.57
Rural Middle Income Tercile								Urban Middle Income Tercile								
Staple Foods	498	17.26	8.60	4.83	1,780	1.84	6.40	0.95	427	18.48	7.89	5.19	1,520	2.44	6.32	1.02
Non-Staple Plant Foods	341	15.68	5.34	14.97	357	8.70	2.06	261.48	340	19.10	6.50	15.78	412	9.39	2.30	260.70
Animal and Fish Products	82	50.62	4.17	45.72	91	0.65	0.84	31.72	84	61.36	5.17	52.93	98	0.72	0.94	32.14
Total All Foods	921	19.66	18.11	8.13	2,229	11.19	9.30	294.15	851	22.97	19.56	9.64	2,029	12.55	9.55	293.86
Rural High Income Tercile								Urban High Income Tercile								
Staple Foods	519	17.90	9.28	5.01	1,852	2.15	6.90	1.58	425	20.17	8.57	5.70	1,503	3.84	7.69	1.42
Non-Staple Plant Foods	413	18.01	7.44	15.83	470	10.06	2.44	290.15	441	22.99	10.14	17.40	583	11.63	2.95	304.29
Animal and Fish Products	145	50.54	7.31	48.23	152	1.04	1.48	54.84	154	66.76	10.31	59.96	172	1.17	1.69	57.95
Total All Foods	1,076	22.33	24.03	9.72	2,474	13.24	10.82	346.57	1,020	28.44	29.02	12.85	2,258	16.64	12.33	363.66
Income Tercile	Rural						Urban									
	Per Capita Income (\$US)	Average Age (years)	Weighted Average EAR FE (mg)	Weighted Average EAR ZN (mg)	Weighted Average EAR VA (mcg RAE)	Per Capita Income (\$US)	Average Age (years)	Weighted Average EAR FE (mg)	Weighted Average EAR ZN (mg)	Weighted Average EAR VA (mcg RAE)						
Tercile 1	94	23.2	17.25	11.76	453	97	23.0	17.52	11.95	459						
Tercile 2	189	25.9	18.23	12.90	481	195	24.7	18.12	12.82	479						
Tercile 3	511	28.1	18.72	13.54	497	676	26.9	18.74	13.73	499						
All		25.4	17.97	12.62	474		25.5	18.32	13.12	486						

Notes:

- FE= Iron, ZN = Zinc, VA = Vitamin A, RAE = Retinol Activity Equivalent, EAR= Estimated Average Requirement, IOM=Institute of Medicine.
- FE, ZN, and VA EAR based on IOM values; FE values for women ages 19+ are adjusted for Hambidge updates; EAR for ZN based on IOM physiological requirements and bioavailability based on IZINCG unrefined cereal-based diet.
- Exchange rate: BDT 63.59 = US\$1

Source: Bangladesh Bureau of Statistics (2005)

INTERVENTIONS TO ADDRESS THE PROBLEM OF MINERAL AND VITAMIN DEFICIENCIES

The ultimate solution and vision for solving the problem of mineral and vitamin deficiencies is adequate dietary quality for all, which eventually can be achieved through increasing incomes, controlling rises in non-staple food prices, and nutrition education. Globally, for a high percentage of the poor, this will take several decades to achieve; in the meantime, several types of cost-effective interventions are available to address mineral and vitamin deficiencies. These include various programmes on the diversification of diets, supplementation, fortification, and biofortification. The challenge during the UN Decade of Action on Nutrition is to foster commitment by governments, the private sector, civil society and all relevant stakeholders to increase the overall level of investments across all of these interventions, and to work together to implement the most cost-effective mix of interventions.

Biofortification is a relatively new intervention. It has particular advantages over more established interventions, which justifies the introduction of biofortification into the mix of viable options. But it also has disadvantages. The advantages and drawbacks with respect to the more established interventions in addressing mineral and vitamin deficiencies are first discussed briefly as background for the more detailed discussion of biofortification that follows.

Supplementation and fortification

Vitamin A supplementation is one of the most cost-effective interventions for improving child survival and is often integrated into national health policies. Supplementation for other micronutrients is less common. Commercial food fortification, where trace amounts of micronutrients are added to staple foods or condiments during processing, helps consumers reach the recommended levels of dietary intakes of specific minerals and vitamins. Supplements are targeted at particular age-gender groups, while fortificants are added to foods widely eaten by most age-gender groups. Both modalities of delivering vitamins and minerals have been shown to increase a target group's nutrient intake and improve their nutritional status when they can be accessed (Allen et al. 2006; Bhutta et al. 2008; Bhutta et al. 2013). The strengths of supplementation and fortification are that the deficits in multiple mineral and vitamin intakes can be met quickly at relatively low cost, and cost-effectively. In some

cases, the consumer bears the cost of the added fortificant or supplement; in others, governments and international agencies bear the annual costs.

The drawbacks are that supplementation and fortification may not reach all intended beneficiaries (particularly in rural areas) due to required behaviour change, implementation constraints and costs. Both interventions involve yearly recurrent costs in every country; the cumulative annual costs of supplements and fortification can reach billions of dollars globally, especially if coverage rates improve over time.² The need for supplements and fortification will decline as food systems provide the necessary intakes of vitamins and minerals through diverse diets at more affordable prices.

Mineral and vitamin requirements of infants and pregnant and lactating women are particularly high. Implementing exclusive breastfeeding in the first six months is crucial for child health and development. In the absence of quality diets, micronutrient powders and ready-to-eat, nutrient-dense foods provide the required nutrients. The benefits of consuming them are particularly high during this crucial, early period of growth. The drawbacks are that per person costs are relatively high and more often borne by the families rather than governments or international agencies.

Interventions to diversify diets

Although the marginalized poor devote relatively high percentages of increased income to the purchase of high-quality, non-staple foods; nutrient requirements (especially of women and

² The World Bank (2006), Table 1.2, provides the following annual unit costs for the following interventions:

Salt Iodization	\$0.20-\$0.50
Vitamin A supplementation	\$1.01-\$2.55
Vitamin A sugar fortification	\$0.69-\$0.98
Iron supplementation	\$0.55-\$3.17

The United Nations Children's Fund (UNICEF) database on iodine (UNICEF 2016a) estimates that 50 per cent of households in Least Developed Countries (LDCs) have access to iodized salt (e.g. 70 per cent coverage in India). If there are 3 billion people in LDCs, and taking the median cost of US\$0.35 per person per year, this would amount to a total cost of \$525 million/year (\$0.35/person x 1.5 billion people).

UNICEF (2016b) estimates that it has distributed 8 billion vitamin A capsules since 1998 at a cost of 60 cents per capsule, including distribution costs, i.e. at a total cost of \$4.8 billion dollars since 1998, or \$240 million per year when divided by 20 years. The UNICEF per unit cost estimate is at the low end of the range given by the World Bank (US\$0.60 x 2 capsules = \$1.20 annually). Neidecker-Gonzalez, Nestel and Bouis (2007) estimated \$1 per capsule, or \$2.00 per child per year, in the upper part of the range given by the World Bank, for a total cost of \$400 million per year – not counting vitamin A capsule distribution by agencies other than UNICEF.

The amounts spent on these two interventions alone have been conservatively estimated at \$750-925 million per year.

preschool children because of their increased requirements for reproduction and growth) are such that consumption of non-staple foods must increase by several multiples before requirements are met. For example, as shown in Table 2, incomes are 5-6 times higher in the high-income terciles compared with the low income terciles, but still even average adequacy is not met. Therefore, incomes must increase by several multiples, which requires several decades of economic growth.³

Social protection programmes increase current incomes. Modestly higher incomes will lead to marginally better dietary adequacy (Table 2). Nutrition education programmes can indicate how to re-allocate the income that is available to poor households for purchasing the most nutritious foods that may be available at a relatively low cost and could be consumed in greater quantities within existing food budgets (World Bank 2006). An analogous intervention that involves substantial behaviour change to diversify diets is to teach farm households to diversify their produce for home consumption, most often through the introduction of home gardens (Sibhatu, Krishna and Qaim 2015).

All of these interventions can be cost-effective, but the fundamental constraint is the limited resources available to poor households, the costs, especially in terms of social protection, of mitigating those constraints, and the requirement for changes in behaviour to be effective, particularly in nutrition education and crop diversification.

Interventions through agricultural research: Biofortification

Biofortification involves breeding staple food crops to increase their micronutrient content, targeting staple foods widely consumed by low-income families globally. Biofortification contributes to solving the underlying problem of mineral and vitamin deficiencies by increasing the amount of iron, zinc and provitamin A produced by food systems.

The fundamental concepts and comparative advantages that justify biofortification are that biofortification:

- Saves on recurrent costs through plant breeding, in which plants relocate more trace minerals to the edible portions of seeds and synthesize higher levels of vitamins in these seeds; this is achieved by crossing mineral and vitamin dense varieties with high-yielding varieties.
- Taps into the effectiveness and cost-effectiveness of plant breeding as well as of seeds to replicate themselves, where the results of research undertaken in a central location can be replicated in other countries.
- Minimizes the need for behaviour change by: (i) piggybacking on an existing system of agricultural research institutes (international and national) that produces a stream of increasingly productive and climate-adapted crop varieties that are adopted by farmers and eventually account for a high percentage of total food supplies; and (ii) focusing on food staples that the poor already eat in large quantities.
- Provides extra iron, zinc and provitamin A to farmers and consumers at no extra cost by growing and eating biofortified varieties of everyday foods in a one-for-one substitution for non-biofortified varieties.
- Initiates the delivery of these micronutrients in the relatively hard-to-reach rural areas where a majority of the poor reside.

The primary drawbacks to biofortification, which diminish over time, are as follows:

- The impacts of agricultural research through plant breeding take a long time to develop; plant breeding can involve ten years or more of research before a variety with full target levels⁴ of micronutrients can be developed and first releases are approved; moreover, new crop varieties are adopted gradually over time.
- Therefore, the density and number of minerals and vitamins in seeds cannot be as quickly manipulated as can levels of minerals and vitamins supplied by supplementation and fortification of foods. Single target levels (specific mineral or vitamin densities in seeds for particular crops) need to be reached in released varieties, whose densities will increase over time. Multiple nutrients can be added through plant breeding, however one at a time sequentially. A conventional plant breeding advanced technique, "marker-assisted-selection", is now being applied to speed up this process (Bouis and Saltzman 2017b).

³ Certainly, incomes for particular households or communities can increase markedly in a relatively short span of time. However, to increase incomes several multiples broadly across an entire nation, takes several decades. Similarly, new crop varieties may be adopted rapidly by individual farmers and in particular communities in a relatively short period of time. However, for biofortified varieties to capture, for example, 70 to 90 per cent of total supply of a particular, major staple crop for an entire nation, one to two decades are needed, depending on a number of factors (e.g. agronomic superiority, the number of diverse growing environments within the same country, the presence of well-developed seed markets and extension systems, and population size in relation to investments available to catalyse scaling-up).

⁴ The concept of breeding "target level" can be explained through an example. White maize has zero provitamin A. The target level density that plant breeders have been given to achieve is 15 mg/kg (sometimes referred to as ppm, or parts per million) provitamin A in maize kernels as harvested. Taking in account per capita consumption in maize eating populations, bioavailability, and losses of provitamin in storage, processing, and cooking, the remaining provitamin A that is consumed should provide an estimated extra 40% of the Estimated Average Requirement for adult, non-pregnant, non-lactating women and preschool children. Further details on targets for all biofortified crops are provided in Bouis and Saltzman 2017a and 2017b.

Nevertheless, the plant breeding and nutrition research under HarvestPlus, the global leader in biofortification science and policy, began 14 years ago. More than 100 biofortified varieties across 12 crops have been released in 30 countries. Biofortified varieties are under testing for release in an additional 25 countries (Bouis and Saltzman 2017a).⁵ Crops are granted release because they meet stringent agronomic standards of high yields and disease and pest resistance set forth by national governments. In the future, analogous to universal fortification, it is hoped that mineral and vitamin density can be included as standards for varietal release as well, but no country has yet taken this important step.

The efficacy and evidence of acceptability of iron and provitamin A is positive and extensive for iron and vitamin A. Improved function outcomes have been shown as well – better cognitive function and work performance for iron, better eyesight adaptation to darkness for provitamin A, and reduced morbidity for zinc.^{6,7}

BIOFORTIFICATION AND THE MIX OF INTERVENTIONS BY THE END OF THE UN DECADE OF ACTION ON NUTRITION

Many doubts about whether biofortification will work have been laid aside, e.g. combining high crop yields with nutrient density in plant breeding, providing rigorous evidence on nutritional efficacy, and whether consumers will accept orange (in place of white) staple food crops. We now know that biofortification can work, and is working in specific countries.

The key unknowns at this point are the time trajectory and upper limit of the percentage of total staple food supplies that will be captured by biofortified crops. For example, consider addressing zinc deficiency in Bangladesh. Currently, an estimated 73 per cent of Bangladeshis have inadequate zinc intakes. Simulations suggest that improved dietary intakes due to increases in incomes over the next 30 years will reduce this prevalence modestly to 63 per cent. Two out of three Bangladeshis will still suffer from inadequate

zinc intakes, despite an assumed quadrupling of per capita incomes (Fiedler and Lividini 2014).

Consider that most Bangladeshis (99 per cent) consume rice daily as their main food staple, and that 93 per cent of the national supply of rice is derived from in-country production of modern varieties of rice. For the most part, traditional varieties of rice were consumed in Bangladesh 40 years ago.⁸

Thirty years from now, it can be expected that most currently sown modern varieties will have been replaced by a new wave of even higher-yielding modern varieties. If breeding of high zinc varieties becomes mainstreamed in rice agricultural research systems such that all modern varieties are dense in zinc, average per capita zinc intakes can be increased by 75 per cent through biofortified rice alone, reducing the prevalence of inadequate zinc intakes to 25 per cent (Fiedler and Lividini 2014). Because new crop varieties replace existing crop varieties only gradually over time, such success will not be achieved by the end of the UN Decade of Action on Nutrition. However, as agricultural research centers begin the practice of exclusively developing only high zinc varieties with ever-higher densities of zinc, this success can be set in motion and virtually locked in by the end of the Nutrition Decade.

This example demonstrates the essence and potential impact of biofortification. Supplementation, fortification, and several other non-agricultural interventions should be seen as relatively expensive, stop gap measures that provide temporary relief for the failure of agricultural systems to deliver sustainable supplies of minerals and vitamins. These interventions are cost-effective because the consequences of these deficiencies for human welfare are so severe.

Although progress in biofortification is relatively incremental, it improves each year. Biofortification is dynamic, sustainable and highly cost-effective, with accelerating momentum to add to the supply of minerals and vitamins supplied by food systems, thereby contributing to a diminution in the underlying cause of mineral and vitamin deficiencies.

⁵ See Figure 2 in Bouis and Saltzman (2017a) for a map of these 55 countries.

⁶ Sazawal Sunil (personal communication, 2017), Zn-biofortified wheat decreases morbidity but does not modify serum zinc among preschool children and their mothers in a RCT in India..

⁷ A list of selected, published nutrition studies for biofortified crops is provided in Annex 1. Brief summaries of findings are provided in Bouis and Saltzman (2017a) and Saltzman et al. (2017); longer summaries are provided in Bouis and Saltzman (2017b).

⁸ Keith Lividini (personal communication, 2017); analysis of Bangladesh Bureau of Statistics (2005) data.

A FUTURE VISION

To reach its full potential, biofortification must be integrated as a core activity within a range of global actions as follows:

Policy

National and international public officials recognize the significant impact of biofortification for improving and sustaining public health, as well as the high economic return to investments in biofortification – with its legitimacy conferred and underpinned by international recognition, especially by standards bodies such as Codex Alimentarius and WHO.

Significant progress has already been made in integrating biofortification into regional and national policies. At ICN2, high-level government representatives from Bangladesh, Malawi, Nigeria, Pakistan and Uganda highlighted the role of biofortification in their national strategies to end malnutrition by 2025. More than 20 additional countries, including Colombia, Panama, Rwanda and Zambia, have included biofortified crops in their national agriculture and nutrition plans. Regional and global processes, such as the African Union's Comprehensive Africa Agriculture Development Programme (CAADP) and the Scaling Up Nutrition (SUN) Movement, are building an enabling environment for biofortification. In countries where the first biofortified varieties (typically the most widely eaten food staple in that country) have been introduced, governments have requested that additional biofortified crops also be tested and released.

Partnerships

Scaling up will require building new and expanding partnerships, maintaining engagement, and increasing partner capacity. A range of delivery partners have already trained thousands of extension staff on agronomic practices and nutrition messages for biofortification, and developed technical packages for use in delivery programming. Going forward, such diverse partners as development banks, food processing companies and retailers, United Nations agencies and non-governmental organizations will include biofortified crops among their services and products.

For example, the World Bank now recommends scaling up of biofortified crops among the technical advice it provides to its member countries in Africa. Orange sweet potato flour is being used as an ingredient in a range of processed

products being sold in several countries in Africa. The World Food Programme has included iron beans in its Purchase for Progress programme in Rwanda. World Vision has incorporated biofortified crops in its agricultural programs in several countries as a way linking its agriculture and nutrition/health activities (Bouis and Saltzman 2017b).

Supply

Agricultural research entities, both public and private, recognize high mineral and vitamin content as core plant breeding objectives; varietal release committees make minimum levels of minerals and vitamins a requirement for approval for release (in addition to the standard agronomic traits, such as high yield).

The key to continued supply of biofortified crops is to move beyond a biofortification-focused breeding program, with funding specifically for biofortified crops, to mainstream the nutrient traits into all relevant crop pipelines being developed by Consultative Group on International Agricultural Research (CGIAR) centres and National Agriculture Research Systems (NARS). Recent progress in developing molecular markers will help facilitate mainstreaming (Babu et al. 2013; Swamy et al. 2016). As new varieties are developed and released, they should include the biofortified trait as a matter of standard practice.

Demand

To ensure that vitamin A biofortified crops are sustainable, both rural and urban consumers must demand high vitamin A content in their staple foods; i.e. they must prefer yellow and orange varieties over white staple foods – preferences influenced through nutrition messaging that the change in color is associated with better nutritional quality. Superior agronomic traits drive demand by rural smallholders for iron and zinc varieties, minerals that are invisible in terms of colour and taste. Eventually they capture a high percentage of the total supply that is available to consumers.

The vision of HarvestPlus is that one billion people will be benefitting from biofortified crops by 2030. If 20 to 25 per cent of the primary staple food supplies are biofortified in a subset of the 55 countries where biofortified crops will have been released (see Figure 2 in Bouis and Saltzman 2017a), then one billion people will have been reached. If fully committed to, biofortification will be one of largest nutrition interventions ever implemented.

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References

- Allen L, de Benoist B, Dary O and Hurrell R (eds.) (2006) *Guidelines on food fortification with micronutrients*. World Health Organization (WHO): Geneva. http://www.who.int/nutrition/publications/guide_food_fortification_micronutrients.pdf.
- Babu R, Palacios-Rojas N, Gao S, Yan J and Pixley K (2013) Validation of the effects of molecular marker polymorphisms in LcyE and CrTRB1 on provitamin A concentrations for 26 tropical maize populations. *Theoretical and Applied Genetics* 126(2): 389–99. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3555234/>.
- Bangladesh Bureau of Statistics (2005) *Household Income and Expenditure Survey*.
- Bhutta Z, Ahmed T, Black RE, Cousens S, Dewey K, Giugliani E, Haider BA, Kirkwood B, Morris SS and Shekar M (2008) for the Maternal and Child Undernutrition Study Group. What works? Interventions for maternal and child undernutrition and survival. *Lancet* 371(9608): 417–40. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(07\)61690-0/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(07)61690-0/fulltext).
- Bhutta Z, Das JK, Rizvi A, Michelle F Gaffey, Walker N, Horton S, Webb P, Lartey A and Black RE (2013) for the Lancet Nutrition Interventions Review Group, and the Maternal and Child Nutrition Study. Group Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *Lancet* 382(9890): 452–77. [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(13\)60996-4.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(13)60996-4.pdf).
- Bouis H, Eozenou P and Rahman A (2011) Food prices, household income, and resource allocation: Socioeconomic perspectives on their effects on dietary quality and nutritional status. *Food and Nutrition Bulletin* 32(1): S14-S23. <https://www.ncbi.nlm.nih.gov/pubmed/21717914>.
- Bouis H and Saltzman A (2017a) Improving Nutrition through Biofortification: A Review of Evidence from HarvestPlus, 2003 through 2016. *Global Food Security* 12: 49-58 <http://www.sciencedirect.com/science/article/pii/S2211912417300068>.
- Bouis H and Saltzman A (eds.) (2017b) Special Issue on Biofortification. *African Journal of Food, Agriculture, Nutrition, and Development* 17(2). <https://www.ajol.info/index.php/ajfand/issue/view/15722>.
- Fiedler JL and Lividini K (2014) *Options for Improving the Zinc-Content of the Bangladesh Diet, 2014-2043*. Unpublished HarvestPlus report.
- Graham RD, Welch RM, Sanders DA, Ortiz-Monasterio I, Bouis HE, Bonierbale M, de Hann S, Burgos G, Thiele G, Liria R, Meisner CA, Beebe S, Potts M, Kadian M, Hobbs P, Gupta RK, Twomlow S (2007) Nutritious Subsistence Food Systems. *Advances in Agronomy* vol. 92: 2-67.
- Hurley TM, Pardey PG, Rao X and Andrade RS (2016) *Returns to Food and Agricultural R&D Investments Worldwide, 1958-2015*. International Science and Technology Practice and Policy Center. University of Minnesota: Minneapolis-St. Paul. <http://ageconsearch.umn.edu/record/249356>.
- Lividini K and Zeller M (2015) *Reductions in inadequate zinc intake with zinc biofortification of rice and wheat*. Unpublished HarvestPlus Report.
- Meenakshi JV, Johnson N, Manyong V, De Groote H, Javelosa J, Yanggen DR, Naher F, Gonzalez C, Garcia J and Meng E (2010) How cost-effective is biofortification in combating micronutrient malnutrition? An ex ante assessment. *World Development* 38(1): 64–75.
- Neidecker-Gonzalez O, Nestel P and Bouis H (2007) Estimating the global costs of Vitamin A capsule supplementation: A Review of the Literature. *Food and Nutrition Bulletin* 28(3): 307-16. <https://www.ncbi.nlm.nih.gov/pubmed/17974364>.
- Ponniah A, Puskur R, Workneh S and Hoekstra D (2008) *Concepts and practices in agricultural extension in developing countries: A source book*. International Food Policy Research Institute (IFPRI)/International Livestock Research Institute (ILRI): Washington DC and Nairobi. <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/125973>.
- Qaim M, Stein AJ and Meenakshi JV (2007) Economics of biofortification. *Agricultural Economics* 37: 119–33.
- Saltzman A, Birol E, Oparinde A, Andersson MS, Asare-Marfo D, Tedla Diressie M, Gonzalez C, Lividini K, Moursi M and Zeller M (2017) Availability, production, and consumption of crops biofortified by plant breeding: current evidence and future potential. *Annals of the New York Academy of Science* 1390(1): 104–14. <https://www.ncbi.nlm.nih.gov/pubmed/28253441>.
- Sibhatu KT, Krishna VV and Qaim M (2015) Production diversity and dietary diversity in smallholder farm household. *Proceedings of the National Academy of Science of the United States of America* 112(34): 10657-62. <http://www.pnas.org/content/112/34/10657.abstract>.
- Swamy BPM, Rahman MA, Inabangan-Asilo MA, Amparado A, Manito C, Chadha-Mohanty P, Reinke R and Slamet-Loedin IH (2016) Advances in breeding for high grain zinc in rice. *Rice* 9:49. <http://dx.doi.org/10.1186/s12284-016-0122-5>.
- United Nations Children's Fund (UNICEF) (2016a) *Nutrition Iodine*. UNICEF Global Databases. <http://data.unicef.org/topic/nutrition/iodine-deficiency>.
- UNICEF (2016b) *Vitamin A Supplementation: A Statistical Snapshot*. UNICEF: New York. https://data.unicef.org/wp-content/uploads/2016/04/VAS-brochure-web-final_253.pdf.
- United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.
- World Bank (2006) *Repositioning Nutrition as Central to Development: A Strategy for Large-Scale Action*. World Bank Group: Washington DC. <https://siteresources.worldbank.org/NUTRITION/Resources/281846-1131636806329/NutritionStrategyOverview.pdf>.

Annex 1: Evidence on the Bioavailability, Efficacy, and Effectiveness of Biofortified Foods

Selected Iron Studies

Cercamondi CI, Egli IM, Mitchikpe E, Tossou F, Zeder C, Hounhouigan JD and Hurrell RF (2013) Total iron absorption by young women from iron-biofortified pearl millet composite meals is double that from regular millet meals but less than that from post-harvest iron-fortified millet meals. *Journal of Nutrition* 143(9): 1376-82. <https://www.ncbi.nlm.nih.gov/pubmed/23884388>.

Finkelstein JL, Haas JD and Mehta S (2017) Iron-biofortified staple food crops for improving iron status: a review of the current evidence. *Current Opinion in Biotechnology* 44: 138-45. <https://www.ncbi.nlm.nih.gov/pubmed/28131049>.

Finkelstein JL, Mehta S, Udipi SA, Ghugre PS, Luna SV, Wenger MJ, Murray-Kolb LE, Przybyszewski EM and Haas JD (2005) A randomized trial of iron-biofortified pearl millet in school children in India. *Journal of Nutrition* 145(7): 1576-81.

Haas JD, Beard JL, Murray-Kolb LE, del Mundo AM, Felix A and Gregorio GB (2005) Iron biofortified rice improves the iron stores of non-anemic Filipino women. *Journal of Nutrition* 135(12): 2823-30. <https://www.ncbi.nlm.nih.gov/pubmed/16317127>.

Haas JD, Luna SV, Lung'aho MG, Wenger MJ, Murray-Kolb LE, Beebe S, Gahutu JB and Egli IM (2016) Consuming iron-biofortified beans increases iron status in Rwandan women after 128 days in a randomized controlled feeding trial. *Journal of Nutrition* 146:1586-92. <http://jn.nutrition.org/content/early/2016/06/28/jn.115.224741.full.pdf>.

Kodkany BS, Bellad RM, Mahantshetti NS, Westcott JE, Krebs NF, Kemp JF, Hambidge KM (2013) Biofortification of pearl millet with iron and zinc in a randomized controlled trial increases absorption of these minerals above physiologic requirements in young children. *Journal of Nutrition* 143(9): 1489-93. <http://jn.nutrition.org/content/early/2013/07/10/jn.113.176677>.

Luna SV (2015) *The effects of iron-biofortified beans on iron status, physical performance and physical activity in Rwandan women*. Doctoral thesis. Cornell University: Ithaca NY.

Scott S, Murray-Kolb L, Wenger M, Udipi S, Gughre P and Haas J (2014) Iron-biofortified pearl millet improves attentional function in Indian adolescents, a 6-month randomized controlled trial. *FASEB Journal* 28(1): Supplement 619.2.

Wenger M, Rhoten S, Scott S, Murray-Kolb L, Lung'aho M, Gahutu JB and Haas J (2016) Improvements in electrophysiological measures of brain function during memory processing in Rwandan women consuming iron biofortified beans. *FASEB Journal* 30(1): Supplement 914.5.

Selected Vitamin A Studies

Gannon B, Kaliwile C, Arscott S, Schmaelzle S, Chileshe J, Kalungwana N, Mosonda M, Pixley K, Masi C and Tanumihardjo SA (2014) Biofortified orange maize is as efficacious as a vitamin A supplement in Zambian children even in the presence of high liver reserves of vitamin A: a community-based, randomized placebo-controlled trial. *American Journal of Clinical Nutrition* 100(6): 1541-50. <https://www.ncbi.nlm.nih.gov/pubmed/25411289>.

Hotz C, Loechl C, Lubowa A, Tumwine JK, Ndeezi G, Nandutu Masawi A, Baingana R, Carriquiry A, de Brauw A, Meenakshi JV and Gilligan DO (2012) Introduction of beta-carotene-rich orange sweet potato in rural Uganda resulted in increased vitamin A intakes among children and women and improved vitamin A status among children. *Journal of Nutrition* 142(10): 1871-80. <https://www.ncbi.nlm.nih.gov/pubmed/22875553>.

Jones KM and de Brauw A (2015) Using agriculture to improve child health: Promoting orange sweet potatoes reduces diarrhea. *World Development* 74: 15-24. <http://www.sciencedirect.com/science/article/pii/S0305750X15000911>.

Low J, Arimond M, Osman N, Cunguara B, Zano F and Tschirley D (2007) A food-based approach introducing orange-fleshed sweet potatoes increased vitamin A intake and serum retinol concentrations in young children in rural Mozambique. *Journal of Nutrition* 137(5): 1320-7. <https://www.ncbi.nlm.nih.gov/pubmed/17449599>.

Palmer A, Chileshe J, Hall A, Barffour M, Molobeka N, West Jr KP and Haskell MJ (2016) Short-term daily consumption of provitamin A carotenoid-biofortified maize has limited impact on breast milk retinol concentrations in Zambia women enrolled in a randomized controlled feeding trial. *Journal of Nutrition* 146(9): 1783-92. <https://www.ncbi.nlm.nih.gov/pubmed/27466608>.

Palmer A, Healy K, Barffour MA, Siamusantu W, Chileshe J, Schulze KJ, West KP Jr. and Labrique AB (2016) Provitamin A Carotenoid-Biofortified Maize Consumption Increases Pupillary Responsiveness among Zambian Children in a Randomized Controlled Trial. *Journal of Nutrition* 146(12): 2551-8. <http://jn.nutrition.org/content/early/2016/10/19/jn.116.239202.abstract> [last access 16 May 2017].

Palmer A, Siamusantu W, Chileshe J, Schulze K, Barffour M, Craft N, Molobeka N, Kalungwana N, Arguello M, Mitra M, Caswell B, Klemm R and West Jr. KP (2016) Provitamin A-biofortified maize increases serum b-carotene, but not retinol, in marginally nourished children: a cluster-randomized trial in rural Zambia. *American Journal of Clinical Nutrition* 104(1): 181-90. <https://www.ncbi.nlm.nih.gov/pubmed/27169838>.

Talsma EF, Brouwer ID, Verhoef H, Mbera GNK, Mwangi AM, Demir AY, Maziya-Dixon B, Boy E, Zimmermann MB and Melse-Boonstra A (2016) Biofortified yellow cassava and vitamin A status of Kenyan children: a randomized controlled trial. *American Journal of Clinical Nutrition* 103(1): 258-67. <https://www.ncbi.nlm.nih.gov/pubmed/26675768>.

van Jaarsveld P, Faber M, Tanumihardjo S, Nestel P, Lombard C and Spinnler Benadé A (2005) beta-Carotene-rich orange-fleshed sweet potato improves the vitamin A status of primary school children assessed with the modified-relative-dose-response test. *American Journal of Clinical Nutrition* 81(5): 1080-7. <http://ajcn.nutrition.org/content/81/5/1080.full>.

Selected Zinc Studies

Rosado J, Hambidge KM, Miller L, Garcia O, Westcott J, Gonzalez K, Conde J, Hotz C, Pfeiffer W, Ortiz-Monasterio I and Krebs N (2009) The quantity of zinc absorbed from wheat in adult women is enhanced by biofortification. *Journal of Nutrition* 139(10): 1920-5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3151017/>.

Signorell C, Signorell C, Moretti D, Zeder C, Tay F, Boy E, Khetarpaul N, Cakmak I and Zimmermann M (2015) Evaluation of zinc bioavailability in humans from foliar zinc biofortified wheat and from intrinsic vs. extrinsic Zn labels in biofortified wheat. *European Journal of Nutrition and Food Safety* 5(5): 863-4. http://www.journalrepository.org/media/journals/EJNFS_30/2015/Aug/Signorell552015EJNFS21133.pdf.

Action Area 2

ALIGNED HEALTH SYSTEMS PROVIDING UNIVERSAL COVERAGE OF ESSENTIAL NUTRITION ACTIONS

Accelerating nutrition improvement in sub-saharan Africa: Scaling up nutrition interventions in three countries

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INTRODUCTION

Africa is home to one-third of the world's 155 million stunted children under five years of age (UNICEF, WHO and World Bank 2016). Similarly, out of the 51.7 million wasted children under five years of age in the world, 14.0 million live in Africa. When severely wasted children encounter common infectious diseases, they are on average 11 times more likely to die than their healthy counterparts. In Africa, the prevalence of babies born small for gestational age is the second highest in the world, at around 24 per cent (Lee 2013). Micronutrient deficiencies also present an important public health problem. In 2011, anaemia, for example, affected 37.8 per cent of non-pregnant women, 46.3 per cent of pregnant women and 62.3 per cent of children 6-59 months of age (WHO 2015). The high burden of undernutrition in Africa results in huge losses of human capital and economic productivity.

Given these challenges and to meet the commitment made in 2012 to implement the Comprehensive Implementation Plan

on Maternal, Infant and Young Child Nutrition (CIP-MIYCN) and to achieve the six Global Nutrition Targets 2025 (WHO 2014b),¹ countries need to accelerate actions to improve nutrition, in particular for the critical 1,000 days during pregnancy and the first two years of life. The results of the actions taken then need to be monitored and evaluated to track progress. Therefore, setting up of a robust nutrition surveillance system should be an integral part of any actions or programme implementation.

The Accelerating Nutrition Improvements (ANI) project was implemented by the World Health Organization (WHO) in 11 countries in sub-Saharan Africa² during 2013–2016 in close collaboration with the Ministry of Health (MoH) and local partners, with the financial support of Global Affairs Canada. The project aimed to strengthen nutrition surveillance in all

¹ World Health Assembly (WHA) Resolution on Comprehensive implementation plan on maternal, infant and young child nutrition (2012). WHA65.6.

² These are Burkina Faso, Ethiopia, Mali, Mozambique, Rwanda, Senegal, Sierra Leone, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe.

11 countries, with a focus on improving the routine system in order to generate information on key nutrition indicators to inform decisions on programme management. The project also provided support to scale up nutrition actions in three of the 11 countries – Ethiopia, Uganda and the United Republic of Tanzania. The scaling-up activities were implemented through country-led programmes and strategies, and within existing systems to avoid duplication and ensure sustainability. The scale-up component of the ANI project aimed to disseminate intervention delivery guidelines for adoption and adaptation; support capacity development for community health workers; and support the scale-up of evidence-informed nutrition interventions.

At the global and regional levels, activities focused on disseminating WHO guidance through the WHO e-Library of Evidence for Nutrition Actions (eLENA),³ the identification and dissemination of best practices (WHO 2016a),⁴ and stakeholder mapping (WHO 2014a and 2016b).

ACTIVITIES IN THE THREE SCALING-UP COUNTRIES AND METHODOLOGY FOR MONITORING PROGRESS

The ANI project addressed priority issues and approaches articulated in the national nutrition strategies. The nutrition problems addressed included infant and young child feeding (IYCF) practices, vitamin and mineral deficiencies, and severe acute malnutrition. The project supported the implementation of the national nutrition strategies including: strengthening nutrition surveillance and information management; expanding access to quality high-impact interventions delivered at the facility and community levels; improving the knowledge, skills and competencies of service providers at all levels to give adequate support in nutrition; improving the district- and regional-level management of nutrition services; and creating demand for services through behaviour change communication.

The progress of the ANI project was assessed using a Performance Monitoring Framework (PMF) developed at the beginning of the project. The PMF was used in a non-experimental longitudinal analysis to compare baseline and end-line results and includes quantitative and qualitative

indicators to monitor and evaluate each country's progress on their individual country implementation plan (CIP) as well as the overall progress of the project. It was also used to assess the effectiveness of scaling up nutrition interventions in the three countries.

RESULTS AND ACHIEVEMENTS IN THE THREE SCALING-UP COUNTRIES

Baseline measurements using the PMF revealed at least three essential gaps in nutrition surveillance: (i) the relative absence of nutrition indicators in national health management information systems (HMIS); (ii) late submission of sub-national data to the national level systems; and (iii) little evidence of the use of the data to influence local action, and when used, their use was limited in scope. The baseline also revealed gaps in relation to systems for scaling-up including low capacity of health workers in the management of severe acute malnutrition and promotion of IYCF, limited availability of outreach services, and lack of plans to scale up nutrition action at the district levels.

The following describes common achievements (WHO 2017a, 2017b and 2016a) which were experienced by the three scaling-up countries.

INCREASED AWARENESS OF NUTRITION NEEDS

Government involvement was critical to strengthening and accelerating the implementation of nutrition interventions. ANI helped develop governmental capacity to prioritize, finance and implement nutrition actions by working through established community networks and existing government institutions. In Ethiopia, results from a needs and feasibility assessment demonstrated to policymakers the need to address anaemia among adolescent girls. ANI-supported districts in Uganda conducted participatory assessments, bringing together multiple stakeholders to develop nutrition plans. In the United Republic of Tanzania, capacity building in multisectoral planning and budgeting promoted increases in district-level investments in nutrition.

³ WHO e-Library of Evidence for Nutrition Actions (eLENA). <http://who.int/elena>.

⁴ Global database on the Implementation of Nutrition Action (GINA). <http://www.who.int/nutrition/gina/en/>.

HEIGHTENED CAPACITY TO IMPROVE QUALITY AND COVERAGE OF NUTRITION SERVICES

Activities were implemented in collaboration with the Nutrition Units of the Ministry of Health and district health teams. Together, the partners worked to strengthen the capacity of frontline health workers by providing training on identified hands-on activities, including the promotion of maternal, infant, young child and adolescent nutrition, management of severe acute malnutrition, social and behaviour change communication (SBCC), promotion of appropriate IYCF practices and growth monitoring and promotion.

The aim of the project to increase the proportion of health workers with the knowledge and skills to deliver nutrition interventions to 75% was achieved by all three countries (WHO 2017a). This resulted in an increased proportion of health workers implementing nutrition interventions in communities. Almost 10,000 health workers, including community health workers, were trained as part of the ANI project in the three countries: Ethiopia trained 3,327, Uganda trained 2,441 and the United Republic of Tanzania trained 4,205.

As described in the case study on Ethiopia, health workers were able to provide better quality and greater coverage of nutrition services following enhanced technical training (WHO 2016a). In Uganda, recipes for complementary foods using locally available foods were developed and promoted. Across the three countries, a total of 9,973 district health managers and health workers at the national and subnational levels were provided training on strengthening nutrition services. To evaluate and help maintain the quality of services provided, capacity-building activities were complemented with post-training follow-up visits and performance review meetings with supervisors.

In all three countries, implementing activities through district structures contributed towards building the capacity necessary for sustaining interventions beyond the life of the project. The trained health workers were able to educate community members and refer children who needed services. They remain a key resource for promoting and supporting breastfeeding, and appropriate complementary feeding within the districts, as demonstrated in the observed changes in practices in Ethiopia and Uganda.

USE OF EVIDENCE-INFORMED ACTIONS TO IMPROVE NUTRITION SERVICES

The ANI project helped to strengthen health worker skills in essential nutrition actions, in particular IYCF counselling and severe acute malnutrition (SAM) management, and provided equipment for health facilities. Support was also provided to update and institutionalize updated evidence-informed protocols and guidelines to improve the quality of nutrition services. Documents developed included guidelines and training manuals, as well as materials on developing an SBCC strategy. Participatory methods were applied throughout the design, implementation and validation processes, ensuring that developments were evidence-informed and culturally appropriate, and that the newly adopted practices would remain in the community in the long term.

In Uganda, availability of comprehensive information facilitated the development of nutritious, locally available, affordable recipe options for complementary feeding. In addition, Uganda adopted current international guidelines for integrated management of acute malnutrition (IMAM), growth monitoring and promotion (GMP), and IYCF, and training manuals for the inpatient management of SAM and for adolescent health. Health workers and government officials reported that availability of nutrition services resulted in reported improvements in coverage.

In all three countries, more than 80 per cent of health facilities in ANI districts now have the necessary equipment and trained health workers to continue providing nutrition services. Almost all children who come to health facilities undergo a growth assessment and are provided with appropriate nutrition services, while the mothers and caregivers of those children are counselled on optimum maternal, infant and young child nutrition.

IMPROVED NUTRITION SURVEILLANCE AND PROGRAMME MONITORING TO FURTHER INFORM NUTRITION SERVICES

Together with other achievements, the ANI project has helped improve nutrition monitoring skills among health workers, supplied equipment for health facilities, institutionalized nutrition surveillance within HMIS, and linked surveillance

activities to capacity building on essential nutrition actions. The Ethiopian national integrated supportive supervision checklists have also included indicators for monitoring and mentoring key nutrition aspects alongside other health services and indicators. This will ensure the sustainability of services to be supported and regularly monitored and supervised.

Stronger nutrition surveillance within the health system of the United Republic of Tanzania allowed improved detection and management of child undernutrition. The HMIS/DHIS2 platform also showed an increase in the proportion of health facilities that reported on nutrition indicators, including stunting, low birth weight, acute malnutrition, timely initiation of breastfeeding, and distribution of vitamin A and iron-folic acid supplements.

NATIONAL NUTRITION ACTION PLANS

The PMF included as a target the development of a national nutrition action plan that met at least four out of the six following requirements: is evidence-informed, has allocated responsibilities, has set targets and indicators to monitor progress, is officially adopted, has budgeting and is implemented. All three countries met this target; the action plans of Ethiopia and the United Republic of Tanzania have met all six requirements.

LESSONS LEARNED

Scaling up nutrition actions must engage multisectoral partners to address the direct and underlying causes of malnutrition in all its forms. The involvement of multiple stakeholders calls for effective coordination and strategic leadership at the national and sub-national levels. The principle of the “three ones” (one plan, one coordinating mechanism, and one monitoring and evaluation framework) is key to effective coordination efforts to scale up effective nutrition actions.

Any projects or initiatives need to be aligned with ongoing country programmes to avoid top-down directives and a duplication of efforts. Involvement of implementing partners from the beginning of the project initiation, joint planning, implementation and monitoring help improve ownership and sustainability of the actions and intervention programmes being implemented. There should be a shared implementation plan that is clear on the respective mandate of all partners. The division of roles should be based on each partner’s technical strength.

Implementing such a joint project requires adequate time and adequate staffing at all levels: government, implementing

non-governmental organization (NGO) partners and WHO. The resources required to scale up nutrition actions must be mobilized from within the existing sectoral budgets. This requires the buy-in and support of various sectors concerned with nutrition. Political will from the highest level and a steering role of such highest level, such as the Prime Minister’s Office, are crucial to securing investments in nutrition.

The integration of project interventions into existing health systems such as district health team supervision, health facility outreach and growth monitoring in Young Child Clinics is likely to increase the sustainability of such interventions at low marginal costs. Training of all health workers in the targeted health centres increases the likelihood of continuation of the nutrition interventions even when the project comes to an end.

Consultation meetings should be conducted at different levels in order to increase buy-in of the communities into the project: with increased buy-in comes greater acceptance of the project and uptake of the interventions. Working with established volunteer groups and associations such as women’s groups has the potential to promote continuity of the interventions beyond the project life. In contrast, groups or associations formed by the project often close or become dormant once the project ends. Involving adolescents in both in-school and out-of-school environments as key nutrition message promoters has the double advantage of improving their own nutrition and spreading messages to their families and communities.

CONCLUSION AND RECOMMENDATIONS

The ANI project increased the knowledge and practices of optimal IYCF practices among the target groups and improved the skills of health workers on the promotion of adolescent, maternal, infant and young child nutrition (AMIYCN) and management of SAM. Caregivers learned recipes and methods for preparing nutritious foods for their children; if the practices continue, they will go far in reducing stunting among children 6-23 months.

In the United Republic of Tanzania, the greatest achievement was raising the profile of nutrition and enhancing the capacity to plan and budget for nutrition at sub-national levels. The district councils developed multi-sectoral plans to scale-up nutrition actions, and there was evidence of increased allocation of funds for nutrition interventions in the sectoral budgets. Through the various training supported by the project in all three countries, the technical capacity of service providers at the regional and district levels markedly improved. In Ethiopia and Uganda, positive changes in behaviours and practices

were observed as result of SBCC activities, in particular the solid approach taken in Uganda to develop evidence-informed dietary guidelines for complementary foods.

NEXT STEPS

- In order to sustain these achievements, it is strongly recommended to support pre-service training, particularly on the management of children with SAM, so that institutions that provide training on nursing, medicine and nutrition can incorporate aspects of care into their curricula. This is a way of building a critical mass of people with adequate skills and capacities to address nutrition problems in countries.
- Health facility-based mentorship and supportive supervision are also needed to ensure that the necessary quality of care is maintained.
- Both technical and financial supports are necessary to further secure the progress made and scale up nutrition surveillance activities nationwide. Due to the short duration of the project, it is important to ensure that the progress made in ANI districts are not only sustainable in the long term, but are also scaled up beyond the focus districts.
- With an improvement in data collection across most districts, other aspects such as data quality, report writing, data use and translation should also be strengthened through continued mentorships, support supervisions and district review meetings for nutrition data.

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References

Lee A, Katz J, Blencowe H, Cousens S, Kozuki N, Vogel JP, Adair L, Baqui AH, Bhutta ZA, Caulfield LE, Christian P, Clarke SE, Ezzati M, Fawzi W, Gonzalez R, Huybregts L, Kariuki S, Kolsteren P, Lusingu J, Marchant T, Meriardi M, Mongkolkeha A, Mullany LC, Ndirangu J, Newell ML, Nien JK, Osrin D, Roberfroid D, Rosen HE, Sania A, Silveira MF, Tielsch J, Vaidya A, Willey BA, Lawn JE, Black RE, for the CHERG SGA-Preterm Birth Working Group (2013) National and regional estimates of term and preterm babies born small for gestational age in 138 low-income and middle-income countries in 2010. *Lancet Global Health* 1: e26-36. [www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X\(13\)70006-8.pdf](http://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(13)70006-8.pdf).

World Health Organization (WHO) (2014a) *Accelerating Nutrition Improvements (ANI). Mapping of stakeholders and nutrition actions in three scaling-up countries in sub-Saharan Africa*. Report of a meeting 27–28 February 2014, Addis Ababa, Ethiopia. WHO: Geneva. www.who.int/entity/nutrition/publications/ANI_workshop_report/en/index.html.

WHO (2014b) *Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition*. WHO: Geneva. www.who.int/nutrition/publications/CIP_document/en/.

WHO (2015) *The Global Prevalence of Anaemia In 2011*. WHO: Geneva. http://apps.who.int/iris/bitstream/10665/177094/1/9789241564960_eng.pdf?ua=1&ua=1.

WHO (2016a) *Accelerating nutrition improvements: best practices for scaling up. Examples from Ethiopia, Uganda and the United Republic of Tanzania*. WHO: Geneva. www.who.int/nutrition/publications/ANI-bestpractices-scalingup/en/.

WHO (2016b) *Accelerating Nutrition Improvements (ANI). Mapping of stakeholders and nutrition actions in three scaling-up countries in sub-Saharan Africa*. Report of the second meeting 10 February 2015, Kampala, Uganda. WHO: Geneva. http://www.who.int/nutrition/publications/ANI_2nd_meeting_report/en/.

WHO (2017a) *Accelerating Nutrition Improvements (ANI): Report of Baseline and End line Perception Survey in ten countries*. WHO: Geneva. www.who.int/nutrition/publications/ANI-perception-surveys/en/.

WHO (2017b) *Accelerating Nutrition Improvements (ANI) in Sub-Saharan Africa. Strengthening Nutrition Surveillance*. Final report 2012-2016. WHO: Geneva. <http://apps.who.int/iris/bitstream/10665/255421/1/WHO-NMH-NHD-17.5-eng.pdf>.

United Nations Children's Fund (UNICEF), WHO and World Bank Group (WB) (2016) *Levels and Trends in Child Malnutrition. Joint Child Malnutrition Estimates. Key findings of the 2016 edition*. UNICEF/WHO/World Bank Group: New York/Geneva/Washington DC. www.who.int/nutgrowthdb/estimates2016.



WHO/YOSHI SHIMIZU

Action Area 3

SOCIAL PROTECTION AND NUTRITION EDUCATION

Ensuring healthier diets, better nutrition and strengthened food systems: The role of social protection policies and programmes

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Social protection has featured prominently in recent debates on food security and nutrition. Increasingly, governments and development practitioners around the world are looking to harness the reach and scale of social protection programmes to address the multiple dimensions of malnutrition, together with improving livelihoods and socio-economic conditions.

GROWING MOMENTUM FOR NUTRITION-SENSITIVE SOCIAL PROTECTION

The Second International Conference on Nutrition (ICN2) in 2014, provided the much-needed impetus in recognizing that social protection policies and programmes are critical to eradicating hunger and malnutrition. Since then, numerous global events have shaped the discussion on nutrition-sensitive social protection. In particular, the *Global Forum on Nutrition-Sensitive Social Protection*, organized by the Russian Federation and World Bank, reinforced the co-benefits of linking nutrition and social protection programmes, as well as emphasized the need for stronger political commitment and partnerships to ensure positive

changes in the lives of nutritionally vulnerable groups (FAO 2016). In December 2016, the FAO/WHO International Symposium on Sustainable Food Systems for Healthy Diets and Improved Nutrition highlighted the importance of linking nutrition and social protection for better nutrition and strengthened food systems.

Evidently, the potential of social protection for improving nutrition and diets has gained traction at the global policy arena. Stimulating action at the country level, however, would require consolidation of current efforts, advancing global commitments into action, and greater coherence among actors working in nutrition and social protection. The UN Decade for Action on Nutrition (2016-2025), proclaimed by the UN General Assembly in April 2016, provides one such opportunity to build on the current momentum and catalyse implementation of commitments in line with the transformative and ambitious 2030 Agenda. The real value-added of the Decade is embedded in its inclusivity and reach to a wide range of stakeholders. It provides an umbrella for sectors that have historically not been seen as drivers for better nutrition outcomes, such as social protection and labour, to align, consolidate and accelerate efforts.

NUTRITION AND SOCIAL PROTECTION LINKAGES: WHAT DO WE ALREADY KNOW?

There is considerable evidence and research now to suggest that social protection programmes can lead to positive nutrition and food security outcomes, primarily by improving dietary diversity, enhancing access to health and nutrition services, and increasing incomes (FAO 2015a and 2015b). Social protection instruments at the disposal of policy makers include, but are not limited to, cash transfers, in-kind transfers, public works programmes and input subsidies. Cash transfers, conditional or unconditional, tend to raise household food consumption, dietary diversity and participation in social services (Alderman 2016). School feeding programmes, a form of in-kind transfers, have shown to increase the quality and quantity of food consumed and improve educational outcomes such as attendance and learning. They also hold potential for strengthening local food systems by supporting small-scale farmers for local sourcing of school meals and, like other forms of in-kind transfers, can provide a vehicle for improving access to fortified foods. The actual impacts of social transfers vary however, and greatly depend on programme design and implementation, and features such as size, predictability and regularity of the transfers, as well as the demographic and socio-economic profile of beneficiaries and the context they live in (e.g. state of natural resources and access to markets) (FAO 2015b).

Production to protection: Impacts of cash transfer programmes in sub-Saharan Africa

The Production to Protection (PtoP) project is a four-year collaboration between the Food and Agriculture Organization of the United Nations (FAO), United Nations Children's Fund (UNICEF) and Department for International Development (DFID) aimed at exploring the impact of cash transfer programmes in six sub-Saharan African countries: Ethiopia, Ghana, Kenya, Lesotho, Malawi and Zimbabwe. A qualitative assessment of these programmes concluded that the impacts of cash transfers are determined by a wide range of contextual factors, some of which include the household asset base, livelihood strategies, levels of vulnerability, local economic institutions and complementary services and programmes. These results affirm the need to make social protection policies and programmes context- and group-specific, narrowly targeted, and integrated in approach, covering multiple sectors.

Source: FAO (2015c).

Social protection programmes can also lead to positive improvements in household income-generating activities. For instance, through social protection measures, households have noted increased levels of savings and access to credit, increased farm and non-farm investments and production, enhanced flexibility in allocation of household labour, and strengthened social networks (FAO 2015b). In addition, for households facing shocks, social protection measures can sustain consumption levels, reduce negative risk-coping strategies, and encourage higher-risk but higher-return livelihood strategies (FAO 2015b).

In short, social protection policies and programmes that include nutrition considerations can address immediate, underlying and basic causes of malnutrition.

MAXIMIZING PROGRAMMATIC LINKAGES BETWEEN NUTRITION AND SOCIAL PROTECTION

From the point of view of programme design, nutrition and social protection offer significant common ground to achieve co-benefits. However, implementing these programmes can be challenging since nutrition is often one of the many development objectives that social protection seeks to address, and the impact on nutrition is not always automatic. Yet, country experiences and good practices gathered from around the world point to a few operational requisites that can be adopted to better design social protection programmes for improved nutrition outcomes.

Increased food consumption and dietary diversity do not always lead to better nutrition status, which is a confluence of multiple factors – access to food, care and health services – that span across different sectors. Therefore, social protection programmes need to be combined with complementary interventions in agriculture, health, and related sectors in order to improve nutrition outcomes. Examples of complementary interventions could include: nutrition education and behaviour change communication, homestead gardening, small livestock breeding and health services (health fee waivers, health care subsidies, social health insurance, among others).

Targeting the nutritionally vulnerable can also greatly enhance the nutrition-sensitivity of social protection programmes, especially when programmes reach women within households. The programmes that address gender roles and improve women's economic empowerment

lead to better child and maternal welfare. Indeed, better child and maternal nutrition is necessary to break the intergenerational nature of poverty – one of the foremost objectives of most social protection programmes.

Finally, it is equally important to raise awareness and build capacities at the country level among policy makers and

development practitioners on operationalizing synergies between nutrition and social protection. Institutional mechanisms that promote intersectoral coordination within and across relevant sectors – social protection, health, agriculture and education, among others – hold the key to successful implementation and scale-up of national programmes and their positive impact on nutrition.

The Republic of Djibouti Nutrition-Sensitive Social Safety Net Program

To counter high levels of malnutrition and food insecurity in the country, an integrated social protection programme has been implemented by the Government to encourage nutrition behaviour change and create income-generating opportunities. The programme targets pregnant and lactating women as well as children under two years of age in poor neighbourhoods.

The programme primarily focuses on mothers, given their key role in improving household nutrition and food security. Special attention is paid to the time and workload of women with the introduction of women-friendly and community-driven artisan projects, and by giving them the option to delegate work. Together with incorporating explicit nutrition goals and objectives in the programme design and evaluation, nutrition-specific interventions, such as the availability of micronutrients, food supplements, vaccinations and care-related services, are being implemented to address the underlying and immediate causes of malnutrition. As a result, dietary diversification, iron supplementation, regular use of soap and household spending on food increased notably among participants in the first phase of the programme.

Source: World Bank (2014).

References

- Alderman H (2016) *Leveraging Social Protection Programs for Improved Nutrition: summary of evidence prepared for the Global Forum on Nutrition-Sensitive Social Protection Programs*, 2015. Working Paper. World Bank Group: Washington DC. <https://openknowledge.worldbank.org/handle/10986/25275>.
- Food and Agriculture Organization of the United Nations (FAO) (2015a) *Nutrition and Social Protection*. FAO: Rome. www.fao.org/3/a-i4819e.pdf.
- FAO (2015b) *The State of Food and Agriculture (SOFA): Social Protection and Agriculture: Breaking the Cycle of Rural Poverty*. FAO: Rome. www.fao.org/3/a-i4910e.pdf.
- FAO (2015c) *Qualitative research and analyses of the economic impacts of cash transfer programmes in sub-Saharan Africa*, by Barca V and Pozarny P. Synthesis Report. FAO: Rome. www.fao.org/3/a-i4336e.pdf.
- FAO (2016) *Experience of BRICS countries in the development of nutrition-sensitive social protection programmes*. Background paper – Prepared for the Global Forum on Nutrition-Sensitive Social Protection Programmes, September 2015, Moscow, Russian Federation. FAO: Rome. www.fao.org/3/a-i6073e.pdf.
- World Bank Group (2014) *Developing a nutrition-based social safety net program in Djibouti*. World Bank Group: Washington DC. <http://www.worldbank.org/en/news/feature/2014/10/28/developing-a-nutrition-based-social-safety-net-program-in-djibouti>.



Agricultural extension and advisory services: Frontline contributors to the Nutrition Decade

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INTRODUCTION

There is growing interest in better leveraging agricultural extension and advisory services (AEAS) for nutrition-sensitive agriculture (Fanzo et al. 2015; GFRAS 2016a). Pluralistic AEAS (defined in Box 1) includes public, non-governmental organization (NGO), and private sector entities that regularly interact with millions of farmers. For readers who are more familiar with health programming, AEAS play a role similar to community health workers (CHWs). It should be noted, however, that AEAS typically engage farming households with the potential to produce a marketable surplus (USAID 2016), whereas CHWs focus on populations most vulnerable to poor health. Enlisting AEAS as vital partners in the UN Decade of Action on Nutrition is essential to realizing the Sustainable Development Goals and 2025 World Health Assembly targets. They are the foot soldiers positioned to play a key role in realizing healthier food systems. Their specific contributions, however, must build on their core competencies and will only be realized when there is alignment between programmatic, market and policy incentives.

Discussions related to nutrition-sensitive agriculture, understood here as efforts to maximize agriculture's contribution to nutrition, have at times considered agriculture in the absence of the market forces to which it responds. This paper outlines opportunities for AEAS to continue their vital role in supporting the production decisions of farming households, while calling attention to incentives that may facilitate AEAS contributions to nutrition. It is organized into three parts: Part I explores the context of AEAS and opportunities for incentivizing nutrition-sensitive action; Part II discusses the role of partnerships, and Part III reviews concrete ways that AEAS can work to improve nutrition.

PART I: THE CONTEXT OF AGRICULTURAL EXTENSION AND ADVISORY SERVICES: OPPORTUNITIES AND CHALLENGES TO INTEGRATING NUTRITION

Box 1. DEFINITION OF PLURALISTIC AGRICULTURAL EXTENSION AND ADVISORY SERVICES

"All the different activities that provide the information, [goods] and services demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational, and management skills and practices so as to improve their livelihoods and well-being." (GFRAS 2012, p. 2).

AEAS stakeholders

AEAS are responsible to the farming households whom they serve, and to their funding organization. Institutions of higher learning that are responsible for training the next generation of AEAS staff play a key role in shaping the scope of AEAS activities. Public and private sector actors contribute to the policy and market environments in which farming households operate. Finally, consumers demanding

agricultural goods play a key role in determining the market pull for various products. Each stakeholder group influences the environment in which AEAS operate in ways that can facilitate or impede nutrition-sensitive action.

The new extensionist concept

The new extensionist concept put forth by the Global Forum for Rural Advisory Services (GFRAS) envisions AEAS staff equipped to facilitate dynamic problem solving among rural populations (GFRAS 2012). The new extensionist is responsive and effective in the face of rapid changes impacting global markets, and enables agricultural actors, including farmers, producer organizations, and researchers, to overcome barriers and leverage existing resources. The new extensionist contrasts historical AEAS models wherein staff acted as conduits of agricultural information under the assumption that knowledge would lead farmers to adopt new agricultural practices.

Despite the momentum to modernize AEAS, activities to maximize market linkages, diversify production, and empower women and marginalized groups continue to receive limited attention (MEAS 2014). AEAS staff have many competing responsibilities, and nutrition may add to an already lengthy list. In many countries, public sector AEAS budgets are severely constrained and high vacancy rates are the norm (Fanzo et al. 2015). AEAS staff often possess little nutrition knowledge themselves, and have limited familiarity with local health and nutrition issues and attitudes. These challenges call into question whether it is reasonable to task AEAS staff with nutrition promotion (MEAS 2015).

Opportunities for incentivizing nutrition-sensitive extension

By identifying appropriate incentives and aligning policies, training and cross-sectoral priorities, AEAS may be able to institutionalize a nutrition-sensitive approach that leads to lasting change. Several promising approaches follow.

Donor leadership

Donor initiatives increasingly require agricultural development projects to deliver both increased productivity as well as improved nutrition outcomes, for example, USG Feed the Future Initiative, the Gates Foundation's Nutritious Food Systems Initiative, Comprehensive Africa Agriculture Development Programme (CAADP) Nutrition Task Force. Non-governmental organizations (NGOs) and some national

AEAS are responding, but it is unknown whether these changes will persist should donor priorities shift away from nutrition-sensitive agriculture.

Financial and programmatic accountability measures

The Scaling Up Nutrition (SUN) Movement has trained member countries to conduct budget analyses that estimate financial commitments to nutrition interventions (SUN Movement 2016). Coupled with SUN's common results framework, countries are equipped with tools to plan, track and evaluate their progress on nutrition across government ministries. When SUN funds are available to ministries, the common results framework can serve as a tool for incentivizing ministry's respective efforts to improve nutrition. This could even translate into opportunities for greater pay for AEAS staff performing more nutrition related activities.

Market pull

Market-based demand for nutritious foods can incentivize nutrition-sensitive AEAS. Creating demand for more nutritious foods is often a function of multiple socio-economic functions, including income growth and efforts to change food preferences. Many nutrient-dense foods already exact a higher price at the market (e.g. dairy, meat, fruits and vegetables), yet the perishability of these products and barriers to market entry can make it difficult for smallholder to compete. AEAS can support the production of these commodities and can partner with efforts to improve demand for nutrient-dense foods, as discussed further in Part II.

Nutrition's role in broad-based, gender-equitable economic growth

A productive workforce is key to growing the GDP of low- and middle-income countries, yet human capital is severely constrained by poor nutrition. Nutrition was an underlying cause of death in 45 per cent of child deaths in 2011 (Black et al. 2013); this statistic evokes moral outrage, and also provides a compelling argument for addressing the drag that poor nutrition imposes on the growth potential of countries shouldering the greatest burden of child deaths and stunting. Efforts to translate nutrition-related costs into economic figures are having an impact on the fiscal priorities of some high-burden countries (e.g. Guatemala) and should continue.

Women's roles as food producers, consumers and family caregivers can also function as an economic incentive for

better integrating nutrition and AEAS. Typically underserved by AEAS (Jiggins, Samanta and Olowoye 1997), women farmers often stand to increase agricultural productivity more substantially than male counterparts (FAO 2011). Due to women's traditional responsibility for family meals, in many instances they have played an outsized role in selecting foods. Although economic analyses are lacking, there is a logical argument to be made for greater marginal returns to investing in women's agricultural productivity and in creating demand for nutrient-dense foods.

Training and Institutional Capacity Development

AEAS staff are typically trained at technical colleges, where the curriculum rarely includes nutrition. Efforts to include nutrition in the core curriculum of all trainees are underway at four-year institutions including the Zamorano Pan-American Agricultural School, and the Food and Agricultural Organization of the United Nations (FAO) is developing modules appropriate for pre-service AEAS training (FAO in press).

Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) is a United States Agency for International Development (USAID) funded project assisting institutions to implement AEAS that responds to the needs of women and men farmers, and that improve the supply and consumption of nutritious foods. The project developed the Institutional Review and Planning Framework (IRPF), which guides institutional management through a process of reflecting on the roles that food and nutrition play within their own lives, responding to case studies that depict nutrition challenges confronted by rural households in their local context, and contemplating how their organizational mission provides the basis for a commitment to nutrition. It moves nutrition from an implicit component of an organization's work to an explicit priority. Organizations can access action-based training and on-the-job support for staff at all levels to gain the conviction, skills, and behaviours necessary to support improved nutrition. Brief fact, tip and activity sheets guide AES staff through either information or specific practices and activities that support improved nutrition.¹

PART II: COORDINATING AND COLLABORATING WITH OTHER SECTORS

Multisectoral collaboration can facilitate shared understanding about which roles are most appropriate for AEAS and which are better left to other sectors. Relationships among diverse organizations should be built on a clear understanding of each partner's respective needs and desires.

AEAS staff typically receive limited training and support in how to conduct appropriate nutrition education or to use Social and Behaviour Change Communication (SBCC). In some programmatic settings, staff might have the latitude to expand their mandate to influencing food preferences. In Malawi, a package of nutrition education materials geared toward AEAS included labelled pictures of hundreds of locally available foods intended to broaden thinking about production, marketing and consumption (FAO 2015).

In other situations, nutrition education may be better left to the health sector. In Ethiopia, a process review collected consistent descriptions of the respective roles of home economics workers (HEWs) and development agents: these agents share services and information related to producing a more diverse diet, while HEWs create demand for these foods and share nutrition-specific information (SPRING 2014a). Challenges to coordination were similar to those encountered by other projects: although a National Nutrition Plan existed, the commitment of some signatory entities to nutrition was not evident. National-level coordination was better than that observed at the regional level, and greater commitment to nutrition was associated with increased levels of funding.

Breastfeeding is an example of a nutrition-related practice that includes aspects relevant to the roles of AEAS as well as others that are best addressed by health sector staff. AEAS staff can facilitate conversations about the importance of ensuring that lactating women who work in agriculture are encouraged to take breaks to either express their milk or breastfeed their children. AEAS staff are not typically trained to provide lactation support, however, which may be better provided by frontline health workers.

¹ Available at: <http://ingenaes.illinois.edu/library> [last access 26 April 2017].

PART III: HOW TO INTEGRATE NUTRITION WITHIN AEAS

Work towards gender equity

The gender norms that permeate decision-making around agricultural production, consumption, and income allocation play an outsized role in determining whether nutrition interventions achieve impact (Malapit and Quisumbing 2015). Gender-transformative approaches that prioritize both women's rights and increased agricultural productivity can foster more equitable decision-making and labour allocations. Providing women with tools, technology and training to reduce on-farm time and labour burdens can have a positive impact on empowerment (GFRAS 2015). Positive nutrition outcomes can also be achieved through non-food approaches, such as increasing opportunities for off-farm employment that raise women's income, given women's propensity to invest a significant portion of their available resources in family food security and nutrition (GFRAS 2016a).

AEAS staff can positively engage men and women in conversations regarding gender equitable decision-making, expenditures of agricultural earnings on nutritious foods, and intra-household food distribution. Such conversations challenge the assumption that nutrition is a "women's topic", and is therefore less important than other production-related topics (Fanzo et al. 2015).

Recognition of men's roles in nutrition has expanded, and nutrition projects that involve men are becoming more numerous (Kuyper and Dewey 2012; GFRAS 2016b). Household methodologies, for example, engage both men and women in addressing challenges that arise when household members make decisions independently, pursue competing goals and ultimately remain poor when better cooperation could improve their livelihoods. Similarly, the Household Agriculture-Nutrition Doable Actions (HANDS) framework implements activities that strengthen family relationships, improve communication, and facilitate joint decision-making (Clemmons 2015). ACDI/VOCA's Agricultural Growth Program-Agribusiness and Market Development Project in Ethiopia trained men in farmer cooperatives on dietary diversity, growth stages and hygiene, who then went on to train other cooperative members. This programme purposely targeted men due to their role as decision-makers for food selection and income allocation (SPRING 2014a).

Building on strengths: contributing to food and nutrition security

Discussions of specific nutrition-sensitive contributions appropriate for AEAS have previously been explored (Fanzo et al. 2015; GFRAS 2016a). It may be useful to conceive of these contributions within the context of the four pillars of food security (FAO 2006), an established core competency of AEAS. Although AEAS activities historically prioritize the pillars of availability and access, they can be expanded to encompass the dimensions of utilization and stability (FAO 2006).

Improving the availability of diverse, nutrient-dense foods

AEAS efforts to improve the availability of diverse, nutrient-dense foods would represent a major contribution to improved nutrition, since rural people in low-income countries are more likely to consume monotonous diets with inadequate diversity (FAO, IFAD and WFP 2013). Farming households typically consume and sell the food they grow, and are unlikely to cultivate crops or raise animals that are unfamiliar, not preferred, or for which there is no market demand (Timmer 1997; Remans et al. 2011). Where market linkages are strong, AEAS can support farmers to specialize by producing nutrient-dense foods demanded by the market (e.g. livestock, legumes, nuts, fruits, etc.) (MEAS 2014). Conversely, where geography and other factors impede market linkages, as in the mountains of Nepal, diversified homestead food production with an emphasis on nutrient-dense foods such as dark green leafy vegetables and animal-source foods may be a more effective means to improve diet diversity for farming households (Bushamuka et al. 2005; Olney et al. 2009).

Improving access to a diverse diet

Food access is a function of social, economic, and physical aspects that mediate the ability to secure the foods required to meet dietary needs. AEAS have traditionally supported food access by increasing agricultural productivity of farming households, but in order to achieve nutrition security, the concept of food access must also consider whether accessible foods meet nutritional requirements (Pingali 2015). AEAS staff can address food access in multiple ways, including: increasing production of diverse foods for the household's own consumption; improving access to markets; improving availability of nutrient-dense foods in the marketplace; reducing food prices; and promoting gender-equitable decision making related to agricultural production and income. Although market-oriented approaches need to be monitored to ensure that they do not reduce food access and livelihoods for the

rural poor, multi-country research suggests that smallholders' diets are more likely to diversify when they access greater quantities of foods in the marketplace than when increasing on-farm diversity (Sibhatu, Krishna and Qaim 2015).

Safeguarding stability

The stability dimension of food security represents the ability of a household to access diverse foods required for healthy, active living of all members, throughout the year. The concept of a "lean" or "hungry season" is familiar in many agricultural communities (Bardhan 1980; Moore et al. 1997). AEAS can advise households on how to produce diverse foods that are agro-ecologically appropriate, extend production seasons (e.g. through water management practices and varietal selection), extend the storage life of foods, and identify wild and/or indigenous foods available throughout the year. AEAS are increasingly using seasonal calendars as a means to assist families in planning for cycles of food availability vis-à-vis labour and health constraints (SPRING 2016). AEAS are increasingly engaged in efforts to support improved production and post-harvest practices, including processing and storage methods that can improve food safety and greatly reduce losses, e.g. by reducing the growth of aflatoxin and other pathogens.

Optimal utilization of nutrients

Food processing, preparation, diet quality and health status all influence the utilization of – or the body's ability to absorb and metabolize – nutrients (FAO 2006). Awareness of the unique nutritional needs of household members and sensitivity to potential gender inequities can enable AEAS to identify how agriculture impacts food utilization and to propose solutions.

A nutrition-supporting environment: Water, Sanitation and Hygiene (WASH)

Food utilization is constrained by infectious disease, which can arise from insufficient access to clean water, inadequate sanitation, and lack of appropriate hygiene practices (WHO 2015). Certain agricultural activities have significant implications for WASH.

Water

Farming households require water for household multiple uses, including household drinking, cooking and bathing needs, in addition to irrigation and livestock. A growing body of work

supports planning for these diverse uses in a coherent way in order to reduce conflict and unintended consequences to either human health or livelihoods (SPRING 2014b). AEAS can work with farmers to eliminate or reduce pollution of water sources by advising on appropriate practices for the application of pesticides and fertilisers (both organic and inorganic). Improved irrigation practices, such as rainwater harvesting and drip irrigation where feasible, can reduce depletion and degradation of water resources. Good animal husbandry practices (e.g., minimizing grazing near water sources used by humans) and proper manure management can help reduce water contamination (Hubbard, Newton and Hill 2004).

Sanitation

Sanitation interventions endeavour to create clean environments for people, where exposure to disease is limited (UNICEF 2016). The presence of animal faeces in a home environment are associated with slower linear growth among children (Headey et al. 2016). AEAS staff can support environmental hygiene by demonstrating how animals should be kept away from where children play and from where food is prepared and consumed.

Hygiene

Good hygiene encompasses practices that promote and preserve health (WHO 2016). Handwashing should be promoted after using the toilet, and handling animals and their manure, fertilizers and/or other chemicals, particularly before cooking and feeding children. Containers in which food and water are stored and eating utensils should also be washed thoroughly. Hygiene should be an important component of AEAS interactions with farm household members that relate to fertilizers, pesticides and livestock management.

CONCLUSION AND IMPLICATIONS

When agriculture optimizes its contribution to food and nutrition security, both rural and urban populations will benefit from a more nutritious and affordable food supply. This contribution will not be automatic, however, and will only result when effective incentives are in place. The intensity required in order for incentives to lead to action and impact is only beginning to be explored. It is hoped that cross-sectoral efforts will identify context-specific ways to optimize the platform of AEAS for building healthy food systems that are accessible to all, an essential contribution to the UN Decade of Action on Nutrition.

Feed the Future

Feed the Future is the U.S. Government's initiative to alleviate hunger and food insecurity in 19 priority, high-burden countries, listed here: www.feedthefuture.gov/countries.

The Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) project supports AES institutions in improving their capacity to implement gender-responsive, nutrition-sensitive services.

References

- Bardhan PK (1980) Interlocking Factor Markets and Agrarian Development: A Review of Issues. *Oxford Economic Papers* 32(1): 82-98.
- Black RE, Alderman H, Bhutta ZA, Gillespie S, Haddad L, Horton S, Lartey A, Mannar V, Ruel M, Victora CG, Walker S and Webb P (2013) Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 382(9890): 15-39.
- Bushamuka VN, de Pee S, Talukder A, Kiess L, Panagides D, Taher A and Bloem M (2005) Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh. *Food and Nutrition Bulletin* 26(1): 17-25. <https://www.ncbi.nlm.nih.gov/pubmed/15810795>.
- Clemmons L (2015) *Household Agriculture-Nutrition Doable Actions: A framework to help focus nutrition-sensitive agriculture SBC programming to promote doable actions for women smallholder farmers and their families*. The Manoff Group: Washington DC. www.fsnnetwork.org/sites/default/files/The%20HANDS%20Framework%20for%20Ag-Nu-WASH%20SBCC%20Programming-%20L%20Clemmons%20The%20Manoff%20Group.pdf.
- Fanzo J, Marshall Q, Wong J, Merchan R, Haber M, Souza A and Verjee N (2015) The Integration of Nutrition into Extension and Advisory Services: A Synthesis of Experiences, Lessons, and Recommendations. *Food and Nutrition Bulletin* 36(2): 120-37. <https://www.ncbi.nlm.nih.gov/pubmed/26121698> [last access 25 April 2017].
- Food and Agriculture Organization of the United Nations (FAO) (2006) *Food Security*. Policy Brief No. 2. FAO: Rome. <http://www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf> [last access 25 April 2017].
- FAO (2011) *The Role of Women in Agriculture*, by the State of Food and Agriculture (SOFA) Team and Doss C. ESA Working Paper No. 11-02. FAO: Rome.
- FAO (2015) *Improving Complementary Feeding in Malawi: Lessons learned from a process review of a food security and nutrition project*. FAO: Rome, Italy. <http://www.fao.org/3/a-bc791e.pdf> [last access 25 April 2017].
- FAO (In press). *Integration of Nutrition in Agriculture Extension Services in Africa: A desk review of country case studies, pre-service and in-service training materials*. Accra, Ghana.
- FAO and Global Forum for Rural Advisory Services (GFRAS) (2010) *Mobilizing the potential of rural and agricultural extension*, by Christoplos I. FAO: Rome.
- FAO, International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) (2013) *The State of Food Insecurity in the World 2013. The multiple dimensions of food security*. FAO: Rome. <http://www.fao.org/docrep/018/i3434e/i3434e.pdf>.
- GFRAS (2012) *The "New Extensionist": Roles, Strategies, and Capacities to Strengthen Extension and Advisory Services*. GFRAS: Lindau. <https://www.g-fras.org/en/157-the-new-extensionist>.
- GFRAS (2015) *Note 9: Integrating nutrition into rural advisory services and extension*, by Fanzo J. Good Practice Notes for Extension and Advisory Services. GFRAS: Lindau. <https://www.g-fras.org/en/good-practice-notes/integrating-nutrition-into-rural-advisory-services-and-extension.html>.
- GFRAS (2016a) *Note 25: Promoting Nutrition-sensitive Extension Advisory Services*, by Kachelriess-Matthess S, Matthes A, Stancher A, Asare B and Ohene Afoakwa E. Good Practice Notes for Extension and Advisory Services: 1-4. GFRAS: Lindau. <https://www.g-fras.org/en/good-practice-notes/25-promoting-nutrition-sensitive-extension-advisory-services.html>.
- GFRAS (2016b) *Note 26: Involving Men in Nutrition*, by Otieno, PE, Farnworth CR and Banda N. Good Practice Notes for Extension and Advisory Services. GFRAS: Lindau. <https://www.g-fras.org/en/good-practice-notes/27-involving-men-in-nutrition.html>.
- Headey D, Nguyen P, Kim S, Rawat R and Ruel M (2016) Is exposure to animal feces harmful to child nutrition and health outcomes? A multicountry observational study. *American Journal of Tropical Medicine and Hygiene* 2017 96(4): 961-9 [Epub Dec 2016]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5392649/>.
- Hubbard RK, Newton GL and Hill GM (2004) Water quality and the grazing animal. *Journal of Animal Science* 82 (E-Suppl.): E255-63. <https://www.ncbi.nlm.nih.gov/pubmed/15471806>.
- Jiggins J, Samanta R and Olawoye J (1997) Improving women farmer's access to extension services. In Swanson B, Bentz R and Sofranko A (eds.) *Improving Agricultural Extension: A Reference Manual*. FAO: Rome.
- Kuyper E and Dewey K (2012) *Fathers support infant and young child feeding: Their contributions to better outcomes*. Literature Review. Alive & Thrive Spotlight on Innovation: Washington DC. <http://www.popline.org/node/645547>.
- Malapit HJL and Quisumbing AR (2015) What dimensions of women's empowerment in agriculture matter for nutrition in Ghana? *Food Policy* 52: 54-63.
- Modernizing Extension and Advisory Services (MEAS) (2014) *Linking Smallholder Farmers to Markets and the Implications for Extension and Advisory Services*, by Ferris S, Robbins P, Best R, Seville D, Buxton A, Shriver J and Wei E. Discussion Paper. MEAS: Urbana. <https://agrilinks.org/sites/default/files/resource/files/MEAS%20Discussion%20Paper%204%20-%20Linking%20Farmers%20To%20Markets%20-%20May%202014.pdf>.
- MEAS (2015) *1-8: Whose Job Is It? Integrating Agriculture and Nutrition in Public Sector Agricultural Extension Services*, by Sigman VA. Technical Note. MEAS: Urbana. http://infoagro.net/archivos_Infoagro/Infotec/biblioteca/EN_MEASBrief4-LinkingFa.pdf.
- Moore SE, Cole TJ, Poskitt EME, Sonko BJ, Whitehead RG, McGregor IA and Prentice AM (1997) Season of birth predicts mortality in rural Gambia. *Nature* 388(6641): 434. <https://www.nature.com/nature/journal/v388/n6641/full/388434a0.html>.

Olney DK, Talukder A, Iannotti LL, Ruel MT and Quinn V (2009) Assessing impact and impact pathways of a homestead food production program on household and child nutrition in Cambodia. *Food and Nutrition Bulletin* 30(4): 355-69. <https://www.ncbi.nlm.nih.gov/pubmed/20496626>.

Pingali P (2015) Agricultural policy and nutrition outcomes – getting beyond the preoccupation with staple grains. *Food Security* 7(3): 583-91.

Remans R, Flynn DF, DeClerck F, Diru W, Fanzo J, Gaynor K, Lambrecht I, Mudiopu J, Mutuo PK, Nkhoma P, Siriri D, Sullivan C and Palm CA (2011) Assessing nutritional diversity of cropping systems in African villages. *PLoS One* 6(6): e21235. <https://doi.org/10.1371/journal.pone.0021235>.

Scaling Up Nutrition (SUN) Movement (2016) *Annual Progress Report*. SUN Movement Secretariat: Geneva. <http://scalingupnutrition.org/progress-impact/sun-movement-annual-progress-report/annual-report-2016-page/>.

Sibhatu KT, Krishna VV and Qaim M (2015) Production diversity and dietary diversity in smallholder farm households. *Proceedings of the National Academy of Science of the United States of America* 112(34): 10657-62. <https://www.ncbi.nlm.nih.gov/pubmed/26261342>.

Strengthening Partnerships, Results and Innovations in Nutrition Globally (SPRING) (2014a) *Using Agriculture Extension Agents to Promote Nutrition: A Process Review of Three Feed the Future Activities in Ethiopia*, by Aakesson A, Pinga V and Titus S. United States Agency for International Development (USAID)/SPRING Project: Arlington. www.spring-nutrition.org/sites/default/files/publications/reports/spring_using_agriculture_extension_agents_to_promote_nutrition.pdf.

SPRING (2014b) *Multiple-Use Water Services: Toward a nutrition-sensitive approach*. USAID/SPRING Project: Arlington. www.spring-nutrition.org/sites/default/files/publications/reports/spring_report_multiple-use_water_services.pdf.

SPRING (2016) SPRING/Senegal Nutrition-Sensitive Agriculture Workshop. www.spring-nutrition.org/about-us/activities/springsenegal-nutrition-sensitive-agriculture-workshop.

Timmer CP (1997) Farmers and Markets: The Political Economy of New Paradigms. *American Journal of Agricultural Economics* 79(2): 621-7.

United Nations Children's Fund (UNICEF) (2016) *About WASH: Water*. www.unicef.org/wash/3942_4456.html.

United States Agency for International Development (USAID) (2016) *Convergence and Tension in Nutrition-Sensitive Agricultural Market Development Activities*. Discussion Paper. USAID: Washington DC. <https://www.usaid.gov/what-we-do/global-health/nutrition/technical-areas/convergence-and-tension-nutrition-sensitive>.

World Health Organization (WHO) (2015) *Improving nutrition outcomes with better water, sanitation and hygiene: practical solutions for policies and programmes*. WHO: Geneva. http://www.who.int/water_sanitation_health/publications/washandnutrition/en/.

WHO (2016) *Health topics: Hygiene*. www.who.int/topics/hygiene/en





A comprehensive approach to food and nutrition education: Brazil's contributions to the UN Decade of Action on Nutrition

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Food and nutrition education empowers people to be active players in the food system. It allows them to make better food choices and, by modifying the demand, can influence the food supply. Increasing income or food availability at the household level will not automatically translate into improved nutrition outcomes of households: for example, if caregivers lack the motivation, knowledge and skills to choose and prepare those foods that will contribute to a healthy diet. Food and nutrition education is a key element for social protection or other food system interventions to effectively improve nutrition. The UN Decade of Action on Nutrition is an opportunity to scale up food and nutrition education efforts, through advocacy, resource mobilization, capacity development and broad implementation where evidence shows clear synergies, such as social protection.

INTRODUCTION

In Brazil, food and nutrition education (FNE) is a strategic action that seeks to achieve food and nutrition security within the country. It has been a component of the *Política Nacional de Segurança Alimentar e Nutricional* (PNSAN, National Food and Nutrition Security Policy) since 2006. The 2012 Framework of Reference for Food and Nutrition Education in Public Policies (Ministério do Desenvolvimento Social e Combate à Fome 2012), tackles the issue of FNE not only in terms of biological nutrients, but also in terms of key components and dimensions of the food system.

This comprehensive approach is being implemented within the scope of the PNSAN through the *Sistema Nacional de Segurança Alimentar e Nutricional* (SISAN, National System for Food and Nutrition Security). The SISAN is a public system adopted by

Brazil to achieve food and nutrition security and guarantee the human right to adequate food.¹ It involves 20 ministries and civil society, and a National Plan with an annual budget of US\$30 billion.

Concrete results of this system can be observed in the policies and actions that allowed Brazil to leave the Hunger Map in 2014 (FAO, IFAD and WFP 2015) – an important milestone for the country. There is still much to improve, however, and the PNSAN has a set of goals and initiatives lined up until 2019.² Some of the main ones include: to grant access to adequate food to approximately 15 million families within the *Bolsa Família* (Family Grant Programme), as well as to 40 million students who rely on school meals every day; to reduce by 25 per cent the rate of nutritionally vulnerable families through a set of policies that promote productive rural inclusion, such as access to water and emergency support, technical assistance and subsidized credit; to support smallholders and family farmers in order to improve trading and strengthen policies such as access to credit and markets, and the protection of both production and income; to invest approximately US\$780 billion in the purchase of family farmers' produce through public procurement; to promote and protect healthy eating habits through regulatory measures (improving food labelling, regulating the commercialization of ultraprocessed food in schools, establishing a tax on sugary beverages); and to strengthen FNE in different areas, offering capacity-building courses to professionals of different sectors (such as health, agriculture, social protection and education) in accordance with the FNE framework.

¹ Government of Brazil Decree no. 7,272 of 25 August 2010, establishing the Sistema Nacional de Segurança Alimentar e Nutricional (SISAN, National Food & Nutritional Safety System)). Governed under Law no. 11,346 of 15 September 2006.

² The Interministerial Chamber on Food and Nutrition Security (Câmara Interministerial de Segurança Alimentar e Nutricional). Plano Nacional de Segurança Alimentar e Nutricional: 2016/2019.

FOOD AND NUTRITION EDUCATION: DEVELOPING A FRAMEWORK FOR MULTI-SECTOR PUBLIC POLICIES IN BRAZIL

In Brazil, the public policies on FNE are based on the *Marco de Referência de Educação Alimentar e Nutricional para as Políticas Públicas* (Framework of Reference for Food and Nutrition Education in Public Policies), which guides the agenda at the federal and intersectoral levels. The framework brought innovation to FNE policies and widened their scope. The concept was developed in a participatory manner under the leadership of the Ministry of Social Development and Fight against Hunger, with active participation from the University of Brasilia and civil society organizations, among others. This necessarily lengthy democratic process lasted from 2010 to 2012.

The concept of FNE is:

“Food and Nutrition Education is a permanent, ongoing, cross-disciplinary and intersectoral field of knowledge and practice that seeks to promote the autonomous and voluntary practice of healthy eating habits. This field should make use of active and problem-solving approaches as well as educational resources that foster conversations with individuals and population groups, considering all stages of life, components of the food system, and interactions that make up nutritional behavior.”

(*Ministério do Desenvolvimento Social e Combate à Fome, p. 23*)

FNE PRINCIPLES

- **Social, environmental and economic sustainability:** Food sustainability is not limited to the environmental dimension, but extends to the human, social and economic relationships in the moving parts of the food system.
- **An approach to the food system in its entirety:** Actions need to cover all dimensions of the food system so that individuals and groups can make informed decisions. These decisions, in turn, can have an impact on previous components of the food system.
- **Enhancement of local food cultures and respect for the diversity of views and perspectives, considering the legitimacy of knowledge of different natures:** knowledge stemming from culture, religion and science should all be respected. Appreciating the different expressions of identity and food culture, and recognizing and promoting the immeasurable cultural wealth found in food, recipes and nutritional practices are paramount to an effective FNE.
- **Food and eating as references and emancipatory practices:** People do not eat individual nutrients; they eat foods and follow recipes. When the FNE policies account for this reality, they are closer to people’s lives and enable the establishment of ties between the pedagogical process and regional and familial needs. Knowing how to prepare your own food also generates autonomy, self-reliance and independence.
- **Promotion of self-care:** Self-care is the process of changing behaviour centred on one’s well-being. It is one of the main pathways to ensure the involvement of individuals in the country’s food and nutrition education.
- **Education as a permanent process, generating an active and informed involvement by the subjects:** Educational approaches should focus on active processes that incorporate popular knowledge and practices, contextualized in the realities of individuals and families, thus facilitating the translation of theory into practice.
- **Diversity in practical scenarios:** The development of actions and strategies suited to the particularities of practical scenarios is fundamental for successful FNE.
- **Intersectoral collaboration:** Each sector can learn and improve as they interact with other sectors, paving the way for a greater effectiveness.
- **Planning, assessing and monitoring actions:** The continuous supervision of strategies and policies is crucial for the effectiveness and sustainability of any actions undertaken. Participatory processes where other stakeholders can be legitimately included in the decision-making process tend to improve the sustainability and results of new initiatives.

These principles should be applied taking into consideration that the act of eating food is a social practice arising from the combination of biological, cultural, environmental and economic factors.

FROM CONCEPT TO ACTION: IMPLEMENTING FOOD AND NUTRITION EDUCATION IN DIFFERENT SECTORS OF BRAZIL

Following the development and adoption of the new framework of reference, public policy space for FNE in Brazil has been gradually expanding at the federal level. Among the concrete actions and initiatives that have been implemented, the following deserves special mention: a set of strategies aimed at raising awareness and supporting vocational training, currently being promoted by the Federal Government. These include:

- the *Rede Virtual Ideias na Mesa* (Ideas-Around-the-Table Network),³ a network that enables the sharing of individual knowledge and practices. It aims to broaden access to Food and Nutrition Education, enabling the circulation of experiences, news, events, resources and educational materials, such as books, videos, long-distance learning courses and several health and nutrition publications. Since its inception four years ago, the Network has gathered 9,365 regular users that shared 226 different experiences, eight editions of its newsletter and five open-source long-distance learning courses;
- the development of manuals and guides designed to educate health professionals on the Brazilian Dietary Guidelines (Guia Alimentar para a População Brasileira 2014);
- the expansion of training courses for health professionals, allowing them to provide complementary nutritional guidance in primary care units, as well as support for Food and Nutrition Education in day-care centres;
- the *Comer pra que?* (Why Eat?)⁴ educational plan geared towards youth with the goal of generating critical awareness about eating practices. Examining food beyond its nutritional aspects entails discovering its environmental, psychosocial, cultural, economic and biological dimensions. Audiovisual resources and communication channels were produced and are available online;
- building capacities of social protection professionals, with a focus on the human right to adequate food and on food and nutrition education, through manuals and a long-distance learning course (Ministry of Social Development and the Fight against Hunger et al. 2014);
- building capacities of 1,500 professionals in the nutrition, health, agriculture, education, social protection and programme management sectors on food and nutrition sustainability. The capacity-building consists in a two-day seminar where knowledge is presented and developed in a participatory manner, culminating in participants presenting their own FNE initiative.

One challenge that this expansion poses to extend FNE to other fields, work environments and community organizations. Achieving this comprehensiveness requires intra-sector and inter-sector collaboration as well as partnerships with different segments of civil society, such as universities, non-governmental organizations, restaurants and community kitchens, food banks and philanthropic institutions, among others. At the municipal level, actions towards FNE were scaled up and expanded upon. A mapping of 144 cities with more than 200,000 inhabitants (Ministry of Social Development and the Fight against Hunger et al. 2014) revealed that FNE is organized around the health, education and social protection sectors, and around public food and nutrition security systems; 92.3 per cent of municipal programme managers said that they had carried out actions in an intersectoral manner; and 89.2 per cent reported they had integrated food and nutrition education into the school environment, 80.2 per cent into primary health services, and 78.4 per cent into social assistance networks. The difficulty here lies in measuring the quality of these actions, considering the considerable complexity of what determines an individual's food choices.

An example of an FNE initiative at the local level was first published in *Ideias na Mesa* (OPSAN et al. 2016). In an attempt to diversify school meals and to enrich the lives of students by presenting them with new flavours, smells and sensations, a group of college students from the University of Vale do Rio dos Sinos presented 81 children between the ages of 7 and 10 with unconventional food plants (UFPs). Seven extra curriculum activities were carried out over the course of one year in three different schools. In one, students were presented with several fruits and vegetables, then were later blindfolded and asked to try each one and recall its name. Among these were several UFPs, which were shown to the students and offered for tasting together with an explanatory note on uncommon food plants. This project shows that the introduction of UFPs in school meals is feasible and allows for the diversification and enrichment of school menus. It is

3 *Ideias na Mesa*. n.d. <http://ideiasnamesa.unb.br> (in Portuguese and Spanish).

4 *Comer pra que?*. n.d. <http://www.comerpraque.com.br/> (in Portuguese).

vital for school meals to be varied and nutritious, because this is a key phase in teaching children to recognize and maintain healthy eating habits. Offering sufficient, quality food in schools is an effective way to guarantee the human right to adequate food. These principles should be applied taking into consideration that the act of eating food is a social practice arising from the combination of biological, cultural, environmental and economic factors.

CHALLENGES AND OPPORTUNITIES DURING THE UN DECADE OF ACTION ON NUTRITION

While it is true that knowledge and education can empower people to make informed dietary decisions, this is not enough because the determinants of food behaviour and the particularities of food systems are highly complex.

In Brazil's experience, the challenge of effectively implementing FNE strategies lies in strengthening the coordination between public policy agendas and a broader approach on FNE that includes themes beyond the biological and nutritional values of food. The broader approach includes eating as a social practice considering the combination of biological, social,

cultural, environmental and economic factors. Optimal results in people's health will only be observed when food is considered as such. Respect and consideration towards different food cultures implies recognition of their traditions and efforts towards their preservation, valorization and transmission. Important steps have been taken in Brazil towards knowledge gathering and sharing, methodological development and results evaluation, in addition to the continuous investment in developing technical, professional and institutional capacities. The Framework of Reference for Food and Nutrition Education in Public Policies and the Brazilian Dietary Guidelines are important technical references here.

The UN Decade of Action on Nutrition provides a window of opportunity for further development of FNE actions that should be intersectoral and embrace an integral approach based on the Human Right to Adequate Food. The adoption of a comprehensive framework for FNE can prevent the fragmentation of the public health agenda, bringing food and nutrition closer together, and contributing to the development of a critical awareness in individuals over their food choices. These choices have a lasting impact not only on their health, but also on the environment, equity, and on the quality of life of both individuals and communities. It is hoped that the Brazilian experience will inspire similar initiatives from other countries during the Nutrition Decade.

References

Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) (2015) *The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress*. FAO: Rome. www.fao.org/3/a-i4646e.pdf.

Ideias na Mesa. n.d. <http://ideiasnamesa.unb.br> (in Portuguese and Spanish).

Ministry of Health (Ministério da Saúde), Secretaria de Atenção à Saúde Departamento de Atenção Básica Coordenação Geral de Alimentação e Nutrição (2014) *Guia Alimentar para a População Brasileira*. http://foodpolitics.com/wp-content/uploads/Brazils-Dietary-Guidelines_2014.pdf.

Ministry of Social Development and the Fight against Hunger (Ministério do Desenvolvimento Social e Combate à Fome) (2012) *Marco de referência de educação alimentar e nutricional para as políticas públicas*. MDS/Secretaria Nacional de Segurança Alimentar e Nutricional: Brasília. www.ideiasnamesa.unb.br/files/marco_EAN_visualizacao.pdf (in Portuguese).

Ministry of Social Development and the Fight against Hunger (Ministério do Desenvolvimento Social e Combate à Fome), Coordenação-Geral de Educação Alimentar e Nutricional (CGEAN/ MDS), Observatório de Políticas de Segurança Alimentar e Nutrição (OPSAN) and Universidade de Brasília (UnB) (2014) *Educação Alimentar e Nutricional: uma estratégia para a promoção do Direito Humano à Alimentação Adequada. Ideias na Mesa*: <http://ideiasnamesa.unb.br/index.php?r=curso/index>.

Observatório de Políticas de Segurança Alimentar e Nutrição (OPSAN), University of Brasília, Ministry of Social and Agricultural Development and Federal Government of Brazil (2016) *Um passeio pelas nossas experiências. Ideias na Mesa*, no. 8. https://issuu.com/ideiasnamesa/docs/revistaideiasnamesa8_duplas.

Secretaria de Avaliação e Gestão da Informação and Secretaria Nacional de Segurança Alimentar e Nutricional (2015) *MAPASAN 2014: mapeamento de segurança alimentar e nutricional. MDS/SAGI/SESAN: Brasília*. <http://mds.gov.br/caisan-mds/monitoramento-da-san/mapasan/2014/publicacao>.

Action Area 4

TRADE AND INVESTMENT FOR IMPROVED NUTRITION

Why policies on trade and markets matter during the Nutrition Decade

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On 25 September 2015, countries adopted a set of Sustainable Development Goals (SDGs), which include commitments to end hunger, achieve food security, and improve nutrition by 2030. To contribute to the achievement of these goals, the UN Decade of Action on Nutrition was proclaimed by the United Nations General Assembly in April 2016, setting a revolutionary shift in the fight against malnutrition in all its forms. This short paper examines how policies affecting trade and markets are a means to achieve the Decade's broader nutrition objectives.

HOW ARE FOOD AND AGRICULTURE MARKETS CHANGING?

Better functioning food and agriculture markets will be critical in ensuring that governments can achieve the new commitments, especially as undernourishment disproportionately affects rural populations in low-income countries. Small farms are still estimated to be home to half the world's hungry, suggesting that agriculture and

rural development remain key to achieving the global nutrition targets.¹

Many developing countries are increasingly relying on food imports to meet growing demand as urban populations grow and average incomes rise. While much of this increased trade is between developing countries, exports from Least Developed Countries (LDCs) have grown far more slowly. However, food imports represent a declining share of total merchandise exports in developing countries as a group, as well as in LDCs. The trend suggests that, overall, the food import bill has become more affordable for these countries as a group.

¹ The set of six Global Nutrition Targets is defined in Resolution 65.6 on the *Comprehensive implementation plan on maternal, infant and young child nutrition* as endorsed by the World Health Assembly (WHA) in 2012. The six global nutrition targets are part of a larger framework of action, encompassing also the global noncommunicable diseases (NCD) targets, as formulated by World Health Organization (WHO) in the context of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020, and the Recommendations formulated during the Second International Conference on Nutrition (ICN2) in 2014. The former have been partly woven into the Sustainable Development Goals (SDGs), in which nutrition should be seen as crosscutting and essential to the achievement of both the 2030 Sustainable Development Agenda and the ambition of the UN Decade of Action on Nutrition 2016-2025.

Agriculture and trade policies have also changed in recent decades. Some developed countries that previously provided heavy subsidies to their farm sectors have now reduced their support, or have switched to less distorting forms. However, data from the Organisation for Economic Co-operation and Development (OECD) indicates that a significant part of these countries' direct support is still linked to production. In addition, several large developing countries, some of which historically taxed agriculture, have moved towards providing increased domestic support for the sector (Brink 2014; ICTSD 2015). Levels of agricultural investment in many of the poorer developing countries nonetheless remain low, with public goods provision often lagging behind governments' stated objectives (FAO 2012).

Tariffs on farm goods have also fallen in all world regions (Bureau and Jean 2013) due to unilateral liberalization and to the impact of preferential trade deals. Tariffs and other non-tariff barriers nonetheless remain significant on a number of politically "sensitive" farm goods such as beef, dairy, rice, and sugar (ICTSD 2009).

Under 'business as usual' conditions, FAO and OECD estimate that the number of undernourished people will fall by about 20 per cent in the coming decade (OECD and FAO 2016). However, there would still be over 600 million people undernourished, of which about 220 million are projected to be in sub-Saharan Africa. The projections imply that governments will need to change current policies in order to reach the zero hunger target by 2030 as well as take action on nutrition deficiencies, overweight and obesity.

Furthermore, price volatility could still see poor consumers pushed back into food insecurity. Although food prices have fallen from unusually high peaks in recent years, many poor countries arguably remain vulnerable to sudden market shocks (Schmidhuber and Meyer 2014; De Gorter 2014; OECD and FAO 2016), in particular if, as the evidence suggests, climate-related extreme weather events become more frequent and intense.²

BETTER FUNCTIONING FOOD AND AGRICULTURE MARKETS WILL BE CRITICAL IN ENSURING THAT GOVERNMENTS CAN ACHIEVE THE NEW COMMITMENTS

Analysis from OECD and FAO (2016) suggests that in the medium term, both production and consumption are due to grow. However, Africa's consumption of rice, wheat, vegetable oils and sugar is expected to grow much faster than production, while Latin America is expected to continue producing more oilseeds, meat, fruit and vegetables than the region is set to consume. While governments in many developing country regions have significant scope to take actions that would boost farm productivity sustainably (FAO 2011), increased trade can also be expected to become more important to ensure that countries can meet growing demand in the future.

WHAT ACTIONS CAN GOVERNMENTS TAKE DURING THE DECADE?

Both national policies and global rules affecting trade and markets will be relevant as policymakers set their minds to achieving the global nutrition targets. However, governments will need to move quickly in order to ensure that the challenge can be met in time. Governments can already take action under existing global rules on trade to boost farm productivity and raise incomes in rural areas. Investments in public goods are allowed without limits under current WTO rules, such as pest and disease control, research, basic infrastructure, land titling, farm advisory services, and sustainable irrigation and water use (Díaz-Bonilla and Ron 2010; Oduro 2009).

In other areas, such as agricultural domestic support, fisheries subsidies, or access to markets for farm goods, governments will need to start now to negotiate meaningful international rules. Trade policy reforms aimed at improving employment opportunities and raising incomes could usefully be targeted at food-insecure population groups. Advance planning and additional international resources will also be needed if governments are to collaborate across borders to finance expanded food aid provision to poor consumers,

² Some analysts nonetheless observe that humanitarian emergencies necessitating external assistance have already become an almost permanent reality in some countries and world regions (Konandreas 2012).

and, in general, poverty-based safety nets, so as to improve economic access to food without adversely affecting how markets function. Effective trade policy measures to mitigate volatility in global markets such as better global rules on export restrictions are also likely to become more important in the future to prevent price spikes from harming consumers in poor food-importing countries.

The ambition of the Nutrition Decade can only be realized if governments determine not to shy away from difficult questions, such as correcting and preventing trade distortions in the area of agricultural domestic support. At the World Trade Organization (WTO), many negotiators have identified this issue as a potential deliverable for the Organization's upcoming ministerial conference in 2017, despite historical difficulties in making progress in this area.

While policymakers may feel daunted by the scale of the task ahead, recent steps forward on agricultural export subsidies suggest that incremental progress is feasible and realistic. Government officials now have an opportunity to take concrete measures towards ensuring that more equitable and sustainable markets actually contribute to the goals of ending hunger and malnutrition in all its forms.

This a summary version of a longer International Centre for Trade and Sustainable Development (ICTSD) paper entitled Trade, Food Security, and the 2030 Agenda, which is available at www.ictsd.org/themes/global-economic-governance/research/trade-food-security-and-the-2030-agenda. This summary focuses on trade and nutrition, while the full ICTSD paper explored trade and the SDGs, linked to several dimensions of food and nutrition security.

References

Brink L (2014) The evolution of trade-distorting domestic support. In Meléndez-Ortiz R, Bellmann C and Hepburn J (eds.) *Tackling Agriculture in the Post-Bali Context: A Collection of Short Essays*. International Centre for Trade and Sustainable Development (ICTSD): Geneva. www.ictsd.org/node/92340.

Bureau JC and Jean S (2013) *Do yesterday's disciplines fit today's farm trade?* E15 Expert Group on Agriculture, Trade and Food Security Challenges, Think Piece. E15Initiative. ICTSD: Geneva. <http://e15initiative.org/wp-content/uploads/2015/09/E15-Agriculture-and-Food-Security-BureauJean-FINAL.pdf>.

De Gorter H (2014) Energy Markets: The Impact on Trade in Biofuels and Farm Goods. In Meléndez-Ortiz R, Bellmann C and Hepburn J (eds.) *Tackling Agriculture in the Post-Bali Context: A Collection of Short Essays*. ICTSD: Geneva. www.ictsd.org/node/92340.

Díaz-Bonilla E and Ron JF (2010) *Food security, price volatility and trade: some reflections for developing countries*. Issue Paper No. 28. ICTSD: Geneva. www.ictsd.org/node/68852.

Food and Agriculture Organization of the United Nations (FAO) (2011) *The State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk*. FAO: Rome.

FAO (2012) *The State of Food and Agriculture: Investing in Agriculture for a Better Future*. FAO: Rome.

International Centre for Trade and Sustainable Development (ICTSD) (2009) *Capping Unusually High Tariffs: The WTO Doha Round and 'Tariff Peaks'*. Information Note No. 9. ICTSD: Geneva. <http://www.ictsd.org/downloads/2011/12/capping-unusually-high-tariffs-the-wto-doha-round-and-tariff-peaks.pdf>.

ICTSD (2015) *National agricultural policies, trade and the new multilateral agenda*. Information Note. ICTSD: Geneva. <http://www.ictsd.org/sites/default/files/National%20Agricultural%20Policies,%20Trade,%20and%20the%20New%20Multilateral%20Agenda.pdf>.

Konandreas P (2012) *Trade policy responses to food price volatility in poor net food-importing countries*. Issue Paper No. 42. ICTSD: Geneva. www.ictsd.org/node/68954.

Oduro A (2009) African countries and the green box. In Meléndez-Ortiz R, Bellmann C and Hepburn J (eds.) *Agricultural Subsidies in the WTO Green Box: Ensuring Coherence with Sustainable Development Goals*. Cambridge University Press: Cambridge.

Organisation for Economic Co-operation and Development (OECD) and FAO (2016) *OECD-FAO Agricultural Outlook 2016–2025*. OECD: Paris.

Schmidhuber J and Meyer S (2014) Has the Treadmill Changed Direction? WTO Negotiations in the Light of a Potential New Global Agricultural Market Environment. In Meléndez-Ortiz R, Bellmann C and Hepburn J (eds.) *Tackling Agriculture in the Post-Bali Context: A Collection of Short Essays*. ICTSD: Geneva. www.ictsd.org/node/92340.

In Commitment 11 of the ICN2 Rome Declaration, Member States 'acknowledge that trade is a key element in achieving food security and nutrition and that trade policies are to be conducive to fostering food security and nutrition for all, through a fair and market-oriented world trade system, and reaffirm the need to refrain from unilateral measures not in accordance with international law, including the Charter of the United Nations, and which endanger food security and nutrition, as stated in the 1996 Rome Declaration.' The Framework for Action includes two recommendations for international trade: Recommendation 17 and Recommendation 18.

To learn more about the impact of trade on nutrition, and more specifically the actions policy makers can take to enhance coherence between trade policy and nutrition action, read the UNSCN Discussion Paper - [Enhancing Coherence between Trade Policy and Nutrition Action](#).



FAO/SEBASTIAN LISTE

If not now, then when? Why West African second generation National Agricultural Investment Plans should be nutrition-sensitive

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This paper aims to highlight the need for West African second-generation National Agricultural Investment Plans (NAIPs) to adequately take into account their impact on nutrition. Accordingly, it first highlights the lack of concrete progress in the fight against malnutrition in the sub-region and the remarkable nutritional potential of agriculture in West Africa. The paper then demonstrates that, while there is a clear lack of consideration regarding nutrition-sensitive agriculture in West Africa, this situation might change as the development and implementation of second-generation NAIPs represent a pinnacle opportunity to unleash the potential of a food-based approach to overcome malnutrition in the sub-region.

In 2005, the Economic Community of West African States (ECOWAS) developed its first Regional Agricultural Investment Plan (RAIP), encouraging each of the 15 West African States to develop their own National Agricultural Investment Plans (NAIPs). Eleven years later, in light of the new challenges facing West African agriculture (e.g. nutrition, climate change,

resilience and social protection (ECOWAS 2016c) as well as recent global and regional commitments and frameworks to fight hunger and malnutrition,¹ the need arose to review and update these RAIP and NAIPs. One of the biggest challenges for the new versions of these documents will be to adequately consider their impacts on nutrition.

A WORRYING NUTRITIONAL SITUATION THAT PROGRESSES SLOWLY

Malnutrition remains dramatically prevalent in West Africa. Among children under five, 32.4 per cent suffer from stunting, and 9 per cent from acute malnutrition (IFPRI 2016a). This is far beyond the alert level referenced by the World Health Organization (WHO 2010). Concurrently, West African women of reproductive age and children are also heavily affected by micronutrients deficiencies (hidden hunger), particularly anaemia and vitamin A, iron, zinc, folic acid and iodine deficiencies (IFPRI 2016a).

Moreover, trends over the past decade have not been reassuring. West African countries consistently rank at the bottom in making lasting change against malnutrition. Between 2005

¹ See, in particular, Zero Hunger Challenge, Zero Hunger Initiative West Africa, New Alliance on Food Security and Nutrition, Grow Africa, Scaling Up Nutrition (SUN) Movement, the Malabo Declaration, the Nutrition for Growth Summit, the Second International Conference on Nutrition and the Sustainable Development Goals.

and 2015, the stunting rate decreased by only 3.1 per cent and wasting rate stagnated (IFPRI 2016a). In consequence, none of the 15 West African States are on track to meet all five of the 2025 under-nutrition targets adopted by the World Health Assembly (WHA) in 2012 (WHO 2012), and only six countries are on track to meet a single target (Côte d'Ivoire, Guinea, Nigeria, Senegal, Sierra Leone and Togo) (IFPRI 2016a).

This worrying situation heavily hinders the development of West African States. Malnutrition has high human costs (cerebral and physical growth delay, higher morbidity rate and increased vulnerability to infectious diseases) and economic consequences (losses equivalent to 11 per cent of gross domestic product (GDP) every year and up to 45 per cent of individuals' income) that are increasingly documented (IFPRI 2014; WFP 2016). It is crucial for West African states to fully understand this problem and to concretely implement a multisectoral approach to overcome it. Of particular importance will be an understanding of the agricultural sector's role and the importance of a food-based approach in the fight against malnutrition.

AN INCREASING RECOGNITION OF A NUTRITION-SENSITIVE AGRICULTURAL APPROACH

A key cause of malnutrition in West Africa is the gap between nutrient needs and intake. Nutrients are naturally provided by food (such as crops, livestock and animal products, fish, and non-wood forest resources). In the sub-region, 80 per cent of the consumed foods are produced locally, which makes the agriculture sector the first source of nutrients for the population (ECOWAS 2016b). This sector is also the main source of revenue in the sub-region since it employs 65 per cent of the working population and represents the main income source for 53 per cent of rural households; in total, it contributes on average 35 percent of national GDP (ECOWAS 2016b).

Through income generation, employment, food production, transformation and consumption, agriculture has therefore a crucial role to play in overcoming the different forms of malnutrition in West Africa.

However, this role is context-specific and needs to be addressed accordingly. Under no circumstances should the positive impacts of agricultural interventions on nutrition be regarded as systematic. In a given context, an agricultural intervention may have a positive impact on the nutritional status of households, while its impacts may be different elsewhere (Dury and Bocoum 2012; CIRAD and ACF 2015).

In order to improve the nutritional status of households, an agricultural intervention has to be structured by taking nutrition into account along the entire lifespan of the project (FAO 2015). This includes, for instance, carrying out of ex ante nutritional analysis of the local context, developing nutrition objectives and nutrition-sensitive agricultural activities, and continuously monitoring of the nutritional outcomes of the implemented activities.

What is nutrition-sensitive agriculture?

Nutrition-sensitive agriculture is a food-based approach to agricultural development that puts nutritionally rich foods, dietary diversity and food fortification at the heart of overcoming malnutrition and micronutrient deficiencies. This approach stresses the multiple benefits derived from enjoying a variety of foods, recognizing the nutritional value of food for good nutrition, and the importance and social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of nutrition-sensitive agriculture is to make the global food system better equipped to produce good nutritional outcomes.

Source: FAO (2014), p. 1.

The importance of this nutrition-sensitive agricultural approach is increasingly recognized by West African countries. All of the 15 countries of the sub-region have joined the Scaling Up Nutrition (SUN) Movement and most of them created inter-ministerial bodies to fight under-nutrition (in some cases, directly under the supervision of the presidency or the first minister). They have also made various multisectoral commitments emphasizing the importance of a food- and agriculture-based approach to fight malnutrition - the Nutrition for Growth Summit, the Malabo Declaration, the Zero Hunger Initiative, the Second International Conference on Nutrition (ICN2) and Sustainable Development Goals (SDGs) - among others.

AN APPROACH THAT RARELY LED TO THE IMPLEMENTATION OF NUTRITION-SENSITIVE AGRICULTURAL INTERVENTIONS

The recognition of this approach led to the development of numerous national nutrition and food security policies promoting agriculture among other nutrition-sensitive approaches. However, the political weight of these policies was generally low and, in most cases, they were not adequately funded. In addition, the technical services entrusted with the implementation of these policies often lacked technical capacities and human resources, particularly at the local level (ACF and IRAM 2015a). As a result, in general, nutrition-sensitive, agriculture-related interventions were rarely or only partially implemented. In fact, while it can be argued that these policies helped institutionalize nutrition-sensitive agriculture in West Africa, it cannot be argued that it led to the implementation of nutrition-sensitive agricultural interventions.

Similarly, the coordination role of the national inter-ministerial bodies on nutrition is often ineffective and dialogue between the nutrition sector and other contributing sectors is still dominated by a health focus. Although some of these inter-ministerial bodies are under the supervision of the presidency or the first minister, health ministries are often in charge of leading the coordination and implementation of nutrition-related activities (ACF and IRAM 2015a). Whilst the involvement of the health sector is something that could be expected, it regularly limits coordination with other sectors. The health sector often implements activities outside its field of expertise without consulting the relevant sectoral ministries (ACF and IRAM 2015b). By extension, case studies show that a lower priority is given to other sectors' possible contributions to nutrition (including agriculture) (ACF 2013a and 2013b; ACF and IRAM 2015a and 2015b).

Nutrition-sensitive agriculture is almost consistently absent or inadequately factored into the relevant policies (poverty reduction policies or agriculture/rural sector development policies). In fact, the agriculture sector in West Africa has remained relatively unresponsive to nutrition despite efforts to integrate a nutrition-sensitive focus into agricultural policies (ACF 2013a and 2013b; ACF and IRAM 2015a and 2015b). The sector's focus is primarily on increasing productivity and it is reluctant to get involved in nutrition-sensitive interventions since they are deemed to be on the side-lines of its core mission (ACF 2013a and 2013b; ACF and IRAM 2015a and 2015).

EXAMPLES FROM SIERRA LEONE, BURKINA FASO AND SENEGAL

As illustrated, the nutrition policies of Sierra Leone (Sierra Leone's *Food and Nutrition Security Policy*; FNSP 2012-2016), Burkina Faso (Burkina Faso's *Politique Nationale de Développement de la Nutrition*; PNDN 2015-2025) and Senegal (*Senegal's Politique Nationale de Nutrition*; PNN 2016) adequately empathize the pathways between agriculture and nutrition and highlight the role of agriculture in overcoming malnutrition.

However, the agriculture and development policies of those countries mostly consider nutrition as an expected automatic outcome of an increase of food production and agricultural wages: Sierra Leone's *Agenda for Prosperity* (AfP 2014-2018) and *National Sustainable Agriculture Development Plan* (NSADP 2010-2030); Senegal's *Plan Sénégal Emergent* (PSE 2014) and the *Programme de Relance et d'Accélération de la Cadence de l'Agriculture Sénégalaise* (PRACAS 2014-2017); and Burkina Faso's *Plan National de développement Economique et Social* (PNDES 2016-2020) and the *Politique Nationale du Secteur Rural* (PNSR 2011-2015).

Yet, as stated above, it was largely demonstrated that this correlation is not systematic and heavily depends on context, which needs to be taken into account from the diagnostic phase (such as households' food diversification score, food habits, access to market and productive resources, women's workload and women's decision-making power regarding food purchases) (Masset et al. 2011; Ruel, Alderman and Maternal and Child Nutrition Study Group 2013; World Bank 2013; FAO 2013; CIRAD and ACF 2015).

This paradoxical situation in West Africa was largely documented and denounced by NGOs (ACF 2013a and 2013b; ACF and IRAM 2015a), United Nations agencies (FAO 2016) and research institutes (IFPRI 2016b). In June 2016, this paradox was further highlighted by the ECOWAS during its inaugurating meeting of the drafting process of second-generation NAIP and RAIP. The new Methodological guide for the drafting process of second-generation NAIP and RAIP (ECOWAS 2016c) produced for the occasion thus explicitly encouraged mainstreaming of nutrition in these agricultural plans, as it should be now considered one of the seven crucial stakes for the transformation of West African agriculture from now to 2025 (ECOWAS 2016a).

THE SECOND GENERATION OF NAIP, A UNIQUE OPPORTUNITY TO PUT WEST AFRICA ON TRACK FOR SDG 2

These recommendations were reflected during the drafting process of the new RAIP, which was adopted in December 2016 by ECOWAS Consultative Committee on Agriculture (ECOWAS 2016b). This regional policy document proposes a comprehensive vision of how agriculture positively and negatively impacts nutrition. The new RAIP also has specific nutritional indicators and 15 per cent of the budget of its objective 3, *Improve food access, nutrition and strengthen the resilience of vulnerable population* is allocated to nutrition.

Nevertheless, while the orientation of this new RAIP is definitely a step in the right direction towards factoring nutrition into West African agriculture, much of the challenge still lies ahead. The role of this plan is to create incentives for the national agricultural policies and investment plans to adopt a new approach. In order to see concrete changes, it is critical that nutrition is adequately factored into the elaboration, implementation,

monitoring and evaluation of second-generation NAIP. This is of particular importance in order to be on track for SDG 2: *End hunger, achieve food security and improved nutrition, and promote sustainable agriculture*, since these NAIPs will cover a period of three to five years.

This challenge should not be underestimated. For the moment, nutrition is not included in most second-generation NAIP drafts, and there is limited time to make them nutrition sensitive before they are finalized (i.e. by the end of July). Adequately integrating nutrition into these documents will therefore require a rapid paradigm shift from West African States.

These NAIPs represent a unique opportunity to unleash the potential of a food-based approach in overcoming malnutrition in West Africa. And while the elaboration, implementation, monitoring and evaluation of these documents fall under each state's purview, the role of NGOs, civil society organizations, United Nations agencies and research institutes in this process should be given due consideration.

Every nutrition stakeholder involved at national level must support ECOWAS's incentives and conduct advocacy for a proper integration of nutrition into second-generation NAIPs.

References

Action Contre la Faim (ACF) (2013a) *Reconciling agriculture and nutrition, case studies: Burkina Faso, Kenya and Peru*. AFC: Paris. http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/burkina_faso_case_study.pdf http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/kenya_reconciling-agriculture-and-nutrition.pdf http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/peru_reconciling-agriculture-and-nutrition.pdf.

ACF (2013b) Synthesis report. ACF: Paris. <http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/sowing-the-seeds-of-good-nutrition.pdf>.

ACF and Institut de Recherches et d'Applications des Méthodes de développement (IRAM) (2015a) *Integration of nutrition into contributing sector programs and policies*. Synthesis report. ACF West African Regional Office: Dakar. http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/acf_iramintegrationnutritioneng.pdf.

ACF and IRAM (2015b) *Integration of nutrition into contributing sector programs and policies, case studies: Mali and Mauritania*. Unpublished documents; available from Dakar, ACF West African Regional Office (WARO) (French only).

Dury S and Bocoum I (2012) Le «paradoxe» de Sikasso (Mali) : pourquoi « produire plus » ne suffit-il pas pour bien nourrir les enfants des familles d'agriculteurs? *Cahier Agricole* 21: 324-36. http://agritrop.cirad.fr/566290/1/document_566290.pdf.

Economic Community of West African States (ECOWAS) (2016a) *Strategic Policy Framework 2025*. Unpublished document; available from Department of Agriculture, Environment and Water Resources, Economic Community of West African States, Abuja.

ECOWAS (2016b) *2016-2020 Regional Agriculture Investment Plan and Food Security and Nutrition*. Unpublished document; available from Department of Agriculture. Abuja.

ECOWAS (2016c) *Methodological guide for the drafting process of second generation NAIP and RAIP*. Unpublished document; available from Department of Agriculture, Environment and Water Resources, Economic Community of West African States, Abuja.

French Agricultural Research Centre for International Development (CIRAD) and ACF (2015) *The Negative Side of the Agricultural–Nutrition Impact Pathways: A Literature Review*, by Dury S, Alpha A and Richard A. *World Food Policy* 2(1): 78-100. <https://agritrop.cirad.fr/578298/1/578298.pdf>.

Food and Agriculture Organization of the United Nations (FAO) (2013) *Key recommendations for improving nutrition through agriculture*. FAO: Rome. <http://www.fao.org/3/a-i4922e.pdf>.

FAO (2014) *Nutrition-sensitive agriculture*. Second International Conference on Nutrition 19-21 November 2014. FAO: Rome. www.fao.org/3/a-as601e.pdf.

FAO (2015) *Designing nutrition-sensitive agriculture investments: Checklist and guidance for programme formulation*. FAO: Rome. <http://www.fao.org/3/a-i5107e.pdf>.

FAO (2016) *Has ten-year implementation of the regional agriculture policy of the Economic Community of West African States (ECOWAP) contributed to improve nutrition?* FAO Regional Office for Africa: Accra. <http://www.fao.org/3/a-i5859e.pdf>.

International Food Policy Research Institute (IFPRI) (2014) *Global Nutrition Report 2014: Actions and Accountability to Accelerate the World's Progress on Nutrition*. IFPRI: Washington DC. <http://www.ifpri.org/publication/global-nutrition-report-2014-actions-and-accountability-accelerate-worlds-progress>.

IFPRI (2016a) *Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030*. IFPRI: Washington DC. <http://www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030>.

IFPRI (2016b) *Making African agriculture and food systems work for nutrition: What has been done, and what needs to be done?* IFPRI: Washington DC. <http://www.ifpri.org/publication/making-african-agriculture-and-food-systems-work-nutrition-what-has-been-done-and-what>.

Masset E, Haddad L, Cornelius A and Isaza-Castro J (2011), *A systematic review of agricultural interventions that aim to improve nutritional status of children*. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London: London. <http://www.bmj.com/content/344/bmj.d8222>.

Ruel M, Alderman H and Maternal and Child Nutrition Study Group (2013) Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *Lancet* 382(9891): 536-5. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)60843-0/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)60843-0/abstract).

World Bank Group (2013) *Improving nutrition through multisectoral approaches*. Working Paper. World Bank Group: Washington DC. <http://documents.worldbank.org/curated/en/625661468329649726/Improving-nutrition-through-multisectoral-approaches>.

World Food Programme (WFP) (2016) *The cost of Hunger in Africa phase 2, Social and Economic Impact of Child Undernutrition in Burkina Faso, Ghana, Malawi and Rwanda*. WFP: Rome. <https://static1.squarespace.com/static/527789a2e4b0a23a823e44cd/t/58073f63440243e2975e0e38/1476870029290/COHA+Project+Summary+Second+Phase+English+Version.pdf>.

World Health Organization (WHO) (2010) *Nutrition Landscape Information System. Country profile indicators interpretation guide*. WHO: Geneva. http://www.who.int/nutrition/nlis_interpretationguide_isbn9789241599955/en/.

WHO (2012) *Global Nutrition Targets 2025*. Policy brief series. WHO: Geneva. http://www.who.int/nutrition/publications/globaltargets2025_policybrief_overview/en/.





Improving the Creditor Reporting System to better track nutrition funding

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ABSTRACT

The existing OECD Creditor Reporting System (CRS) provides an inaccurate picture of nutrition funding, leading to underestimations in donor official development assistance (ODA) to nutrition. Donors that are part of the Organisation Economic and Co-operation and Development (OECD) Development Assistance Committee (DAC) are currently discussing how a new policy marker for nutrition will increase transparency and accountability on nutrition. This is more relevant now than ever as we move forward into the UN Decade of Action on Nutrition. This article emphasizes the main proposed changes to the existing CRS.

BACKGROUND

Considerable efforts have been devoted to building a stronger system for tracking nutrition funding by OECD DAC donors (Action Against Hunger International 2012; and 2014; Ickes, Trichler and Parks 2015; Picanyol 2014). Despite the progress achieved, there is currently a limited understanding of what funds are available for nutrition, where they are allocated, and whether they are properly channelled to reach the most vulnerable population (Beecher 2015).

Only ten out of 29 donors (IFPRI 2016 and 2015) already report according to the SUN Donor Network methodology (SUN Movement 2013), but this reporting is neither applied universally nor consistently. The Creditor Reporting System (CRS) data are the unique source for official statistics on Official Development Assistance (ODA). The CRS Aid Activity database is the only systematic and consistent way to track nutrition investments.

A NEW SYSTEM FOR CLASSIFYING AND TRACKING NUTRITION ODA

In its current form, the CRS provides an inaccurate picture of nutrition funding, leading to underestimations in donor ODA to nutrition. As part of increasing efforts to track spending on nutrition, OECD DAC donors are currently discussing the introduction of a new policy marker for nutrition to accelerate progress in achieving the global nutrition targets as well as the 12 Sustainable Development Goals (SDGs) that are highly relevant to end malnutrition in all its forms by 2030 (IFPRI 2016).

There is a broad agreement that nutrition-specific interventions address the more immediate determinants of undernutrition (e.g. the quality of individual dietary intake and the provision of individual health services), while nutrition-sensitive programmes address the underlying determinants of malnutrition and incorporate specific nutrition goals and actions (e.g. food security, the quality of water and sanitation, and adequate caregiving resources at the maternal, household and community levels). Donors use a list of purpose codes to report on their aid flows and identify the sector of destination to the DAC databases. The CRS should reflect both nutrition specific and sensitive donors' investments.

A new system to track nutrition-specific investments that are reported outside of the basic nutrition code

The only relevant code for nutrition within the CRS is not well aligned with the scientific definition of nutrition specific interventions (Bhutta et al. 2013) and misses “key sources of nutrition specific funding in other purpose codes: US\$487 million in nutrition-specific funding can be found in 15 other purpose codes in the health and emergency response sector in 2014” (D’Alimonte, Heung and Hwang 2016, p. 11).

A new policy marker will allow for the identification of activities focused on a nutrition policy objective and will provide information on the degree to which DAC donors implement the nutrition policies in their aid programmes. With respect to other policy markers, members would be requested to assess and indicate for each aid activity whether or not it includes nutrition activities as a principal (fundamental to the design of the activity) or significant (important but not one of the principal reasons for undertaking the activity) objective.

Establishing a nutrition policy marker will help track nutrition-specific investments that are captured outside of the basic nutrition code and will ensure that the CRS reflects the scientific definition of nutrition-specific interventions.

A new policy marker for nutrition will help produce an accurate and reliable accounting of nutrition-sensitive investments.

The solutions needed for improving nutrition outcomes are multisectoral (Ickes, Trichler and Parks 2015). Spending in a broad range of areas may have significant nutrition-sensitive objectives and outcomes to contribute to improved nutrition for women, adolescent girls and children, or other vulnerable populations.

However, there is currently no systematic way to track nutrition-sensitive investments with the current CRS database. According to D’Alimonte, Heung and Hwang (2016), over \$3.8 billion of investments that are likely to nutrition-sensitive across 35 purpose codes are not marked in any systematic way. The new marker will also improve the monitoring of nutrition-sensitive development assistance.

In 2017, DAC donors have the opportunity to dramatically reform the transparency and accountability of their nutrition commitments, thereby increasing confidence that commitments are being kept and that member states are making progress towards achieving World Health Assembly global nutrition targets and SDGs. This is a unique opportunity to increase transparency and accountability on nutrition during the Nutrition Decade and beyond.

References

Action Against Hunger International (2012) *Aid for Nutrition: Can Investments to Scale Up Nutrition Actions Be Accurately Tracked?* Action Against Hunger International: Paris. http://www.actionagainsthunger.org/sites/default/files/publications/Aid_for_Nutrition_low_res_final.pdf.

Action Against Hunger International (2014) *Aid for Nutrition: Improving Tracking and Accountability for More Impact*. Discussion Paper. Action Against Hunger International: Paris. http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/acf_improving_tracking_and_accountability.pdf.

Beecher J (2015) *Tracking Nutrition aid: DFID’s aid spending for nutrition*. Development Initiatives. <http://devinit.org/post/tracking-nutrition-aid-dfids-aid-to-nutrition-is-increasing>.

Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S and Black RE (2013) Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? *Lancet* 382(9890): 452-77.

D’Alimonte M, Heung S and Hwang C (2016) *Tracking funding for nutrition: Improving how aid for nutrition is reported and monitored*. Policy Brief. Results for Development: Washington, DC. www.r4d.org/sites/resultsfordevelopment.org/files/resources/R4D_TrackingAid4Nutrition%20final.pdf.

Ickes SB, Trichler RB and Parks BC (2015) Building a Stronger System for Tracking Nutrition sensitive Spending: A methodology and estimate of global spending for nutrition-sensitive foreign aid. *Food Nutrition Bulletin* 36(4): 520-33. <https://www.ncbi.nlm.nih.gov/pubmed/26503329>.

International Food Policy Research Institute (IFPRI) (2015) *Global Nutrition Report 2015: Actions and Accountability to Advance Nutrition & Sustainable Development*. IFPRI: Washington DC. <http://www.ifpri.org/publication/global-nutrition-report-2015>.

IFPRI (2016) *Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030*. IFPRI: Washington DC. <http://www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030>.

Organisation Economic and Co-operation and Development (OECD) (2017) *Creditor Reporting System*. OECD. Stat. <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>.

Picanyol C (2014) Financial Resource Tracking for Nutrition: Current State of the Art and Recommendations for Moving Forward Panel 7.1. In *Global Nutrition Report 2014*. IFPRI: Washington DC. http://www.globalnutritionreport.org/files/2014/11/gnr14_pn4g_11picanyol.pdf.

Scaling Up Nutrition (SUN) Movement (2013) *Sun Donor Network: Methodology and Guidance Note to Track Global Investments in Nutrition*. SUN Movement: Geneva. <https://scalingupnutrition.org/wp-content/uploads/2012/10/SUN-MOVEMENT-STRATEGY-ENG.pdf>.

Action Area 5

SAFE AND SUPPORTIVE ENVIRONMENTS FOR NUTRITION AT ALL AGES

Implementing food-based dietary guidelines for policies, programmes and nutrition education

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ABSTRACT

It is recognized that food-based dietary guidelines (FBDGs) need to guide environmental, institutional and policy guidelines, and be used as a communication tool by health and education professionals. However, there has been a lack of information on how FBDGs are and should be implemented by national entities. This paper focuses on how FBDGs can help achieve healthy food systems by considering various avenues for implementation and drawing on results from a literature review and a key informant survey aimed at government sources, carried out by the Food and Agriculture Organization of the United Nations (FAO). Implementation strategies are considered within the agriculture sector, the food industry, the health sector, social protection, workplaces and schools, targeting actions at the level of individuals, families and groups, communities and institutions, and national policies. For each of these

sectors/settings, an example of real-life implementation is provided, mainly from developed countries. Finally, some preliminary recommendations are given on what efforts can be made to maximize the impact of FBDGs.

INTRODUCTION

The variety of healthy diets from around the world shows that there is not just one way to eat healthily, or one pattern to recommend to people. This is one reason for which countries develop their national FBDGs. FBDGs are a set of evidence-based, easily understood, behaviour-focused messages for the general public (often accompanied by an illustration such as a food pyramid), which takes into account a country's food availability, diet patterns and food culture, and nutrition-related issues. FBDGs focus on providing recommendations about foods not nutrients, and

many FBDGs now include a wider perspective including food combinations (meals), eating modes, food safety, physical activity and sustainability aspects. Some FBDGs also cover groups with special nutritional needs such as recommendations for infants and young children and mothers.

The Plan of Action endorsed at the 1992 International Conference on Nutrition (ICN1) called on governments to “provide advice to the public by disseminating, through the use of mass media and other appropriate means, qualitative and/or quantitative dietary guidelines relevant for different age groups and lifestyles and appropriate for the country’s population” (FAO and WHO 1992, p. 46). Following this call, many countries developed FBDGs. The ICN2 Framework for Action also recommends that countries “adopt and adapt, where appropriate, international guidelines on healthy diets” (FAO and WHO 2014, Recommendation 13), in addition to mentioning FBDGs (FAO and WHO 2014, Recommendation 21). Within the context of the UN Decade of Action on Nutrition, there is a great potential for FBDGs to be further utilized for creating a supporting environment for nutrition, tying in with many of the work areas, in particular those of sustainable food systems for healthy diets and social protection and nutrition education.

THE ROLE OF FOOD-BASED DIETARY GUIDELINES

Food-based dietary guidelines for the public

The original purpose of national FBDGs was to advise the public. It clearly emerged that the real challenge was not in determining what to recommend, but rather, in ensuring that the population would follow the recommendations. There are questions as to whether the FBDGs are fulfilling this role adequately due to the power of market forces in shaping agricultural production by directing supply and demand for food, and the need to recognize that information and messages alone are insufficient to change food practices. Coordinated efforts involving regulatory frameworks, economic incentives and disincentives, and educational activity at all levels of formal and non-formal systems as well as the need for adequate funding, planning, and ongoing monitoring and evaluation are needed (e.g. Smitasiri and Uauy 2007; Stockley 2001; Keller and Lang 2008). There is also a clear need for an impact appraisal and an examination of implementation methodologies.

Professional use: These guidelines are also being used by national professionals, in particular in the Ministries of Health and Education, in academia and in NGOs, but comparatively little by other sectors like the Ministries of Agriculture or the food industry. Some examples are the use by Ministries of Health for nutrition counselling of families with children; use by Ministries of Education in elementary and secondary school curricula or in teacher training; and the use of relevant FBDG messages by health-related NGOs such as those for heart health, cancer and diabetes in their work.

To guide policies: The guidelines are generally not adopted at the policy level to guide environmental and policy changes in all relevant sectors. This can result in lost opportunities for coordination and synergies throughout the food system.¹ Hence, the ICN2 Framework for Action recommends that countries *implement nutrition education and information interventions based on national dietary guidelines and coherent policies related to food and diets*, and the recent Foresight Report (Global Panel 2016a) makes it a priority to *ensure that food-based dietary guidelines (FBDGs) guide policy decisions to reshape food systems*. At the International Symposium on Sustainable Food Systems for Healthy Diets and Improved Nutrition that took place in Rome 2016, which was a follow-up to ICN2 and was held to establish the outline of the Nutrition Decade’s Work Programme, there was a call by Patrick Webb for FBDGs to be: *“re-framed and re-thought everywhere to guide policy-makers; not make them just consumer-focused but directly policy-maker-focused.”*²

Sustainable diets: FBDGs also have another new role to play in promoting sustainable diets; *indeed the greatest challenge to FBDGs revision is how climate change is (affecting) and will (further) affect the food supply and health* (Wahlquist 2016). Since climate change and nutrition are a two-way street, FBDGs can help to reshape food demand and food production towards more sustainable choices, not only in terms of environmental sustainability, but also in terms of social and economic sustainability.

¹ A food system can broadly be defined as gathering “all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes. A sustainable food system is a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised.” (HLPE 2014, p. 12).

² Patrick Webb, UNSCN News 42.

The FAO review of the food-based dietary guidelines implementation

To date, there has not been much systematic assessment of impact, information on how FBDGs are actually implemented by countries, or detailed guidance on how implementation should be done.

Accordingly, FAO has recently carried out a literature review of FBDG implementation and a key informant survey (referred to herewith as the “FAO study”),³ with the emphasis on “implementation” as distinct from “dissemination” (Table 1).

A socio-ecological approach

Diet and eating behaviours are influenced by many factors (Figure 1), which include: individual factors such as what people know, prefer and believe; the influence of families and

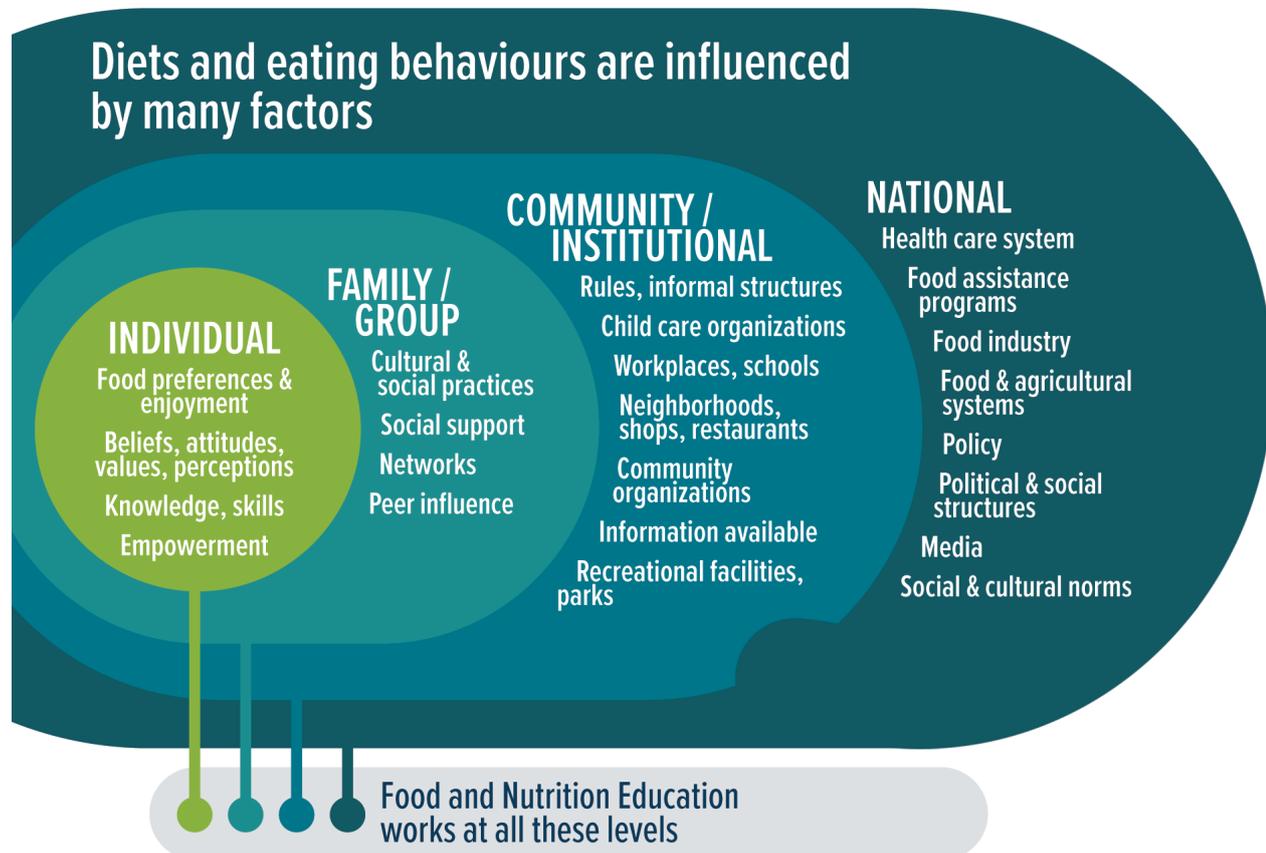
Table 1. FOOD-BASED DIETARY GUIDELINES DISSEMINATION AND IMPLEMENTATION

Dissemination	Implementation
Activities that aim to inform the public about the FBDG messages using different channels (e.g. videos, songs, websites) and communication materials (e.g. leaflets and posters).	Strategies that embed FBDGs in national policies and programmes, and apply and activate them in different sectors (e.g. health, agriculture, education) and settings (e.g. schools, communities and workplaces).

peer groups; the influence of communities and institutional structures such as schools; and the wider national context beyond an individual's control. This social ecological framework (McLeroy et al. 1988) was used as the basis for the FAO study, in order to explore if FBDGs act at all these different levels, i.e. (i) to inform policies and actions at food system level; (ii) to help shape the interface between food systems and diets; and (iii) to educate the public and enable them to have a healthy diet and lifestyle (at interpersonal and individual levels).

³ A full report on this study, with a full account of methodology, is forthcoming.

Figure 1. FACTORS AFFECTING DIETS AND EATING BEHAVIOURS



The literature review covered key scientific databases and grey literature. The findings helped shape questions for the key informant survey on policies, programmes and professional training guided by FBDGs, impact and suggestions for low-cost strategies. Responses were received from 47 key informants in 27 of the 34 countries contacted, mostly from developed countries.

Key informants included staff and researchers in government ministries, national nutrition organizations and academia, including: national FBDG focal points; members of the national FBDGs development committee; recommended experts on FBDGs; and/or nutrition-related programs and policies in different sectors, providing a picture mainly of government-led activities.

PURPOSE OF THIS PAPER

This paper draws on the findings of the FAO study, which presents information on previous studies, some possibilities for implementation in various sectors/settings, and recommendations on how to maximise the impact of FBDGs.

PREVIOUS STUDIES

Previous studies have assessed the use of FBDGs on factors such as their inclusion in policy and national programmes, communication strategies, political support and resources for implementation (FAO 2014a); means of dissemination and data on the impact on policy and consumer diets (Keller and Lang 2008); and links between FBDGs and policies affecting the food environment (FAO 2016b). Their findings presented an incomplete picture, highlighting insufficient policy presence, weak implementation and little data.

IMPLEMENTATION POSSIBILITIES

The study identified the following sectors and settings of FBDGs implementation. The need and potential in each sector is briefly discussed. Only cases with a direct link to FBDGs were considered.

1. Implementation in the agriculture sector

Overall, there is enough food in the world to meet everyone's need for dietary energy and protein. But is the available food of the right quality for a good diet? A study by the Overseas Development Institute (ODI 2014) compared the global availability of food with national dietary guidelines and found that supply does not tally with recommendations; there was an oversupply of grains, oils and fats and sugars, and a notable under-supply of fruits and dairy.

These findings highlight the critical need for nutrition-sensitive agriculture and trade.⁴ FBDGs can play an important role in nutrition-sensitive agriculture and food system interventions by showing the importance of a healthy diet for a particular country's population. Agricultural policies should support the production of a diversity of nutrient-rich foods (Global Panel 2016b). FBDGs can also promote local and traditional products (FAO 2010). In addition, they can also be instrumental in shifting consumer demand towards diets that are more environmentally sustainable. National FBDGs that embed both health and sustainability objectives can form the basis of agriculture policies that are beneficial to the health of both the environment and the consumers (FAO and FCRN 2016).

Figure 2 summarizes FBDGs-related strategies that can be adopted by the agriculture sector. In addition, recommended strategies for workplaces (see Figure 6) should be carried out in all agriculture sector canteens and food outlets. The following stakeholders should be involved in the planning: agricultural ministry staff, agricultural extension workers, large farming companies, smallholder farmers, agronomists, agricultural engineers, private sectors, seed companies, communities, those responsible for home and community gardening initiatives and other initiatives, as well as a nutrition adviser.

One such example has been the East Finland Berry and Vegetable Project (Berry Project) started in 1986 as part of the North Karelia project. The project aimed to increase consumption of domestic berry and vegetable products and mushrooms, in line with the FBDGs recommendations on berries, fruits and vegetables.⁵ The Berry Project aimed to help dairy farmers switch to berry and vegetable farming, as the demand for dairy products was declining with the drop in consumption of butter and fatty dairy products.⁶ This led to a

4 For guidance on how to make agriculture and food systems nutrition-sensitive, see: www.fao.org/nutrition/policies-programmes/en/.

5 It is not clear as to whether the project was actually guided by the FBDGs.

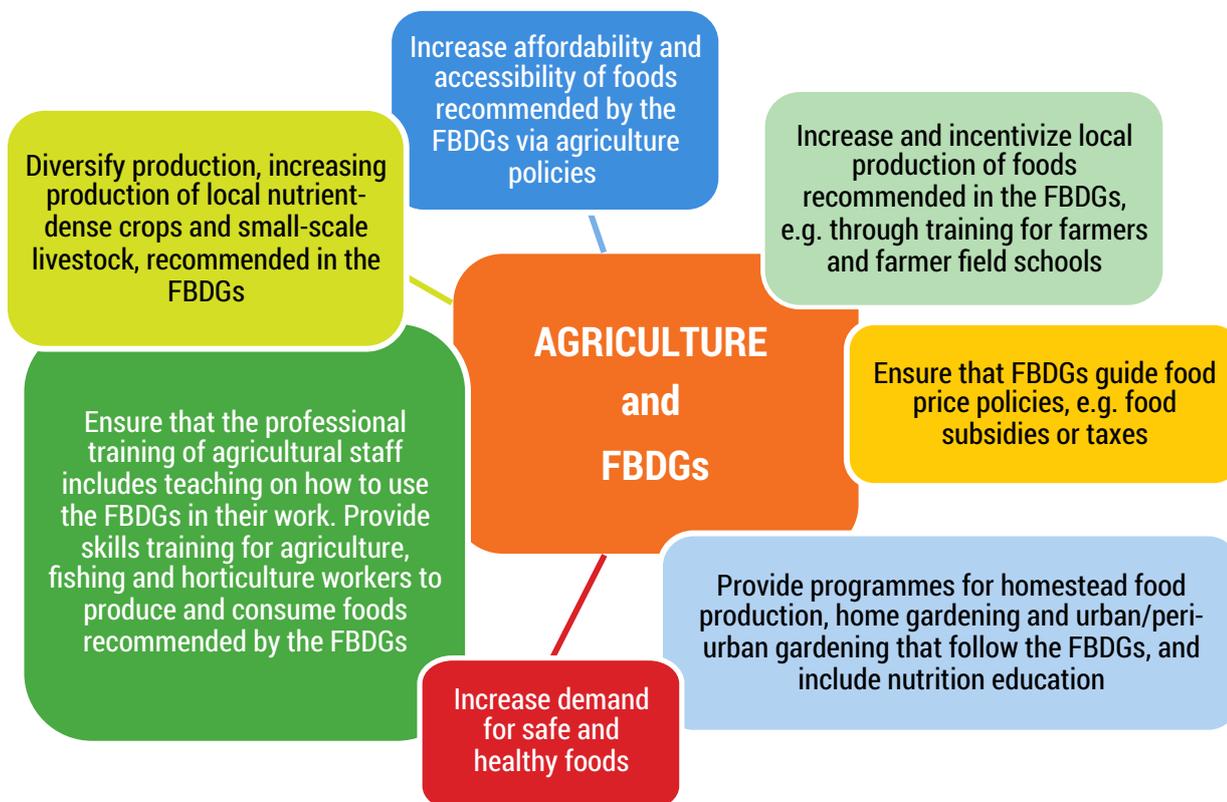
6 The main strategy of the North Karelia project was to reduce the high saturated fat intake, especially from dairy sources, and to increase the consumption of vegetables and fruit. The project is credited with reducing the incidence of coronary heart disease of the working-age population by 73 per cent in North Karelia from 1971 to 1995, with

major collaborative project between berry farmers, industry, various commercial sectors and the health authorities, which was financed by the Ministry of Agriculture and the Ministry of Commerce. Sales campaigns, new product development

and various supportive activities were also involved, in addition to education. Many small companies producing juices, berry and mushroom conserves and vegetable products were established by local people. Local berry consumption rose gradually, and many farmers switched from dairy to berry production (EPHA 2016; INSPQ 2013; Pekka, Pirjo and Ulla 2002).

the major contributor being reduction in the population cholesterol level, as a result of dietary changes (Pekka, Pirjo and Ulla 2002).

Figure 2. FOOD-BASED DIETARY GUIDELINES (FBDGs) IMPLEMENTATION IN THE AGRICULTURE SECTOR



2. Implementation involving the food industry

Engagement with the private sector has the potential to make healthy food choices available (Krebs-Smith, Reedy and Bosire 2010), if it acts in line with the standards and incentives established by government (WHO Regional Office for Europe 2015). The food industry stands to gain by responding to consumer demand - in a survey of 30,000 individuals in 60 countries, 88 per cent said they would pay more for healthier foods (The Nielsen Company 2015).⁷

Figure 3 shows possible strategies in how FBDGs can be used to guide food industry actions. The following stakeholders should be involved: industry management, employees, small-scale producers (e.g. bakeries), manufacturers, food processors, wholesalers, various ministries (e.g. Health, Industry and Trade), nutrition/health non-governmental organizations (NGOs), retailers' associations, consumers' associations, the media, importers, food scientists, and advisers to the food industry.

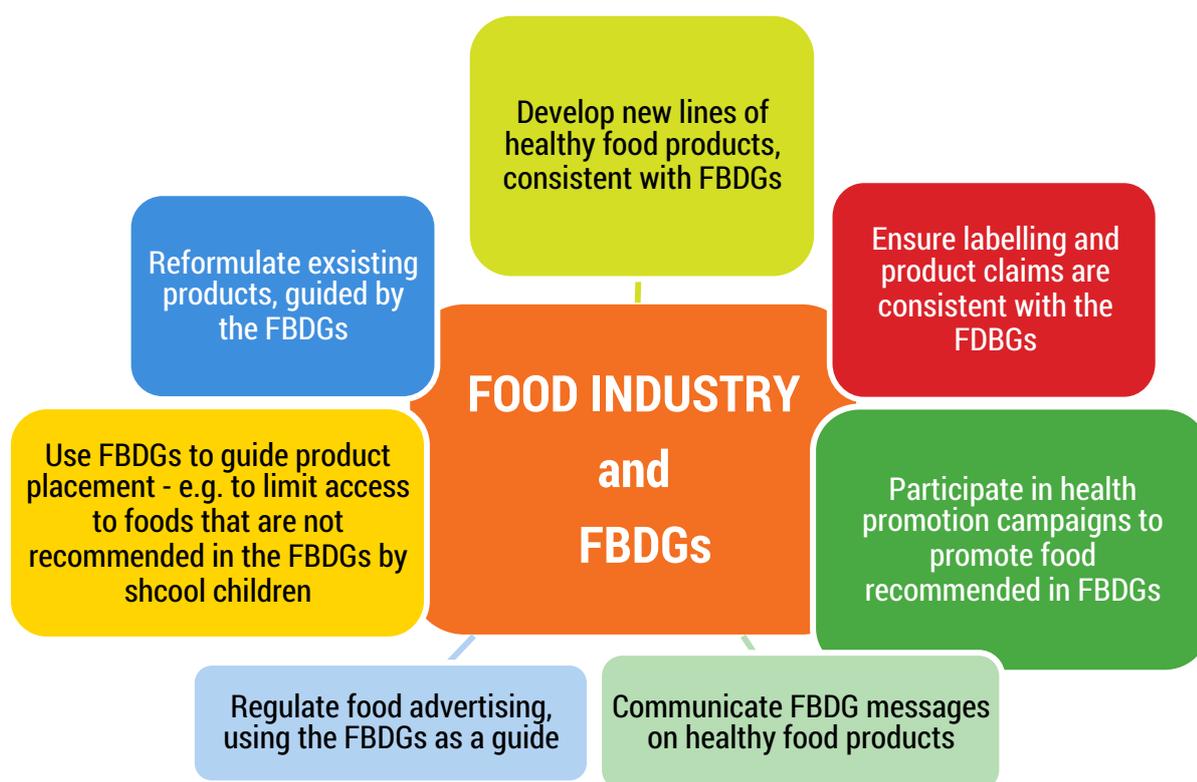
An example of regulating advertising is the Canadian Children's Food and Beverage Advertising Initiative (CAI), a self-regulation system that restricts advertising of food and

⁷ These findings were based on online responses; hence, it is not representative of the world population.

beverages aimed at children under 12. Within this system, industry participants have reformulated and enhanced the nutritional profile of many products advertised to children. The nutrition criteria for products are based on Canada's Food Guide and other international reports and guidelines (Advertising Standards Canada 2016). One problem with

such voluntary schemes is that not all companies choose to join. The Government of Canada is working to amend the Food and Drugs Act to prohibit food and beverage marketing directed at children under 13. Canada's Food Guide webpages include a guide to industry on the use of food guide content in labelling and advertising (Health Canada 2017).

Figure 3. HOW CAN FOOD-BASED DIETARY GUIDELINES (FBDGs) BE USED TO GUIDE FOOD INDUSTRY ACTIONS?



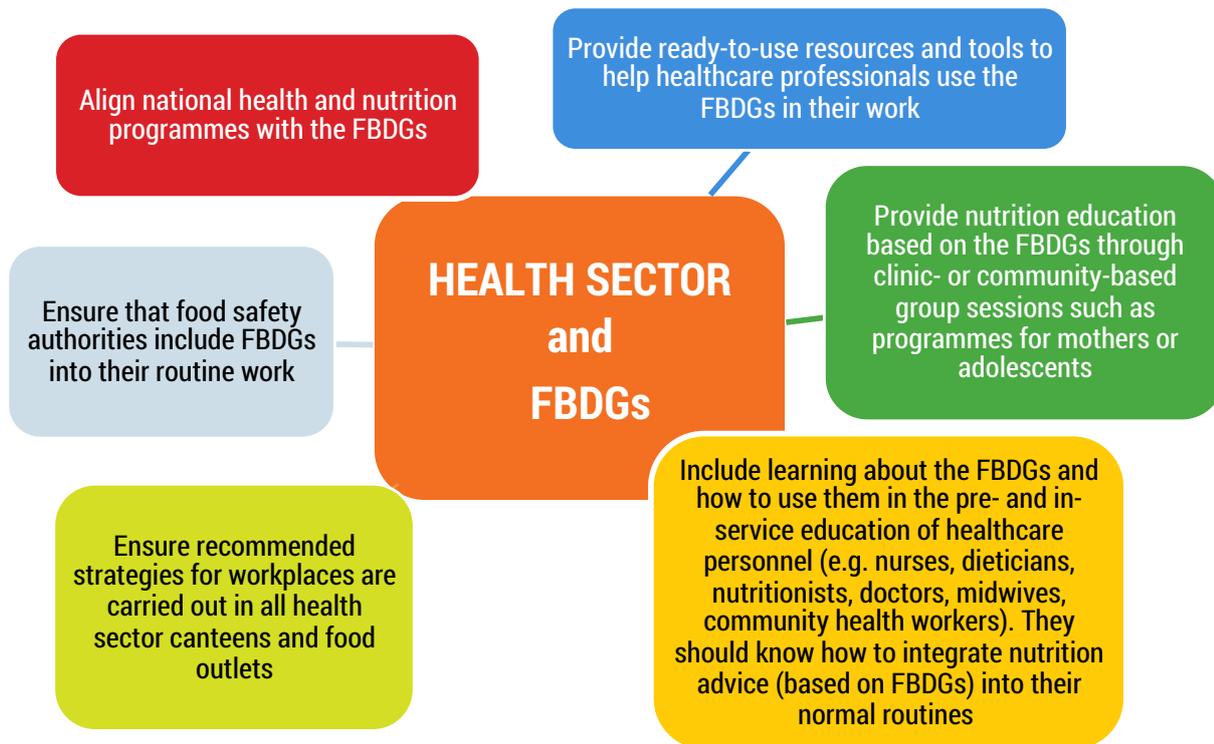
3. Health sector implementation

Viewed by the public as credible (WHO 2000), healthcare professionals can reach a large part of the population, especially women and children. FBDGs are essential for guiding policies and action in health service work on food and nutrition (Figure 4). The following stakeholders should be involved: Ministry of Health staff, hospital managers, health clinics/centres, dietitians, nutritionists, midwives, health workers, health promotion personnel, nurses, care practitioners, pharmacists, dentists and other therapists (e.g.

occupational, physical, speech and language), community leaders/volunteers, health professionals in training (e.g. nutrition students) and associations of health professionals.

In Iran, an educational programme to promote the FBDGs in a primary health care setting was piloted at the community level. The programme was run by health workers over four weeks in 12 urban health centres. It led to a significant improvement in women's individual perceptions about the FBDGs, and resulted in some positive dietary and physical activity changes (Shariatjafari et al. 2012).

Figure 4. IMPLEMENTATION OF FOOD-BASED DIETARY GUIDELINES (FBDGs) IN THE HEALTH SECTOR: WHAT CAN BE DONE?

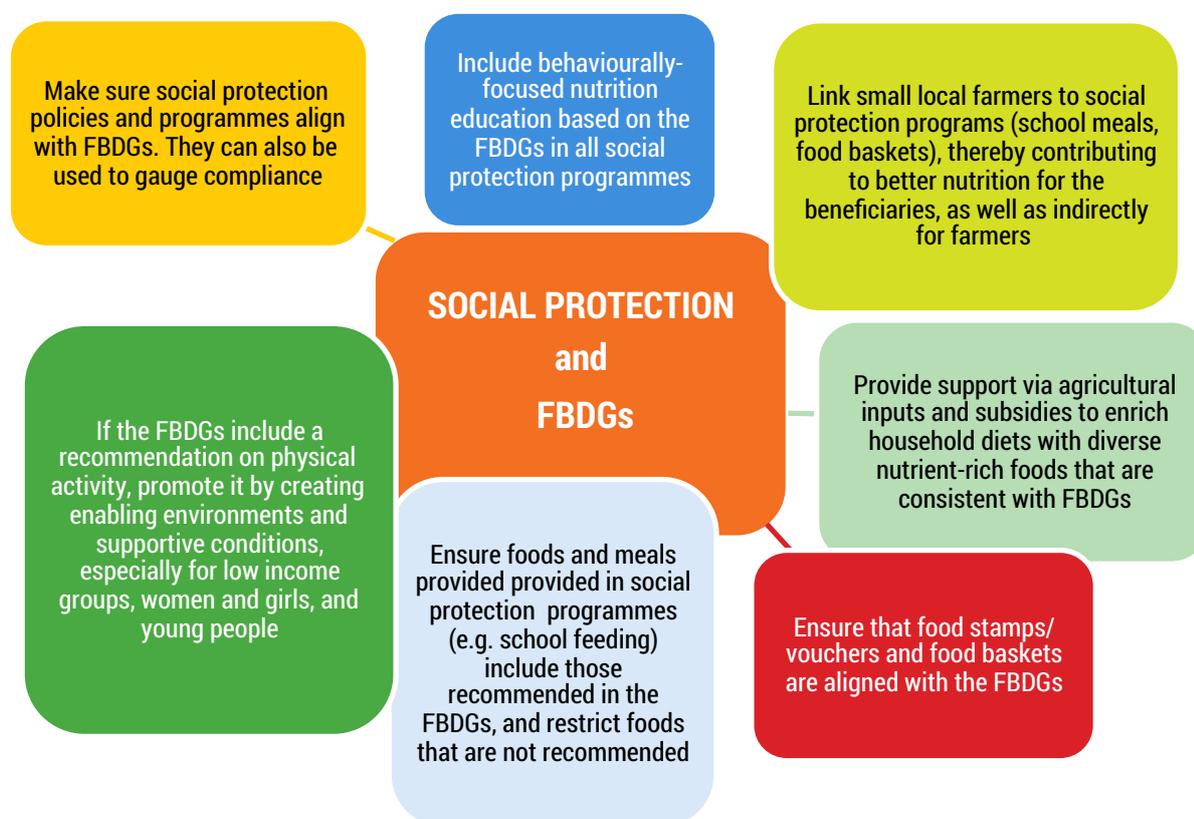


4. Implementation in social protection

FBDGs can be used to guide food aid/vouchers in social protection programmes, as well as nutrition education (Figure 5). Increasing income or food availability at the household level does not automatically translate into improved nutrition outcomes of households; hence, it is important for social protection programmes to integrate nutrition education and behaviour change approaches (FAO 2015; IFPRI 2014). The following stakeholders should be involved in planning: the Ministries of Social Protection, of Welfare and of Agriculture, agricultural extension workers, farmers, health care workers, local community, civil society, humanitarian aid agencies, United Nations agencies, NGOs, the private sector and consumer associations.

In the United States of America, the Dietary Guidelines for Americans are applied to State food assistance programmes, such as: the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); the Farmer's Market Nutrition Program (FMNP); Senior Farmer's Market Nutrition Program (SFMNP); the Supplemental Nutrition Assistance Program (SNAP Program); and the Expanded Food and Nutrition Education Program (EFNEP), a national community outreach program for low-income families. Educational materials follow the guidelines, which also set the criteria for food aid vouchers. Evaluation results are available for most of the above programmes (FAO 2013). EFNEP evaluations, for example, show consistent improvements in the US in following FBDGs more closely, including: increasing servings of fruits and vegetables; making healthier food choices and reading nutrition labels; and improving food resource management, such as planning meals and shopping with a grocery list (FAO 2013).

Figure 5. IMPLEMENTATION OF FOOD-BASED DIETARY GUIDELINES (FBDGs) IN SOCIAL PROTECTION: WHAT CAN BE DONE?



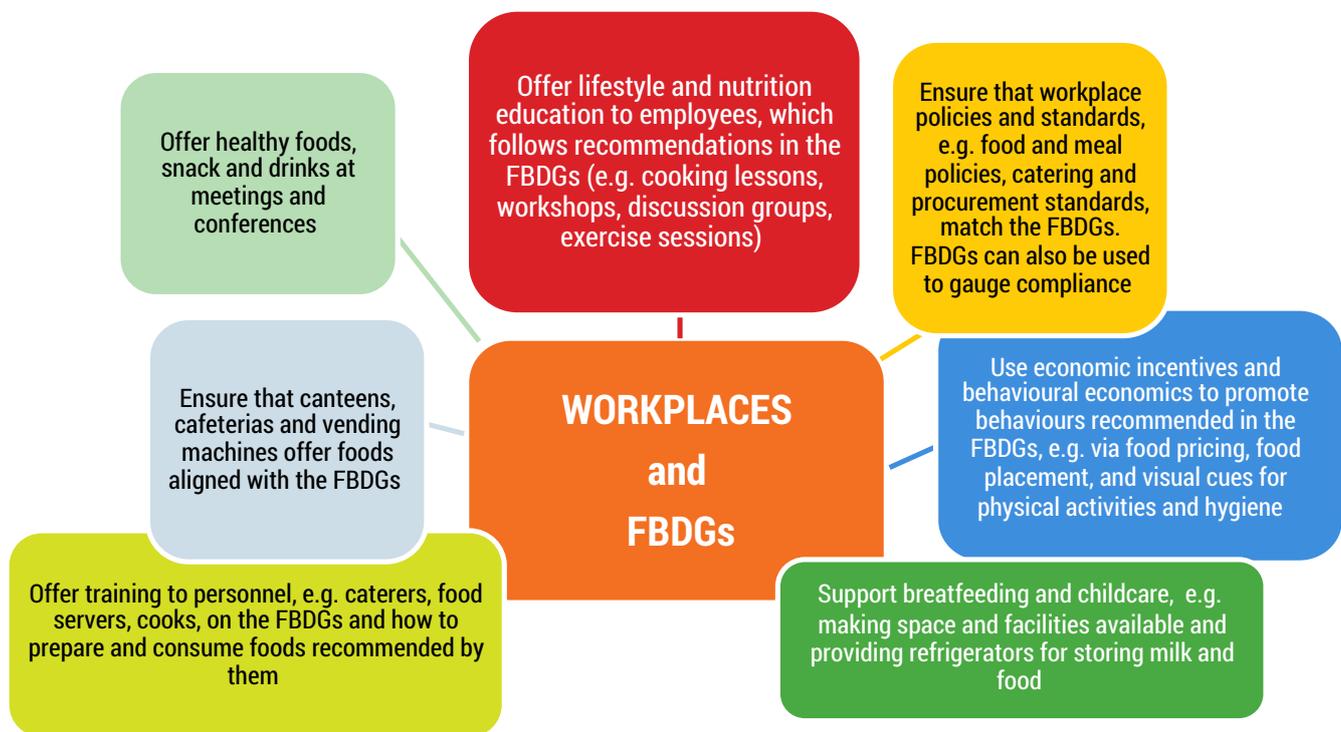
5. Implementation in workplaces

Worksites are recognized as a setting with great potential for health promotion to improve the health of the adult population (FAO and WHO 2014; WHO 2008; and 2013). Employers also benefit, as well-nourished people are estimated to be at least 20 per cent more productive, and have more positive working attitudes (Wanjek 2005).

Figure 6 shows possible strategies. Planning processes should include the management, employees, caterers, food service managers, food servers, canteen staff, cooks, vendors and vending machine contractors, health advisers and nutrition advisers.

One example is the “Food at work” model project for healthy workplaces in Denmark. The trade union “United Federation of Danish Workers” and the Ministry of Family and Consumer Affairs work together to make lunch healthier, and influence demand and supply of healthy food to canteens, based on the official FBDGs. The project focused mainly on three FBDG messages: (i) eat more fruits and vegetables; (ii) eat less fat (especially saturated); and (iii) follow the plate model (including portion size). Evaluations showed that healthy foods offered increased, including fruit schemes, lunch clubs, weekly meal programmes, cold water machines and reducing sales of sugary foods and drinks. A high degree of motivation and satisfaction among employees was found, including improved knowledge and health behaviour and a measurable improvement in overall diet (Lassen et al. 2005).

Figure 6. HOW CAN FOOD-BASED DIETARY GUIDELINES (FBDGs) BE USED TO GUIDE WORKPLACE ACTIONS?



6. Implementation in schools

Increasingly, countries are now using a comprehensive approach, where school food and nutrition (SFN) programmes combine locally sourced nutritious school meals with multisector actions, including nutrition education, family and school community involvement, school gardening, and training and technical support to help schools achieve an overall healthier environment. This can increase the capacity to promote change in the actual consumption of healthy school meals and to encourage children's lifelong healthy eating habits (Global Panel 2015). FBDGs have an important role to play, as they can ensure that consistent messages and guidelines are used across school systems. FBDGs can guide the design, implementation and evaluation of different components of comprehensive SFN policies and programmes in a coherent manner (Figure 7).

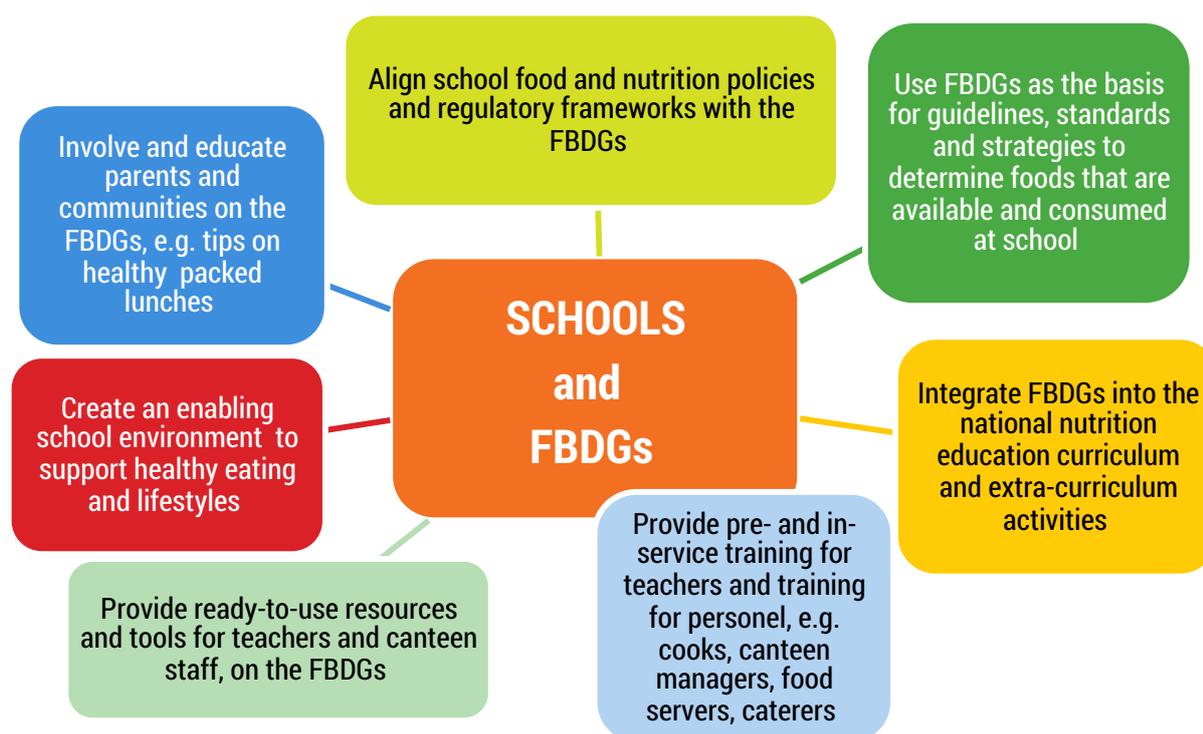
Planning processes should include: ministry staff (education, agriculture, health ministries, etc.), municipalities, school management, school principals, teachers, students, parents and families, caterers, food servers, canteen staff, cooks, food vendors, cleaners, school administrators, secretaries, parent-teacher associations (PTAs), janitors/caretakers and governors/school boards.

In Slovenia, for example, the National Dietary Guidelines for Healthy Nutrition in Kindergartens and Schools (NDGs) became obligatory through the renovated School Meals Act in 2010 (Gregoric et al. 2015). The NDGs are based on the FBDGs for Slovenia, which in turn were developed by the National Institute of Public Health using the WHO guidelines, Country-wide Integrated Non-communicable Diseases Intervention (CINDI), as a base. The NDGs guide

standards and subsidies for school menus, cross-curricular nutrition education, and a school fruit and vegetable programme. Evaluation findings showed that school lunches on average contained adequate amounts of protein and did not significantly exceed the maximum recommended values for sugars, total fat and saturated fatty acids (SFA).

However, they did not meet minimum recommendations for energy, carbohydrates or dietary fibre intake, nor for some micronutrients. In addition, better menu quality was related to larger schools, and to some extent, those located in higher socio-economic status municipalities (Gregoric et al. 2015).

Figure 7. HOW CAN FOOD-BASED DIETARY GUIDELINES (FBDGs) BE USED IN SCHOOL PROGRAMMES?



EIGHT RECOMMENDATIONS FOR SUCCESSFUL FBDGs

The following summary combines some of the authors' study findings with published literature (Keller and Lang 2008; Smitasiri and Uauy 2007; Stockley 2001; Wahlquist 2016; Vorster 2013), and includes action at most levels of the social-ecological framework presented in Figure 1.

1. Ensure a consumer-centred approach

Although the examples of implementation mentioned above are government-led and hence top-down, consumers are always key actors in the change process. Whatever the sector or setting,

it is important to bring together a range of stakeholders and discuss the FBDGs, compare them with current diets, identify barriers to healthy eating, review feasible changes in practice, and decide together on actions to be taken by staff, workers, clients or citizens as well as by management or institutions.

2. Ensure an implementation plan and funding

In government-led actions, the strategy and funds for implementation need to be planned from the start. In the key informant survey, nearly half of the responding countries did not report a strategy or plan for implementation of FBDGs. A lack of financial resources and/or support was identified as a major barrier to implementation. Plans should include support for local level implementation.

3. Ensure that food-based dietary guidelines (FBDGs) support and guide all policies and programmes that influence food and diets

Countries should put in place policies and legislation to ensure that FBDGs will guide diverse programmes in agriculture and food security, education, health and social protection.

4. Ensure that food-based dietary guidelines (FBDGs) target policymakers

An FAO/WHO Expert Consultation report recommended that two sets of guidelines be developed: one that is more quantitative and technical for policymakers and health professionals; and the other that is more qualitative and practical for the general public (FAO and WHO 1998). However, a third may be needed, i.e. a short advocacy-based version for policymakers in each sector, which includes action ideas and practical steps.

5. Involve a range of stakeholders

As mentioned in the Introduction, the FBDGs are used by professionals in several ministries, academia and NGOs, and to some extent in the food industry. However, the work of the various agencies is not usually coordinated nationally. At the national level, an implementation committee should represent a range of stakeholders, including the media and private sector representatives, civil society organizations and academia, with a lead ministry in charge of overseeing implementation and evaluation. This holds true at any level of implementation, for example, workplace committees might involve food providers, management, employees and labour representatives.

6. Provide training for implementers

Several respondents in the survey identified lack of trained personnel as a barrier, including lack of education/knowledge and lack of capacity in government workers. Training and training of trainers should be planned from the outset of the programme of implementing FBDGs (FAO and WHO 1998). Learning about FBDGs must be integrated into in-service meetings and training of personnel across the sectors.

7. Take into account public belief and motivation

Some respondents identified “consumer will/attitude” as a barrier to implementation. Implementers must expect and target this lack of motivation in the public. Some strategies

to create public demand for healthy diets will be needed. This can be achieved by building a strong consumer movement and a broad climate of awareness, knowledge and skills through direct experience and practice.

8. Build in monitoring and evaluation

The survey revealed that very few countries had monitoring and evaluation data on the impact of FBDGs. Both process and impact evaluation are immensely important both for programme designers to see what works and how well and to justify funding, and, at a different level, for consumers to see the progress being made. The objectives should always be clearly stated, measurable and realistic and should focus on changes in practices and attitudes. Baseline data on knowledge, attitudes, behaviours, resources, circumstances and barriers can be gathered through a knowledge, attitudes and practices (KAP) survey (FAO 2014b) or through informal discussion.

Monitoring and evaluation should focus on: (i) alignment with policies and programmes; (ii) the approach adopted and its conduct; (iii) reach, frequency and programme participation/exposure; (iv) impact evaluation to measure the extent to which FBDGs objectives have been reached; and (v) maintenance and sustainability of the target practices. Findings could be linked with other reporting systems in place, for example, monitoring of obesity rates, increase in supply of vegetables, sales data or national dietary surveys of food consumption patterns.

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References

- Advertising Standards Canada (2016) *The Canadian Children's Food and Beverage Advertising Initiative*. 2015 Compliance Report. Advertising Standards Canada: Toronto. www.adstandards.com/en/childrensinitiative/2015ComplianceReport.pdf.
- Contento IR (2015) *Nutrition Education: Linking Research, Theory, and Practice*, 3rd edition. Jones & Bartlett: Burlington.
- European Public Health Alliance (EPHA) (2016) *Agriculture and Public Health: Impacts and pathways for better coherence*. Discussion paper May 2016. EPHA: Bruxelles. http://epha.org/wp-content/uploads/2016/05/Agriculture-and-Public-Health_EPHA_May2016-2.pdf.
- Food and Agriculture Organization (FAO) (2010) *Linking people, places and products. A guide for promoting quality linked to geographical origin and sustainable Geographical Indications*, 2nd edition. FAO: Rome. www.fao.org/docrep/013/i1760e/i1760e00.pdf.
- FAO (2013) *Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness*. Background Paper for the International Conference on Nutrition (ICN2) by Hawkes C. FAO: Rome. <http://www.fao.org/docrep/017/i3235e/i3235e.pdf>.
- FAO (2014a) *El estado de las alimentarias basadas en alimentos en América Latina y el Caribe*. FAO: Rome. www.fao.org/3/a-i3677s.pdf.
- FAO (2014b) *Guidelines for assessing nutrition-related Knowledge, Attitudes and Practices*. KAP Manual. FAO: Rome. www.fao.org/docrep/019/i3545e/i3545e.pdf.
- FAO (2015) *Nutrition and Social Protection*. FAO: Rome. www.fao.org/3/a-i4819e.pdf.
- FAO (2016a) *Food and Nutrition Education for Healthy Diets*. Infographic. www.fao.org/resources/infographics/infographics-details/en/c/425630.
- FAO (2016b) *Influencing food environments for healthy diets*. www.fao.org/3/a-i6484e.pdf.
- FAO and Food Climate Research Network at University of Oxford (FCRN) (2016) *Plates, pyramids, planet. Developments in national healthy and sustainable dietary guidelines: a state of play assessment*. FAO: Rome. www.fao.org/3/a-i5640e.pdf.
- FAO and World Health Organization (WHO) (1992) *Final Report of the Conference*. International Conference on Nutrition. FAO: Rome. <http://apps.who.int/iris/bitstream/10665/61254/1/a34812.pdf>.
- FAO and WHO (1998) *Preparation and Use of Food-based Dietary Guidelines*. WHO Technical Report Series: 880. WHO: Geneva. http://apps.who.int/iris/bitstream/10665/42051/1/WHO_TRS_880.pdf?ua=1&ua=1.
- FAO and WHO (2014) *Conference Outcome Document: Framework for Action*. Second International Conference on Nutrition. FAO: Rome. www.fao.org/3/a-mm215e.pdf.
- Global Panel on Agriculture and Food Systems for Nutrition (Global Panel) (2015) *Healthy Meals in Schools: Policy Innovations Linking Agriculture, Food System and Nutrition*. Policy Brief No. 3. Global Panel: London. www.glopan.org/sites/default/files/pictures/PolicyBrief_healthyMeals.pdf.
- Global Panel (2016a) *Food systems and diets: Facing the challenges of the 21st century*. Global Panel: London. <https://www.glopan.org/foresight>.
- Global Panel (2016b) *Assuring Safe Food Systems: Policy Options for a Healthier Food Supply*. Policy Brief No. 5. Global Panel: London. <http://glopan.org/sites/default/files/Food-Safety-Policy-Brief.pdf>.
- Gregoric M, Pograjc L, Pavlovac A, Simcic M and Gabrijelcic BM (2015) School nutrition guidelines: overview of the implementation and evaluation. *Public Health Nutrition* 18(9): 1582-92. <https://www.ncbi.nlm.nih.gov/pubmed/25660122>.
- Health Canada (2017) *General Principles for the Use of Content from Canada's Food Guide Resources in Labelling and Advertising*. <https://www.canada.ca/en/health-canada/services/food-nutrition/canada-food-guide/general-principles-use-content-canada-food-guide-resources-labelling-advertising.html>.
- High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security (HLPE) (2014) *Food losses and waste in the context of sustainable food systems*. HLPE Report 8. HLPE: Rome. <http://www.fao.org/3/a-i3901e.pdf>.
- Institut National de Santé Publique du Québec (INSPQ) (2013) *The North Karelia Project in Finland: A societal shift favouring healthy lifestyles. The TOPO collection* (5): 1-7. www.inspq.qc.ca/pdf/publications/1624-NorthkareliaProjectFinland.pdf.
- International Food Policy Research Institute (IFPRI) (2014) *Safety nets in Bangladesh: Which form of transfer is most beneficial? Operation performance of the transfer modality research initiative*. IFPRI: Washington DC. <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/128939/filename/129150.pdf>.
- Keller I and Lang T (2008) Food-based dietary guidelines and implementation: lessons from four countries – Chile, Germany, New Zealand and South Africa. *Public Health Nutrition* 11(8): 867-74. <https://www.ncbi.nlm.nih.gov/pubmed/17942004>.
- Krebs-Smith SM, Reedy J and Bosire C (2010) Healthfulness of the U.S. Food Supply: Little Improvement Despite Decades of Dietary Guidance. *American Journal of Preventive Medicine* 38(5): 472-77. <http://nccor.org/downloads/roundtable/Krebs-Smith%20-%20Healthfulness%20of%20the%20US%20Food%20Supply.pdf>.
- Lassen AD, Andersen JS, Biloft-Jensen AP, Bruselius-Jensen ML, Christensen T, Fagt S and Trolle E (2005) *Mad på arbejde - Metode, forløb og evaluering af projektet*. Danmarks Fødevareforskning: Søborg. http://orbit.dtu.dk/files/3559645/mpa_press.pdf.
- McLeroy KR, Bibeau D, Steckler A and Glanz K (1988) An Ecological Perspective on Health Promotion Programs. *Health Education Quarterly* 15(4): 351-77.
- Overseas Development Institute (ODI) (2014) *Future diets: Implications for agriculture and food prices*. Report by Keats S and Wiggins S. ODI: London.
- Pekka P, Pirjo P and Ulla U (2002) Part III. Can we turn back the clock or modify the adverse dynamics? Programme and policy issues. Influencing public nutrition for non-communicable disease prevention: from community intervention to national programme – experiences from Finland. *Public Health Nutrition* 5(1A): 245–51. <https://www.cambridge.org/core/journals/public-health-nutrition/article/part-iii-can-we-turn-back-the-clock-or-modify-the-adverse-dynamics-programme-and-policy-issues/79E1D5E9F5CFFBABC9E9BFEC9A1EBD98>.
- Shariatjafari S, Omidvar N, Shakibzadeh E, Majdzadeh R, Minaei M and Gholamzade M (2012) Effectiveness of Community-based Intervention to Promote Iran's Food-based Dietary Guidelines. *International Journal of Preventive Medicine* 3(4): 249-61. <https://www.ncbi.nlm.nih.gov/pubmed/22624081>.

Smitasiri S and Uauy R (2007) Beyond recommendations: Implementing food-based dietary guidelines for healthier populations. *Food and Nutrition Bulletin* 28 (Suppl. 1): S141-51. <http://journals.sagepub.com/doi/pdf/10.1177/15648265070281S112>.

Stockley L (2001) Toward public health nutrition strategies in the European Union to implement food based dietary guidelines and to enhance healthier lifestyles. *Public Health Nutrition* (4): 307-24.

The Nielsen Company (2015) *The Nielsen Global Health & Wellness Survey*. <https://www.nielsen.com/content/dam/niensenglobal/eu/nielseninsights/pdfs/Nielsen%20Global%20Health%20and%20Wellness%20Report%20-%20January%202015.pdf>.

Vorster H (2013) Revised food-based dietary guidelines for South Africa: challenges pertaining to their testing, implementation and evaluation. Guest editorial. *South African Journal of Clinical Nutrition* 26(3) (Suppl.): S1-S164. www.adsa.org.za/Portals/14/Documents/FoodBasedDietaryGuidelinesforSouthAfrica.pdf.

Wahlquist ML (2016) Food-Based Dietary Guidelines (FBDGs): Their Future. *Malaysian Journal of Nutrition* 22 (Suppl.): iii-v. http://www.nutriweb.org.my/publications/mjn0022_1/default.php.

Wanjek C (2005) *Food at work: Workplace solutions for malnutrition, obesity and chronic diseases*. International Labour Office: Geneva.

WHO (2000) *Nutrition for Health and Development. A global agenda for combating malnutrition*. WHO/NHD/00.6. WHO: Geneva. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.385.768&rep=rep1&type=pdf>.

WHO (2008) *Monitoring and Evaluation of Worksite Health Promotion Programs - Current state of knowledge and implications for practice*. Background paper prepared for the WHO/WEF Joint Event on Preventing Noncommunicable Diseases in the Workplace (Dalian/ China, September 2007) by Engbers L. WHO: Geneva. www.who.int/dietphysicalactivity/Engbers-monitoringevaluation.pdf.

WHO (2013) *Global action plan for the prevention and control of non-communicable diseases 2013-2020*. WHO: Geneva. http://apps.who.int/iris/bitstream/10665/94384/1/9789241506236_eng.pdf?ua=1.

WHO Regional Office for Europe (2015) *European Food and Nutrition Action Plan 2015-2020*. Regional Committee for Europe - 64th Session. EUR/RC64/14. WHO Regional Office for Europe: Copenhagen. http://www.euro.who.int/_data/assets/pdf_file/0008/253727/64wd14e_FoodNutAP_140426.pdf.





FAO/AMI VITALE

Vegetables and low hanging fruit: Their role in increasing consumption of plant dietary components and phytonutrients for chronic disease prevention and health promotion

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Author statement: *The author declared not having any conflict of interest.*

The Work Programme of the UN Decade of Action on Nutrition, 2016-2025,¹ seeks to combat malnutrition in all its forms: undernutrition, vitamin and mineral deficiencies, overweight, obesity, and diet-related non-communicable diseases. One approach that has good potential to address all of these objectives is to enhance research to identify programmes for increasing the consumption of nutrient dense plant foods, fruits, vegetables, legumes and whole grains. The success of such an exploration will require focusing on a range of tactics to favourably influence factors that hamper and remedy shortfalls in the overall chain of supply of fruits and vegetables to communities and individuals. Experimentation with such tactics is warranted since the scientific literature is replete with evidence to support broad health benefits of increasing fruit and vegetable consumption.

Over the past two decades, epidemiological studies have shown a consistent inverse relationship between fruit and vegetable intake and all-cause mortality, and are the basis for the World Health Organization (WHO) recommendation for adults to consume at least 400 grams per day (five servings) of fruit and vegetable, above which mortality is not reduced further (WHO 2003). The conclusions from the body of science suggest that increased fruit and vegetable intake is protective against cardiovascular disease and cancer, as well as other chronic diseases (FAO 2003; Boeing et al. 2012; Majid et al. 2014; Wang et al. 2014). In the same timeframe, other epidemiological research has identified dietary patterns featuring an abundance and variety of plant foods as a common characteristic in populations that experience low risk for chronic disease and exceptional healthy longevity. The

Okinawan and Mediterranean style diets are two well-known examples. Interestingly, plant-based dietary patterns rich in fruits, vegetables, whole grains and legumes are a feature of these two demographics of healthy longevity, in addition to an active lifestyle and other health-promoting behaviours (WHO 2003). An emerging body of evidence in vitro and animal model systems has identified several mechanisms that are thought to play important roles in aging. The primary mechanistic pathways result in reduced oxidative stress, suppressed low-grade chronic inflammation and the induction of autophagy. Advances in the understanding of the biology of aging suggest that the origins of chronic disease may lie in the age-related decline in cell, tissue and organ function.

These two bodies of emerging research together suggest that age-related decline in cells, tissues and organs underlies the onset of many chronic diseases. Studies in animal models are consistent with this and suggest interventions that slow the rate of aging hold potential to reduce risk for chronic disease and promote health.

Plant foods appear to hold potential to promote health and function of different organ systems and thus assist in helping these systems work better longer. Green leafy vegetable consumption has been associated with improvements of heart rate variability measures, which may reduce the risk of cardiovascular disease through these favourable changes in cardiac autonomic function (Park et al. 2009). Strong inverse associations have been found between plant-based anthocyanin intake and age-related decline in lung function (Mehta et al. 2016). Increased fruit and vegetable intake has a positive impact on bone mineral density (deJonge et al. 2015), immune function as determined by antibody response to vaccination (Gibson et al. 2012) and weight change (Bertoia et al. 2015).

¹ See www.who.int/nutrition/decade-of-action/en.

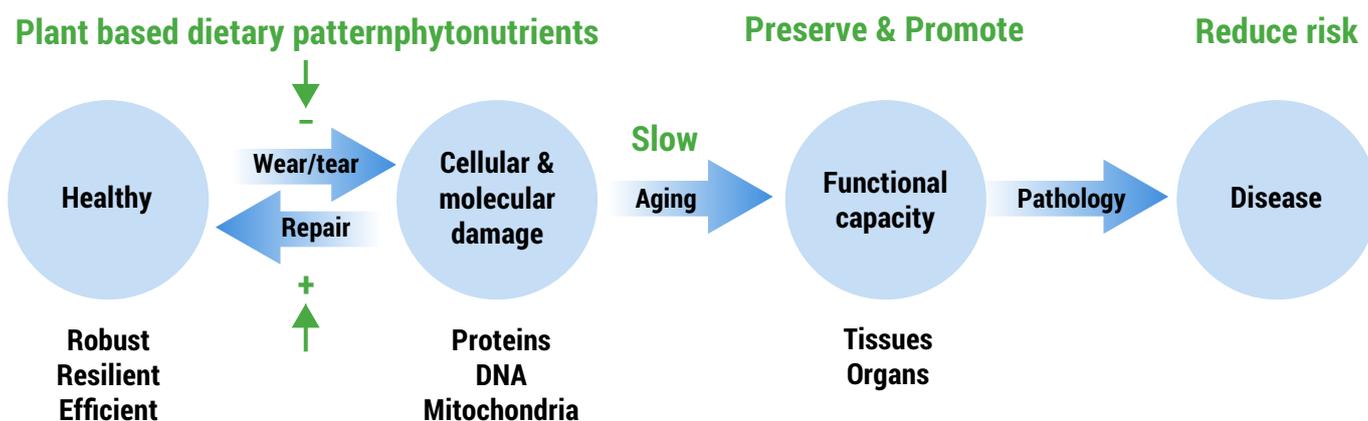
Despite the WHO recommendation for fruit and vegetable intake, and a variety of programmes to strengthen production, plant food supply chain and education, fewer than one out of four adults worldwide consume the WHO-recommended 400 g of fruits and vegetables per day (Murphy et al. 2014).

Fruits, vegetables, legumes and whole grains are unique sources of high fiber, vitamins and minerals that are essential for and promote healthy physiological function. In addition, plant foods are sources of thousands of natural chemicals called phytonutrients or phytochemicals. "Phyto" refers to the Greek word for plant. Phytonutrients function in plants in part to protect against infectious microbes and environmental stresses. Interestingly, research now shows that phytonutrients from plant foods perform similar beneficial

and protective functions in the human body (Sia and Liu 2014). The strengthened stress responses and protective functions are thought to be among the key mechanisms by which plant food rich diets confer reduced disease risk and health promotion (Figure 1).

The reasons for inadequate consumption of fruits and vegetables are many and complex. Research by the Food and Agriculture Organization of the United Nations (FAO) suggests that inadequate agricultural production may be a limiting factor in developing countries. In the developed world, other factors such as distribution systems and affordability may be limiting. Beyond these, improved education about dietary guidelines and training on how to prepare fruits and vegetables may also represent opportunities.

Figure 1. A MODEL FOR THE ROLE OF PHYTONUTRIENTS IN SLOWING AGING, PROMOTING HEALTH AND REDUCING RISK FOR CHRONIC DISEASE



Although a number of projects and interventions have been developed to increase fruit and vegetable intake, these have been focused primarily on the United States of America and the European Union (EU). Moreover, population-based intake assessments suggest that fruit and vegetable intake remains well below WHO recommendations, both within the United States and the EU. There is a need and opportunity for research in developing countries because the factors that limit availability and intake are likely culturally unique. Beyond different demographics, there is an emergent need for better methods for assessment of dietary intake that are adaptable across different cultural settings.

Evaluation of the evidence as a whole supports the role of plant-based dietary patterns in promoting health longevity and suggests that there is an opportunity to intercept individual health trajectories with a healthy plant-based dietary pattern to reach the ultimate goal of improved health and function throughout life. Research focused on elucidating the mechanisms by which plant food-based diets promote healthy longevity, increase health benefits and reduce chronic disease, is rapidly advancing on a clear trajectory that continues to strengthen the importance of advocating increased plant food consumption. This exciting frontier points to the vegetables and low-hanging fruit. Enhanced research and experimentation with programmes focused on improving consumption of these health promoting foods are welcomed during the Nutrition Decade.

References

Bertoia ML, Mukamal KJ, Cahill LE, Hou T, Ludwig DS, Mozaffarian D, Willett WC, Hu FB and Rimm EB (2015) Changes in Intake of Fruits and Vegetables and Weight Change in United States Men and Women Followed for Up to 24 Years: Analysis from Three Prospective Cohort Studies. *PLoS Medicine* 12(9): e1001878. <https://www.ncbi.nlm.nih.gov/pubmed/26394033>.

Boeing H, Bechthold A, Bub A, Ellinger S, Haller D, Kroke A, Leschik-Bonnet E, Müller MJ, Oberritter H, Schulze M, Stehle P and Wat B (2012) Critical review: vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition* 51(6):637–63. <https://www.ncbi.nlm.nih.gov/pubmed/22684631>.

FAO (Food and Agriculture Organization of the United Nations) (2003) *Increasing fruit and vegetable consumption becomes a global priority*. FAO: Rome. www.fao.org/english/newsroom/focus/2003/fruitveg1.htm.

Gibson A, Edgar JD, Neville CE, Gilchrist SECM, McKinley MC, Patterson CC, Young IS and Woodside JV (2012) Effect of fruit and vegetable consumption on immune function in older people: a randomized controlled trial. *American Journal of Clinical Nutrition* 96(6): 1429-36.

de Jonge EAL, Kiefte-de Jong JC, de Groot LCPGM, Voortman T, Schoufour JD, Zillikens MC, Hofman A, Uitterlinden AG, Franco OH and Rivadeneira F (2015) Development of a food group-based diet score and its association with bone mineral density in the elderly: The Rotterdam study. *Nutrients* 7(8): 6974–90.

Majid E, Lopez AD, Rodgers A, Vander Hoorn S and Murray CJL (2014) *Comparative quantification of health risks: global and regional burden of disease due to selected major risk factors*. World Health Organization (WHO): Geneva.

Mehta AJ, Cassidy A, Litonjua AA, Sparrow D, Vokonas P and Schwartz J (2016) Dietary anthocyanin intake and age-related decline in lung function: longitudinal findings from the VA Normative Aging Study. *American Journal of Clinical Nutrition* 103(2): 542-50. <https://www.ncbi.nlm.nih.gov/pubmed/26791184>.

Murphy MM, Barraj LM, Spungen JH, Herman DR and Randolph RK (2014) Global assessment of select phytonutrient intakes by level of fruit and vegetable consumption. *British Journal of Nutrition* 112(6): 1004-18. <https://www.ncbi.nlm.nih.gov/pubmed/25108700>.

Park SK, Tucker KL, O'Neill MS, Sparrow D, Vokonas PS, Hu H and Schwartz J (2009) Fruit, vegetable, and fish consumption and heart rate variability: the Veterans Administration Normative Aging Study. *American Journal of Clinical Nutrition* 89(3): 778–86. <http://ajcn.nutrition.org/content/89/3/778.long>.

Sia H and Liu D (2014) Dietary antiaging phytochemicals and mechanisms associated with prolonged survival. *Journal of Nutritional Biochemistry* 25(6): 581-91. <https://www.ncbi.nlm.nih.gov/pubmed/24742470>.

Wang X, Ouyang Y, Liu J, Zhu M, Zhao G, Bao W and Hu FB (2014) Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: Systematic review and dose-response meta-analysis of prospective cohort studies. *British Medical Journal* 349: g4490. <https://www.ncbi.nlm.nih.gov/pubmed/25073782>.

World Health Organization (WHO) (2003) *Diet, nutrition and the prevention of chronic diseases: Report of the joint WHO/FAO expert consultation*. WHO Technical Report Series, No. 916 (TRS 916). WHO: Geneva. www.who.int/dietphysicalactivity/fruit/en/index2.html.





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Action Area 6

STRENGTHENING GOVERNANCE AND ACCOUNTABILITY FOR NUTRITION

Progress in defining and promoting respect for human rights in the food and nutrition-relevant business sector

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INTRODUCTION

The UN Decade of Action on Nutrition 2016-2025 is a timely and welcome prospect that should advance the work to bring the human rights to adequate food and diet-related health firmly into global sustainable development efforts. The 2015 Sustainable Development Goals (SDGs) provide overall direction, specifically for food and health through Goal 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture) and Goal 3 (Ensure healthy lives and promote well-being for all at all ages) and their related specified targets. The Nutrition Decade offers an opportunity to also systematically establish links between these targets and human rights standards, aimed at providing a new drive to sustainable solutions through an explicit human rights based approach. When properly understood and operationalized, such an approach could strengthen evidence-based, norm-oriented policies, monitoring and accountability. This paper looks particularly at what it could mean for business enterprises to respect

rights established under international human rights law, with particular reference to implications for business enterprises in the food systems and their relevance to diet-related health. In parallel, the legally established obligations of states to protect their people against harm done by third parties, including business enterprises, demand more precise interpretations in this context.

The business connections were already reviewed in 2011 by Oshaug in SCN News No. 39, whose overall theme was “Nutrition and Business – How to engage?” Oshaug outlined the significance of the United Nations Human Rights Council’s adoption of the UN Guiding Principles on Business and Human Rights (UN 2011), as proposed by the United Nations Secretary-General’s Special Representative on Business and Human Rights, Professor John Ruggie. This chapter builds on Oshaug in exploring developments since his paper was published, especially as regards the emerging efforts to develop a reporting framework for businesses. The paper also draws attention to current work to interpret state obligations to respect, protect and fulfil

economic, social and cultural rights, including the rights to adequate food and health, in regard to business activities. Both efforts might give guidance to UNSCN in engaging in this matter through the Nutrition Decade.

NUTRITION AND THE UNITED NATIONS GUIDING PRINCIPLES ON BUSINESS AND HUMAN RIGHTS

The process of globalization has aroused heated debates on the impact of corporate activities on internationally established human rights. These include the human rights to adequate food and to the highest attainable standard of health. Access to adequate food is potentially impacted by many types of transnational companies or other enterprises along the food chain, from extractive industries (mining), timber industries, or industries buying up land for modern agricultural production (Pinstrup-Andersen and Watson 2011; Gaia Foundation 2014). All may lead to major agricultural and rural-urban transformations affecting vulnerable population groups' livelihood and consequently, also household food security, by undermining their opportunities to grow food or earn sufficiently to buy food for a healthy diet. Moving along the food chain from production towards processing and marketing of foodstuffs, the impact will be more directly on the quality and health dimensions of household food acquisitions for daily diets, with potential consequences for both undernutrition, obesity and associated non-communicable diet-related diseases (NCDs) such as heart disease, diabetes Type 2 and cancer (Swinburn et al. 2011). The food industry's contribution to unhealthy food environments is well known, with ultra-processed foods high in saturated fat and trans-fats, sugar and salt (HFSS foods) dominating food supplies in higher-income countries and rapidly increasing in low- and middle income countries (Monteiro et al. 2013). Well-documented links have been established between the marketing of these ultra-processed foods aimed at children, and the generation of unhealthy food behaviour and rising obesity among children worldwide (Cairns, Angus and Hastings 2009; WHO 2016).

Following an extensive discussion over several years, the United Nations Guiding Principles on Business and Human Rights (hereafter, the Guiding Principles) offer a set of guidelines for states and companies to prevent, address and remedy human rights abuses committed in business operations. They are based on three pillars: (i) the duty of the state to protect against harm caused by corporations; (ii) the responsibility of business enterprises to respect human

rights in their operations; (iii) and the responsibility of both the state and enterprises to establish effective remedies to bring violations to a halt and/or to compensate for human rights violations that may have occurred. Furthermore:

The Guiding Principles are grounded in recognition of

- (a) States' existing obligations to respect, protect and fulfil human rights and fundamental freedoms;
- (b) The role of business enterprises as specialized organs of society performing specialized functions, required to comply with all applicable laws and to respect human rights;
- (c) The need for rights and obligations to be matched to appropriate and effective remedies when breached.

(UN 2011, p. 1)

These general fundamental principles are further elaborated for all three pillars of the Guiding Principles. Business enterprises should respect all the rights established in the International Bill of Human Rights,¹ which also encompass the human right to food and health.² It should be highlighted, in particular, that with respect to the business pillar: *business enterprises may undertake other commitments or activities to support and promote human rights, which may contribute to the enjoyment of rights. But this does not offset a failure to respect human rights throughout their operations* (UN 2011, p. 13). This last sentence underlines the distinction between the requirement of general respect for human rights and the concept of "corporate social responsibility". The latter has often been interpreted by enterprises as do-good investing in schools, health facilities, and nutrition projects, or similar actions, independently of their own business practices that might have deep and continuing consequences for various civil, political, economic, social and cultural rights.

¹ The International Bill of Human Rights is the collective name for the Universal Declaration of Human Rights (UDHR 1948), the International Covenant on Civil and Political Rights (ICCPR 1966) and the International Covenant on Economic, Social and Cultural Rights (ICESCR 1966).

² These rights are established in ICESCR as Articles 11 on the Right to an adequate standard of living [...] including food, and Article 12 on the right to the highest attainable standard of health.

“DUE DILIGENCE” – A CHALLENGE FOR BUSINESS AND GOVERNMENTS

This section explores the concept of “due diligence”, which at one level is a normal practice in the business world for assessing internal and external processes for potential risk to their own business. In the context of the Guiding Principles, however, this refers to a human rights due diligence, or impact assessment, that should be required from states as part of their duty to protect (see below), and which the businesses should also commit themselves to do in order to demonstrate their respect for human rights.

In order to identify, prevent, mitigate and account for how they address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed...

(UN 2011, pp. 17-18)

When human rights due diligence are communicated as the Guiding Principles suggest, publicly available reports could be used as a tool to assess and rank to what extent businesses address their impacts on nutrition-related human rights throughout the value chain (UN 2011).

The specific interest here is, therefore, what due diligence would encompass to check negative impact – documented or potential – of any business operations on the human right to adequate food and diet-related health. This poses an imperative and a challenge to food security and public health nutrition specialists to define the nature of measurable risks to the enjoyment of adequate food and diet-related health, and to translate them into standards and thresholds that can be used in corresponding due diligence assessments. Defining human rights due diligence criteria in the food sector is in its infancy and should get high priority in the Nutrition Decade.

A research and action network based in Norway, *Food, Human Rights and Corporations* (FoHRC),³ has examined the above by considering in tandem the currently most commonly accepted standards of food security and diet-related health, and the best matching human rights standards as established in the International Bill of Human Rights and subsequent relevant human rights instruments.

Corporate activities in food production/land use, product composition, marketing of breastmilk substitutes and of HFSS foods to children are critical areas that relevant businesses should examine in human rights due diligence assessments, given the potential impacts on livelihoods, food security, nutrition and health. Solid standards to inform human rights due diligence processes are, however, lacking. They would have to be sought in, for example, existing or new understanding of nutrition-sensitive agriculture (UNSCN 2015), the range of international, regional and national food legislation (Eide and Eide 2016), the elements of the International Code of Marketing of Breastmilk Substitutes (WHO 1981) and the mounting documentation of unhealthy marketing of HFSS-foodstuffs directed to children and youth (Cairns, Angus and Hastings 2009; WHO 2010; WHO and EURO 2016). Many other documents, reports and articles, too numerous to be referred, add to the sources from which standards can be proposed and negotiated.

There is a logical potential for aligning these forthcoming standards that may be agreed, with core values of a human rights-based approach (HRBA). These imply *non-discrimination* in all forms, and respect for human dignity, participation and empowerment, which are to be enjoyed by all people as “rights-holders”. Furthermore, responsible actors as “duty-bearers”, should conduct operations and monitoring while ensuring *transparency*, showing *respect for the rule of law*, and demonstrating *accountability*.

It is to be seen how an integration and application of such a “double set” of international standards can give new momentum to the assessment of food security and nutrition impact in a human rights context. This can bring a new understanding of what and how to measure such impact, which then will encompass both *outcome indicators* (from food security and nutrition) and *process indicators* (from a HRBA as indicated above).⁴

³ See: <https://www.jus.uio.no/smr/english/research/projects/fohrc/>.

⁴ The origin of these core values of a HRBA to development issues is a list developed at a workshop at Stamford in 2003 of the UN Development Group (UNDG 2003), which FAO's Right to Food Unit (now Team) shortened and brought under the acronym PANTHER in 2006, see: <http://www.fao.org/righttofood/about-right-to-food/human-right-principles-panther/en/>.

THE UNITED NATIONS GUIDING PRINCIPLES REPORTING FRAMEWORK, 2015

The task is challenging and will take time and new learning, understanding and collaboration. The authors have found inspiration in an initiative building on the Guiding Principles: the “*UN Guiding Principles Reporting Framework*”, launched in 2015 (Shift and Mazars 2015) (hereafter, the Reporting Framework). This non-governmental organization (NGO) initiative by members of the team that developed the Guiding Principles, brings further insight into the requirements to human rights due diligence, with emphasis on possible harm done to people, not to the business. A few companies, including multinational food companies, are among early adopters of the Reporting Framework, which offers a new area for analysis and debate.⁵

In recognition of needed prioritization of human rights risks by businesses, the Reporting Framework introduces the concept of “salient” human rights issues, as defined by being “most severe”: i.e. based on how grave and how widespread the impact would be and how hard it would be to rectify the resulting harm.

The challenge in nutrition will be to document and defend the salience of some of the potentially most serious food security and nutrition impacts of operations by businesses throughout their value chains. Possible obstacles for establishing e.g. marketing of HSSF food to children as a salient human rights issue could be that the consequences (obesity and NCDs) are multi-factorial and manifest themselves over longer period of time, and the marketing might therefore not be perceived as an immediate human rights issue. Marketing of breast milk substitutes could have a better possibility as being established as a salient issue. At present, the early human right reports submitted by food industry actors under the Reporting Framework for the most part ignores food- and nutrition-related issues, with the exception of some attention to land and water rights. Researchers, educators and practitioners from food security/public health nutrition and human rights need to join forces in approaching this challenge in the Nutrition Decade as this work is only just emerging.

In the making: A “General Comment” on state obligations to protect human rights in the context of business activities from the United Nations Committee on Economic, Social and Cultural Rights

The question of the degree of salience of business harm to the right to adequate food and public health nutrition, is equally important to protective measures to be taken by states, including regulatory. A new “General Comment”⁶ on “State Obligations under the International Covenant on Economic, Social and Cultural Rights in the Context of Business Activities” is in preparation in the first half of 2017 by the United Nations Committee on Economic, Social and Cultural Rights (CESCR).⁷ This is another sign that the focus of business and human rights is entering more substantively in the implementation of Member States’ established duties to “respect, protect and fulfil” human rights, here with emphasis on their protective duties to help prevent harm to people from business. It is hoped that harm to the rights to food and health will get attention in the new General Comment, which can thereby become another useful reference document in the Nutrition Decade. A case in point is the marketing of unhealthy food products to children who must be protected from such manipulative activities through regulatory actions as obligations of the state.⁸

Growing interest in the Guiding Principles: The annual United Nations Forum on Business and Human Rights in Geneva

The Guiding Principles are attracting growing attention by states, civil society organizations, and increasingly also corporations. Several business enterprises appear to wish to demonstrate good human rights performance, recognizing that respect for human rights may in the end be good for business too. A demonstration of the broad interest is the

⁵ See: <http://www.ungreporting.org/about-us/support-and-users/#Companies>.

⁶ “General Comments” from the United Nations human rights treaty bodies (or convention committees) constitute these bodies’ interpretation of the content of specific rights under the respective human rights instruments that they are mandated to monitor, but which are formulated in very general terms. Thus, General Comment No. 12, or GC 12 from the UN Committee on Economic, Social and Cultural Rights (CESCR) in 1999 is referred to as one of the milestones in the United Nations’ interpretation of the right to food as a human right (CESCR 1999), followed in 2000 by General Comment No. 14 on the right to the highest attainable health (CESCR 2000), and in 2003 by General Comment No. 15 on the right to water (CESCR 2003), with many others following. Other human rights treaty bodies also issue general comments. In 2013, the UN Committee on the Rights of the Child (CRC) adopted its General Comment 15 on the right of the child to the enjoyment of the highest attainable standard of health and its General Comment No. 16 on state obligations regarding the impact of business on children’s rights (CRC 2013a and 2013b).

⁷ The UN Committee on ESCR held a Day of General Discussion on 21 February 2017 to discuss a first draft of the new General Comments, open to those interested also outside the United Nations.

⁸ FoHRC has suggested a small text addition to this end in the Draft General Comment.

Annual Forum on Business and Human Rights⁹ organised by the UN Working group on Business and Human Rights.¹⁰ The Working Group was established under the Human Rights Council in 2011 to guide the dissemination and implementation of the Guiding Principles.

Held in the Palais des Nations in Geneva over three full days, the Forum is the largest meeting point of different groups debating the practical application of the Guiding Principles, gathering participants from interested governments, NGOs, intergovernmental agencies and businesses, the latter increasingly at the CEO level, or business associations.¹¹ The Forum also offers space for NGO-organized side events to be included in the programme.

The Forum is one important context where the UNSCN can be active in the Nutrition Decade. The diversity of industrial enterprises from production to marketing and consumption, and the indirect impact that many non-food enterprises may have on livelihoods and food security were alluded to above. Hence, the food security and nutrition community may need to observe a broad range of relevant businesses from a nutrition and human rights perspective. The Annual UN Forum on Business and Human Rights can help actors within different sectors to grasp the larger picture in which their sector-based interests must be framed, whether within governments, civil society/academia or business. In the case of the food and health “sectors”, this work needs drivers from both the human rights/right to food and health side and the public health nutrition side, with mutual commitment and coordination on a systematic basis to give results. It requires that food security and public health nutrition advocates actively utilize new fora and opportunities not normally within their sphere of action.

A PARALLEL DEVELOPMENT – “THE TREATY PROCESS”

In 2014, a parallel process was triggered by resolutions¹² adopted by the Human Rights Council in June that year leading to the establishment of an Open-Ended Intergovernmental Working Group mandated “to elaborate an international legally binding instrument on transnational corporations

and other business enterprises with respect to human rights” – referred to as “the treaty process”. The difference is the intended binding nature of the envisaged treaty, compared with the voluntary nature of the Guiding Principles. In 2014, many industrialized states, being the home states of multinational corporations, opposed the proposal to adopt a binding treaty and signalled their preference to stick to the Guiding Principles. This caused some tension over the first two years; however, they are currently less marked since it is now understood that efforts towards implementing the Guiding Principles can also serve the content of a possible future binding treaty. Thus, the respective strength and potentials of the two instruments of “soft” vs. “hard” human rights law underlined constructive discussions at the last UN Forum on Business and Human Rights.

A BRIEF FLASHBACK AND A FORWARD-LOOKING CONCLUSION

Against a background of at times heated debates over the role of business involvement in various United Nations bodies and arrangements, thus also animated and sometimes difficult in the earlier UNSCN, the introduction of business in a human rights perspective has brought new and constructive inputs. Well-planned encounters and debate with interested business representatives, including under the auspices of the UNSCN, may lay the grounds for exchange on human rights and testing the seriousness of the businesses’ respect for human rights. The condition is that one succeeds in advancing the criteria for such respect, leveraged through human rights due diligence by both states and business, and open communication about findings and any needed changes in practice. At the same time, the increased attention and evolving guidance to how to handle conflicts of interest in nutrition programmes, notably from WHO (WHO 2015; WHO 2017)¹³ must steer all UNSCN interaction with business.

This paper began by highlighting the UN Decade of Action on Nutrition as an opportunity for further linking food security and nutrition with the international human rights and other legally based normative frameworks. The Nutrition Decade’s Work Programme¹⁴ is a first step towards achieving this.

9 See: <http://www.ohchr.org/EN/Issues/Business/Forum/Pages/2016ForumBHR.aspx>.

10 See: <http://www.ohchr.org/EN/Issues/Business/Pages/WGHRandtransnationalcorporationsandotherbusiness.aspx>.

11 Since the beginning of the Forum in 2012 to the Fifth Forum in November 2016, there were around 2,500 participants.

12 A/HRC/26/L.22/Rev1, A/HRC/26/L.1.

13 WHO (2017b) Personal information by F. Branca, Head of WHO Department of Nutrition for Health and Development, at an expert seminar organized by FoHRC and FIAN in Oslo on 24 April 2017, during his presentation on “Human rights protection and prevention of conflicts of interests are necessary for improved nutrition”.

14 United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme.

The Nutrition Decade provides an enabling environment such that national, regional and international policies and programmes respect, protect and fulfil 'the right of everyone to have access to safe, sufficient, and nutritious food, consistent with the right to adequate food, the fundamental right of everyone to be free from hunger consistent with the International Covenant on Economic, Social and Cultural Rights and other relevant United Nations instruments.

Beyond this overall promise there is only one token example in the Work Programme in regards to trade and investment for improved nutrition, which should *"not negatively impact the right to adequate food in other countries."* (United Nations Decade of Action on Nutrition (2016-2025), para. 40). Although the statement on trade and investment is very welcome, we call for commitments to human rights based action also in other areas important for food security and nutrition outcomes as the Work Programme is being implemented.

The Nutrition Decade's Work Programme is now available and there are great opportunities to anchor the work that will be carried out in a solid human rights framework. It should not be forgotten that the earlier SCN was one driver and vehicle in a critical phase, especially through its active Working Group on Nutrition, Ethics and Human Rights from the mid-nineties to the end of the first decade of the new millennium. When the SCN in its old version went through organizational and other pressures, human rights temporarily tended to lose ground in the process. It is time to review and redress what has been underutilized, by taking advantage of the new business and human rights interest, which also touches on one of the most sensitive areas regarding who should govern nutrition? The duty-bound state or another kind of state, or irresponsible business, or alternatively responsible business?

The UNSCN is and always was a United Nations-based institutional arrangement. Accordingly, it has, through its member agencies and Secretariat, the obligation to adhere to the United Nations Charter of 1945 where human rights was first laid down as one of the foundations for the new organization. Furthermore, it must direct its work in accordance with the constantly evolving United Nations human rights legal framework and institutions, together with several remarkable developments in some of the Specialized Agencies and other thematic bodies, notably FAO. The UNSCN is in a unique position to recall and revive the human

rights stance of its member agencies according to their field of responsibility, and in accordance with former Secretary-General Kofi Annan's United Nations Reform that started in 1997 and related developments that called for the United Nations human rights programme to extend throughout the United Nations System (UNGA 1997, especially paras. 79 and 200).

Although there is increased interest in business and human rights, the work to include nutrition in the framework proposed by the UN Guiding Principles for Business and Human Rights is still in its infancy. The authors and their FoHRC colleagues therefore invite UNSCN members and affiliates, and other colleagues in academia and civil society, to help set business and human rights in the food sector on the agenda of the UN Decade of Action on Nutrition. All these groups should work to help determine what should govern nutrition and strive towards an alignment of food security and nutrition standards with human rights standards, where governments, civil society and business will all eventually find their revitalized roles defined by duties, responsibilities and accountability. The United Nations thematic and human rights bodies should give direction, as necessary triggered and supported as earlier by United Nations friends in academia and civil society.

A special opportunity for the UNSCN should be its membership in the United Nations Interagency Task Force on the Prevention and Control of Noncommunicable Diseases, where nutrition will be a regular item led by the UNSCN, on the Task Force meeting agenda.¹⁵ As already mentioned the UNSCN has a rich history of building awareness on food security, nutrition and human rights among United Nations agencies through its former Working Group on Nutrition, Ethics and Human Rights, a task which should be revived and extended into the Nutrition Decade.

In conclusion, the UNSCN can fully play its harmonizing role in this context. There are many odds against a mainstreamed human rights-based approach in the world, including current and expected harsh resistance from some Member States. This should not make anyone shy away from the challenges and the opportunities in the coming nine-year perspective.

As acknowledged by Dr Oleg Chestnov in the foreword to [WHO's Ambition and Action in Nutrition 2016-2025](#), the 10 year strategy encourages the organization "to focus on what we do best and to engage in strategic collaboration where appropriate. It will also steer us to use human rights-based approaches and prevent conflicts of interest.

¹⁵ As decided by the Task Force in October 2016.

References

- Cairns G, Angus K and Hastings G (2009) *The extent, nature and effects of food promotion to children: a review of the evidence to December 2008*. Prepared for the World Health Organization. World Health Organization (WHO): Geneva. www.who.int/dietphysicalactivity/Evidence_Update_2009.pdf.
- Eide WB and Eide A (2016) Regulations under international human rights law and under EU law - Two different regimes that could be better harmonized? The case of food and health. *European Journal of Risk Regulation* 7(4): 728-32.
- Food, Human Rights and Corporations – FoHRC (2016). <https://www.jus.uio.no/smr/english/research/projects/fohrc/>.
- Gaia Foundation (2014) *UnderMining Agriculture. How the extractive industries threaten our food systems*. The Gaia Foundation: London. http://www.patagoniaalliance.org/wp-content/uploads/2014/09/undermining-agriculture_gaia_report_lowres.pdf.
- Monteiro CA, Moubarac JC, Cannon G, Ng SW and Popkin B (2013) Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews* (14): 21-8. <https://www.ncbi.nlm.nih.gov/pubmed/24102801>.
- Oshaug A (2011) The human right to adequate food: reflections on the engagement with the private sector. *SCN NEWS* (39): 98-100. www.unscn.org/en/resource-center/Unscn-news?idnews=1311.
- Pinstrup-Andersen P and Watson II DD (2011) *Food Policy for Developing Countries. The Role of Government in Global, National, and Local Food Systems*. Ithaca: Cornell University Press.
- Shift and Mazars (2015) *The UN Guiding Principles Reporting Framework*. www.ungpreporting.org/consult-the-reporting-framework/download-the-reporting-framework.
- Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie ML and Gortmaker SL (2011) The global obesity pandemic: shaped by global drivers and local environments. *Lancet* 378 (9793): 804-14.
- United Nations (UN) (2011) *Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework*. UN: New York. http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf.
- United Nations Committee on Economic, Social and Cultural Rights (CESCR) (1999) *General Comment No. 12: The Right to Adequate Food (Art. 11 of the Covenant)*. E/C.12/1999/5. CESCR: Geneva. www.refworld.org/docid/4538838c11.html.
- CESCR (2000) *General Comment No. 14: The Right to the Highest Attainable Standard of Health (Art. 12)*. E/C.12/2000/4. CESCR: Geneva. www.refworld.org/pdfid/4538838d0.pdf.
- CESCR (2003) *General Comment No. 15: The Right to Water (Arts. 11 and 12 of the Covenant)*. E/C.12/2002/11. CESCR: Geneva. www.refworld.org/docid/4538838d11.html.
- United Nations Committee on the Rights of the Child (CRC) (2013a) *General Comment No. 15: The right of the child to the enjoyment of the highest attainable standard of health (art. 24)*. CRC/C/GC/15. CRC: Geneva. www.refworld.org/docid/51ef9e134.html.
- CRC (2013b) *General comment No. 16: State obligations regarding the impact of the business sector on children's rights*. CRC/C/GC/16. CRC: Geneva. www.refworld.org/docid/51ef9cd24.html.
- United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.
- United Nations Development Group (UNDG) (2003) *The UN Statement of Common Understanding on Human Rights-Based Approaches to Development Cooperation and Programming (the Common Understanding)*. Adopted by the UNDG at Workshop on a Human Rights based Approach in the context of UN reform held at Stamford, Conn. on 3-5 May 2003. <http://hrbportal.org/the-human-rights-based-approach-to-development-cooperation-towards-a-common-understanding-among-un-agencies>.
- United Nations General Assembly (UNGA) (1997) *Renewing the United Nations: A programme for reform*. Report of the Secretary-General. U.N.Doc. A/51/950. UNGA: New York. www.globalpolicy.org/images/pdfs/renewing_the_united_nations.pdf.
- UN Standing Committee on Nutrition (UNSCN) (2015) *Changing Food Systems for Better Nutrition, SCN News 40* (several chapters). UNSCN. http://www.unscn.org/files/Publications/SCN_News/SCNNEWS40_final_high_res.pdf.
- World Health Organization (WHO) (1981) *International Code of Marketing of Breast-Milk Substitutes*. WHO: Geneva. www.who.int/nutrition/publications/infantfeeding/9241541601/en.
- WHO (2010) *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*. WHO: Geneva. http://apps.who.int/iris/bitstream/10665/44416/1/9789241500210_eng.pdf.
- WHO (2016) *Addressing and managing conflicts of interest in the planning and delivery of nutrition programmes at county level*. Technical Report. WHO: Geneva. <http://www.who.int/nutrition/publications/COI-report/en/>.
- WHO and Regional Office for Europe (EURO) (2016) *Tackling food marketing to children in a digital world: trans-disciplinary perspectives. Children's rights, evidence of impact, methodological challenges, regulatory options and policy implications for the WHO European Region*. WHO: Geneva. <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/publications/2016/tackling-food-marketing-to-children-in-a-digital-world-trans-disciplinary-perspectives-childrens-rights-evidence-of-impact-methodological-challenges-regulatory-options-and-policy-implications-for-the-who-european-region-2016>.
- WHO Ambition and Action in Nutrition 2016-2025 (2017). <http://www.who.int/nutrition/publications/nutrition-strategy-2016to2025/en/>.

As a contribution to the UN Decade of Action on Nutrition, UNSCN commissioned a paper on [Global Governance for Nutrition](#) to enable the wider nutrition community to better understand the role of UNSCN in the significantly evolved nutrition landscape.

A second paper [By 2030, end all forms of malnutrition and leave no one behind](#) was produced making the link between the global targets, the actions and the relevant actors working on nutrition to help provide clarity and streamline efforts.



A Closer Look

The United Nations Decade of Action on Nutrition: Accelerating actions from African countries on nutrition

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This article aims to provide an overview on what the Decade of Action on Nutrition means and how it is being operationalized in the African context. The Nutrition Decade is an opportunity for African countries to strengthen their policy and financial commitments while taking firm actions and making investments to fight all forms of malnutrition in the Agenda 2030.

National governments in Africa have demonstrated more and more sustained commitments in the fight against hunger and malnutrition in line with the 2030 Agenda for sustainable development. Nutrition is central to the African Union's Agenda 2063 (AU 2015) and the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods (AU 2014b) as well as the Declaration on Nutrition Security for Inclusive Economic Growth and Sustainable Development in Africa (AU 2014a). African leaders have committed to improving mutual accountability for actions and results and ending hunger and reducing stunting to 10% and underweight to below 5% by 2025.

The Nutrition Decade is an opportunity to support African countries to renew efforts towards eradicating hunger and preventing all forms of malnutrition. This is in accordance with the broad commitments made at the Second International Conference on Nutrition (ICN2) and as agreed in the 2030 Agenda for Sustainable Development. Through its operationalization,

the Nutrition Decade will offer an opportunity for countries to make specific, measurable, achievable, relevant and time-bound (SMART) commitments, to scale-up the realization of nutrition actions, to increase investments as well as implement policies and programs to improve food security and nutrition, and to promote mutual accountability at all levels to advance the global nutrition agenda by 2025.

Many activities are already under way at continental, regional and country levels in the context of the implementation of ICN2 outcomes:

At continental level, the 2016 ReSAKSS conference¹ on *achieving a nutrition revolution for Africa* (Ghana, October 2016) invited the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) to raise awareness among stakeholders on the Nutrition Decade and its implications for Africa. The side event "*Mutual accountability for achieving Nutrition commitments of Malabo Declaration, ICN2 and SDGs in Africa*" brought together more than 50 participants representing the African Union Commission, African Ministries of Agriculture, United Nations Agencies, United States Agency for International Development (USAID) and the Consortium of International Agricultural Research

¹ ReSAKSS stands for Regional Strategic Analysis and Knowledge Support System: <http://conference.resakss.org/>.

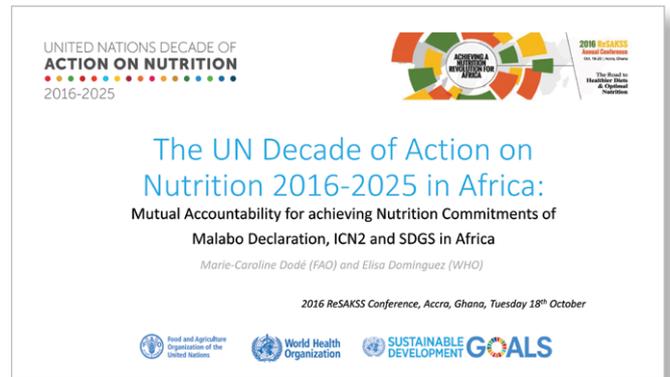
Centers (CGIAR), among others. Participants seized the opportunity of this side event to share perspectives on the role various stakeholders could play in the Nutrition Decade. The role of research as a provider of knowledge to strengthen evidence-informed decision-making was highlighted. Countries underlined the role of UN agencies and partners to provide more guidance on how to address sectoral and multisectoral challenges and design new models for action while ensuring financial and technical resources.

At regional level, during the mid-term review of the Nutrition Forum 2015 recommendations organized by the West African Health Organization (WAHO) (Guinea-Bissau, 15-17 November 2016), countries from the Economic Community of West African States (ECOWAS) took stock of the implementation of recommendations from previous ECOWAS Nutrition forum (Togo, November 2015). One of the recommendations made concerned the integration of nutrition indicators in national health information systems in order to support countries in improving accountability by tracking their progress on the World Health Assembly global nutrition targets and SDGs targets linked to nutrition (IFPRI 2016). The UN-Agencies under the leadership of FAO and UNICEF also organized the sub-regional consultation on repositioning nutrition for development in Central Africa. The consultation sought to reinforce multi-sectoral coordination on nutrition.

In addition, UNICEF jointly with the regional nutrition working group in West Africa launched on 9 November 2016 in Ouagadougou (Burkina Faso) the Global Nutrition Report for the region highlighting the need for country investment to mobilize domestic resources. Taking advantage of this regional event, Alive and Thrive and UNICEF launched a Lancet series on Breastfeeding, which led to a dialogue on the implications of both policies and programs in promoting breastfeeding in West African countries and steps that countries should implement in order to make effective efforts in implementing the Code on Marketing of Breastmilk substitutes.

The organization of a continental symposium in Africa in October 2017 organized jointly by WHO and FAO will constitute another step within the operationalization of the Nutrition Decade and will pave the way towards further acceleration of setting, tracking and achieving SMART commitments and actions on nutrition in Africa.

The Work Programme of the Nutrition Decade (2017) describes its aims, added value and guiding principles; key areas for priority actions (action areas); modalities of engagement and roles of Member States and other stakeholders; the tools for driving action (means of implementation); and accountability framework.



The nutrition Decade is focusing on a key component:

- **Commitments for action:** While many countries have already developed food and nutrition policies, they could raise the level of ambition, improve the design, focus on priorities for action, allocate additional resources and develop a road map with time-bound operational targets.

This component will be implemented through:

- **Evidence-informed advocacy activities:** generating evidence and strengthening data on effective nutrition interventions, policies and investments.
- **Convening platforms:** Conferences, summits and forums will help develop and drive the Nutrition Decade's Work Programme, provide an opportunity to recognize successes and voice challenges and obstacles and facilitate collaboration among all stakeholders.

In addition, UN system agencies and partnerships will assist countries to shape their own commitments and to call for adequate commitments from other stakeholders. FAO and WHO have prepared a resource guide to assist countries in translating the 60 recommendations of the ICN2 Framework for Action into country specific SMART commitments for action on nutrition, in line with the 2030 Agenda for Sustainable Development and various regional strategic frameworks. The Nutrition Decade is considering an accountability mechanism, under Member States oversight, to monitor implementation of these commitments.

References

African Union (AU) (2014a) *Declaration on Nutrition Security For Inclusive Economic Growth And Sustainable Development In Africa*. Assembly/AU/ /Decl.4 (XXII). www.g20ys.org/upload/auto/f20d5372b44d38f099213d39bad3d251f90369dc.pdf.

AU (2014b) *Malabo Declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods*. Doc. Assembly/AU/2 (XXIII). www.tralac.org/images/docs/5874/malabo-declaration-on-accelerated-agricultural-growth-and-transformation-adopted-june-2014.pdf.

AU (2015) *Agenda 2063. The Africa We Want*. www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf.

International Food Policy Research Institute (IFPRI) (2016) *Global Nutrition Report. From Promise to Impact. Ending malnutrition by 2030*. IFPRI: Washington DC. <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/130354/filename/130565.pdf>.

United Nations Decade of Action on Nutrition (2016-2025) (2017). *Work Programme*. www.unscn.org/uploads/web/news/Work-Programme_UN-Decade-of-Action-on-Nutrition-20170517.pdf.





FAO/GIUSEPPE BIZZARRI

Improved governance for nutrition reduces stunting among indigenous Adivasi children in Maharashtra, India

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India is considered a success story in terms of economic growth. However, this economic performance has left behind the country's indigenous peoples, who, although identified by the Constitution as Scheduled Tribes, they prefer the name Adivasi ("original inhabitants"). Adivasi represent 8.6 per cent (104 million) of India's population but account for 23 per cent of child deaths and 25 per cent of the extremely poor; an estimated 50 per cent are in India's lowest wealth quintile (IIPS and Macro International 2007; Das, Kapoor and Nikitin 2010; Das et al. 2011; Chandramouli 2013).

India's high levels of child undernutrition are a stark marker of the country's unequitable economic growth. They also reflect persistently higher nutrition deprivation among Adivasi children. Data collected a decade ago indicated that 27.6 per cent of Adivasi children aged 0-59 months were wasted, 53.9 per cent were stunted and 76.8 per cent were anaemic compared to 19.0 per cent, 47.4 per cent and 68.7 per cent, respectively for non-Adivasi children (i.e. up to 45 per cent higher) (IIPS and Macro International 2007).

MAHARASHTRA: NUTRITION AND ADIVASI CHILDREN

The state of Maharashtra – India's second most populous – is home to 12.8 million Adivasi who represent 9.4 per cent of the state's population (Census 2011). In 2005, the poor nutrition situation of Maharashtra's Adivasi children grabbed public

attention when the media reported that 718 children, 96 per cent of them Adivasi, had died due to undernutrition in the Thane region (Ramani 2011).

The worrisome nutrition situation of Adivasi children in the state of Maharashtra was confirmed by India's 2005-2006 National Family Health Survey, which indicated that 57.8 per cent of children aged 0-59 months were stunted (compared to 44.6 per cent among non-Adivasi) and 30.0 per cent were severely stunted (compared to 17.5 per cent among non-Adivasi) due to chronic nutrition deprivation (IIPS and Macro International 2007).

In view of this situation, a group of social activists filed a public interest litigation before the Mumbai High Court. The Court directed the State Government to establish a High-Level Commission comprising state government, development partners, academia and civil society representatives to advise the State Government on the way forward to address the nutrition situation of Adivasi children in Maharashtra.

The Commission recommended the creation of the State Nutrition Mission as an autonomous body under the chairmanship of the State Chief Minister, headed by a senior government official of the rank of Principal Secretary, comprising a team of hand-picked professionals with a proven record in managing successfully large-scale programmes, and mandated to coordinate interdepartmental efforts to reduce child undernutrition in the five districts with the largest Adivasi population: Amravati, Gadchiroli, Nandurbar, Nasik and Thane.

MAHARASHTRA: THE STATE NUTRITION MISSION

The State Nutrition Mission was constituted in 2005. In the first two years (2005-2007) of its initial five-year phase, its work focused on improving the coverage and quality of the services delivered by the Integrated Child Development Services (ICDS) and the National Rural Health Mission (NRHM), the state flagship programmes for child nutrition, health and development. Priority was given to fill the staff vacancies in these programmes, particularly community workers and supervisors, and improve the knowledge, skills and motivation of these frontline workers to provide counselling, support and services to pregnant women and mothers of young children aged 0-35 months, particularly through home visits. In addition, incentives were provided to medical officers and nurses who accepted to serve in Adivasi communities.

All children under six years of age were registered at their doorstep. Children's weight was monitored monthly at the village anganwadi centre, the delivery point of ICDS services, where mothers were counselled on how to feed their young children. All underweight children were tracked and followed by the anganwadi workers. Three performance indicators were monitored monthly at every anganwadi centre: (i) coverage: proportion of eligible children registered at the anganwadi centre; (ii) weighing efficiency: proportion of children registered at the anganwadi centre whose weight was monitored in a given month; and (iii) prevalence of undernutrition: proportion of children underweight.

The information generated at each anganwadi centre's monthly review was consolidated by village, block and district, and shared with the State Nutrition Mission. The Mission ranked the villages and blocks based on their performance on the three indicators: those with a low coverage, low efficiency and high prevalence of child underweight were given priority attention, and the Mission coordinated a rapid response by the state flagship programmes for children. By 2007, programme coverage in the five districts increased from 48 to 88 per cent and weighing efficiency improved from 39 to 86 per cent.

Encouraged by these positive results, the scope of the State Nutrition Mission was extended in 2007-2009 to an additional ten districts where Adivasi represented at least 40 per cent of the population. Finally, in 2009-2010, the mandate of the Mission was extended to cover all the rural and tribal blocks across Maharashtra's 33 districts. After completing its first phase (2006-2010), the State Chief Minister renewed the mandate of the Mission for a second five-year phase (2011-2015), with the instruction to prioritize improvements in the nutrition situation of children under two years of age, particularly among Adivasi

and other vulnerable population groups. The Mission's new focus on children under two was in line with global evidence that 1,000 days from conception to age two was central as the window of opportunity to prevent child undernutrition (Black et al. 2008).

MAHARASHTRA: BETTER RESULTS FOR ADIVASI CHILDREN

In 2012, the Government of Maharashtra commissioned the first independent state nutrition survey to assess progress and identify priority areas for action. Data was collected between February and May 2012. The survey was implemented by the International Institute for Population Studies, which had led the three Demographic and Health Survey rounds in India (1992-2005) and included a representative sample of children aged 0-23 months from the six administrative divisions of the state. A selection of primary sampling units was drawn separately for urban, rural and Adivasi areas applying probability proportional to size sampling followed by systematic random sampling. Full details of the survey methodology are described elsewhere (IIPS 2012).

The findings of the survey indicated that the prevalence of stunting (height-for-age z-score < -2) in children under two declined from 38.6 per cent in 2006 to 23.3 per cent in 2012, i.e. a 15.3 percent point decline over a six-year period, with an average annual rate of reduction (AARR) of 2.6, which compares favourably with the AARR of ~ -0.5 until 2005 (UNICEF 2014). Furthermore, the prevalence of severe stunting (height-for-age z-score < -3) decreased from 14.5 per cent in 2006 to 7.7 per cent in 2012, i.e. a 6.8 percent point decline and an AARR of 1.1.

Importantly, the decline in the prevalence of stunting was significantly more pronounced among Adivasi children than among non-Adivasi children. From 2006 to 2012, the prevalence of stunting among Adivasi children declined from 53.3 to 30.6 per cent (i.e. a 22.7 percent point decrease with an AARR of 3.8), and from 36.6 to 22.1 per cent among non-Adivasi children (i.e. a 14.5 percent point decrease with an AARR of 2.4) ($p < 0.01$). Similarly, over the same period, the prevalence of severe stunting among Adivasi children declined from 29.3 to 12.4 per cent (i.e. a 16.9 percent point decrease with an AARR of 2.8) and from 12.4 to 7.0 among non-Adivasi children (i.e. a 5.4 percent point decrease with an AARR of 0.9) ($p < 0.01$). Similar trends were observed for the prevalence of wasting (weight-for-height z-score < -2) and underweight (weight-for-age z-score < -2).

Preliminary findings from India's National Family Health Survey 2015-2016 (Ministry of Health and Family Welfare 2016) in Maharashtra confirm that the prevalence of stunting in children under five declined from 46.3 per cent in 2006 to 34.4 per cent in 2016, i.e. a 25.7 percent decline over a ten-year period. NFHS-4 data on the prevalence of stunting among Adivasi and non-Adivasi children and/or by socio-economic group will be available at the time of the release of the survey's final report expected before the end of 2017.

MAHARASHTRA: LESSONS LEARNED

The State Nutrition Mission has been a key policy instrument in accelerating the reduction of child stunting in Maharashtra. Findings from a multidisciplinary analysis on the drivers of the decline of stunting in Maharashtra indicated that the vision and skills of the Nutrition Mission's leadership and staff allowed for much progress, from maintaining political impetus and focus to motivating frontline workers to deliver better quality services at greater scale (Haddad et al. 2014).

Our analysis shows that the decline of child stunting in Maharashtra was broad-based and pro-Adivasi, indicating that the Mission's efforts to improve governance for nutrition led to greater social inclusion and equity. The main lessons learned are drawn from the Mission's focus on scaling up proven interventions and strengthening leadership, coordination, coverage, quality, equity, and accountability for nutrition results:

- **Leadership and coordination:** Under the leadership of the State Chief Minister, the Mission's coordination and review mechanism strengthened inter-sectoral convergence to achieve nutrition results for children, particularly among the most vulnerable populations.
- **Coverage with quality:** State flagship programmes for children gave priority to expanding the coverage and quality of services by: (i) filling exiting vacancies; (ii) improving the skills and motivation of frontline workers; and (iii) bringing effective interventions closer to children, particularly through home visits.
- **Equity for impact:** The most vulnerable children and women were be prioritized to achieve greater equity and impact through special plans for districts with a high concentration of Adivasi children.
- **Measurement for accountability:** Effective mother-child tracking mechanisms and programme monitoring and surveillance systems were set up, including independent nutrition surveys, to assess progress, prioritize interventions and allocate resources.

Despite the challenge ahead – 34.4 per cent of children under five in the state have stunted growth - Maharashtra is showing that improved governance for nutrition can achieve broad-based results and greater social inclusion and equity.

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References

- Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, Mathers C and Rivera J for the Maternal and Child Undernutrition Study Group (2008) Maternal and child undernutrition: Global and regional exposures and health consequences. *Lancet* 371(9608): 243-60. <https://www.ncbi.nlm.nih.gov/pubmed/18207566>.
- Chandramouli C (2013) *Scheduled tribes in India as revealed in Census 2011*. Ministry of Tribal Affairs, Government of India. <http://tribal.nic.in/writereaddata/AnnualReport/ScheduledTribesinIndiaasRevealedinCensus2011.pdf>.
- Das MB, Hall G, Kapoor S and Nikitin D (2011) *India's Adivasis. Indigenous peoples*. Country briefs Series. World Bank Group: Washington DC.
- Das MB, Kapoor S and Nikitin D (2010) *A closer look at child mortality among Adivasis in India*. Policy Research Working Paper 5231. World Bank Group: Washington DC. <http://sa.indiaenvironmentportal.org.in/files/A%20Closer%20Look%20at%20Child%20Mortality.pdf>
- Haddad L, Nisbett N, Barnett I and Valli E (2014) *Maharashtra's child stunting declines: what is driving them? Findings from a multidisciplinary analysis*. Institute of Development Studies: Brighton. <http://www.ids.ac.uk/publication/maharashtra-child-stunting-declines-what-is-driving-them-findings-of-a-multidisciplinary-analysis>.
- International Institute for Population Sciences (IIPS) (2012) *Comprehensive Nutrition Survey in Maharashtra*. IIPS: Mumbai.
- IIPS and Macro International (2007) *National Family Health Survey (NFHS-3), 2005-2006*. IIPS: Mumbai.
- Ministry of Health and Family Welfare, Government of India (2016) *National Family Health Survey 2015-2016*. IIPS: Mumbai.
- Ramani V (2011) *Making a difference. The Mission approach to reducing child malnutrition. The experience of the Rajmata Jijau Mother-Child Health and Nutrition Mission (2005-2010)*. Aurangabad, India. <http://www.mahnm.in/static/library/d94989fe-1461-5e3a-ab7a-d21944b059ae.pdf>
- United Nations Children's Fund (UNICEF) Regional Office for South Asia (2014). *The smart start for child growth and development*. UNICEF Regional Office for South Asia: Kathmandu.



FAO/PRECIOUS N. CHITEMBWE

Building confidence for peace with nutrition-sensitive food systems, a Colombian experience

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For more than half a century, Colombia has suffered the consequences of an internal armed conflict that has affected agricultural production and commercialization, environmental integrity and the food security of communities caught in the crossfire, in particular indigenous communities.¹ The 2016 Peace Agreement between the Colombian Government and the Revolutionary Armed Forces of Colombia (FARC) offers a rare opportunity to reverse decades of neglect of smallholder food systems that has left many communities with high vulnerability and risk of food and nutrition insecurity. Statistics reveal an alarming situation within the most vulnerable of the population, and malnutrition in all its forms is worse in IDP and ethnic communities. Almost 90 percent of indigenous children under five suffer from chronic malnutrition in the Pacific Coast, and 60 per cent in the south and north of the country are chronically malnourished (WFP 2017).

More than 3.4 million women are officially registered as victims of the conflict and 7.2 million small producers live in situations of poverty or extreme poverty (Perry 2010). This situation has created enormous inequality, reaching a value of 0.711 on the Human Development Index (UNDP 2014). Further, its impact is even more severe within certain ethnic groups (Government of Colombia 2010). Indigenous peoples have seen a serious deterioration in their nutritional status, as evidenced by an increase in overall malnutrition as well as in rates of chronic malnutrition. Finally, children in rural zones abandon school due to inefficient consumption of nutritious food (UNICEF and CEPAL 2006) and are an easy

target for dissident illegal groups. These groups push them to take part in combat or to produce illicit drugs.

The prevalence of chronic malnutrition in indigenous communities is more than double the overall national rate of 13.2 per cent. Similarly, in the coastal Atlantic and Pacific regions and in rural Colombia, the rate is twice as high as it is in urban areas. The Government of Colombia has worked to improve Food Security and Nutrition (FSN) through the design of policies that aid in the provision of food and made a formal commitment through an official policy document. The FSN policy has been designed so that all Colombians have continued access to sufficient quantities of a variety of high quality, safe and nutritious food (Government of Colombia 2007). In addition, the Government advocates for differential approaches to reach indigenous peoples in the most appropriate manner possible. One of the Government's approaches is the School Meals Programme. However, more than nine years after the policy came into effect, unsustainable production systems, limited commercial opportunities, and poor access to nutritious foods, particularly for indigenous and Afro-descendant peoples and other victims of the conflict, have hindered progress towards the realization of the right to food for all Colombians. Many indigenous communities do not receive the stipulated entitlement or nutritious foods based on local diets.

The lack of varied diets, and deficiencies in caloric and micronutrient intake for ethnic families contrasts markedly with the foods available in the same rural zones where smallholder farmers produce 75 per cent of the food consumed by 48 million Colombians. This production also generates 50 per cent of rural employment. The incomes of most smallholder producers is insufficient to create conditions

¹ Instituto Nacional de Salud (National Health Institute) (2016) Sivigila. <http://portalsivigila.ins.gov.co/sivigila/index.php>.

to improve production potential or their own food security. This financial shortfall adds to existing vulnerabilities, and many producers may be obligated to turn to illicit crops in order to supplement their income.

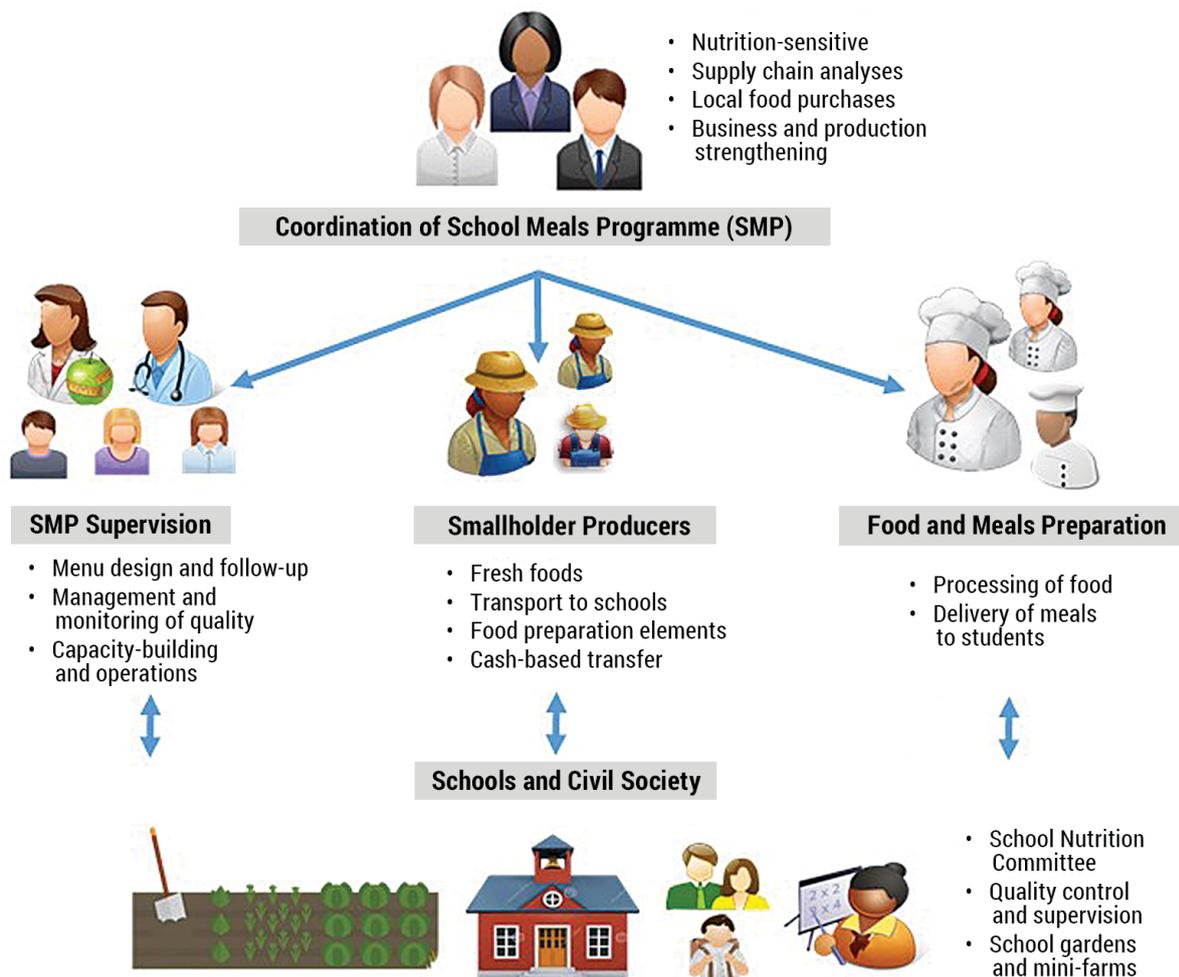
Unstable local markets further undermine food insecurity as products flow to larger urban centres via a range of intermediaries, which increases prices for consumers and lowers profits for the smallholder producer. Moreover, ancestral and traditional production methods have given way to modern production models, resulting in the unsustainable use of soils and a dependency upon agrochemicals. This creates inefficient value chains and a negative effect on FSN and environmental sustainability throughout the country.

Despite this situation, there are success stories in the development of FSN policies in Colombia, for example, social programmes that bring food to people who need it most. The Ministry of Education has a vested interest in keeping

children and youths in school. Part of their strategy is to provide students with access to nutritious food during their days at school, and also create healthy eating habits through the provision of complementary meals under Resolution 24371 (Government of Colombia 2016).

In 2011, the Ministry of Education developed a decentralized School Meals Programme model, giving full autonomy and responsibility to local governments to implement the Resolution; however, this authority is not, in general, accompanied by cost-effective implementation models or the development of local capacities for the monitoring and control of the programme. The Departments of Putumayo, La Guajira, Chocó and Caquetá in particular have had difficulty in addressing the needs of students who live in vulnerable situations. In such cases, World Food Programme (WFP) has brought technical assistance to develop innovative models that tend to the nutritional needs of students from both rural and urban areas.

Figure 1. INNOVATIVE MODEL OF SCHOOL MEALS PROGRAMME



WFP is working to support the development of new implementation models and to link the demand from schools with the production from smallholder producers (WFP 2017). Concurrently, WFP helps to develop the capacities of local governments, creating a shared responsibility among community members, parents and local authorities, strengthening community solidarity, governance and citizen participation, all of which are crucial elements in peace building. WFP's development of inclusive, cost-effective and innovative models is leading to more diversified diets and the promotion of healthy lifestyles for students of all ages. In addition, rural economies are strengthened and confidence built for the future.

An interesting example is Putumayo, in the south of the country. This department was severely affected by armed conflict and the cultivation of illicit crops, and children were at risk of recruitment. The department developed a model to strengthen their school nutritional programmes with the primary objective of preventing students from dropping out of school or being recruited to take part in illicit activities. The programme with WFP's support reached 56 boarding schools and approximately 8,000 students. During 2015 and 2016, results included the creation of diversified diets and healthy lifestyles for these students, and self-sufficiency of supply through school gardens and mini-farms.

Further north, in Caquetá, another department was severely affected by conflict, WFP has provided assistance to implement a model that led to the strengthening of nutrition for more than 24,000 students at 64 day schools and 24 boarding schools. In addition to preventing child recruitment, this model has increased capacities within the local government, including through the strengthening of value chains and the role of women as both producers and as service providers for the provision of foods to schools.

Within the two models, supply value chains were strengthened, linking more than 2,000 smallholder producers with the School Meals Programme and improving the nutritional value of the meals, while increasing income for producers as well as their capacity to supply food of higher nutritional value. Importantly, the two models supported by WFP helped to significantly improve diets and local economies. Students saw a daily caloric increase of 600 Kcal/day and a more diversified diet through the consumption of a variety of fruits, vegetables, legumes, cereals, milk products, eggs and meat. In addition, this has led to a decline in school dropouts and in rates of recruitment by illegal armed actors.

The participation of rural women has been fundamental in the School Meals Programme. Approximately 48 per cent of the smallholder producers providing food are women. The production of fresh produce, fruits, milk products, eggs and chicken has been led by rural women with their garden plots and mini-farms in the vicinity of schools in the School Meals Programme. Additionally, there has been an improvement in the quality of meals by including traditional food products such as quinoa, legumes, and local, native tropical fruits from the Colombian Amazon. The provision of these traditional foods has been accompanied by a recovery of ancestral production methods, which has lessened impacts on the environment and natural resources, and reduced the use of agrochemicals in the production stage.

The strengthening of food systems is an important tool for improving governance and peace-building at the local level. Through the implementation of innovative models for school meal programmes, local members of civil society become involved in implementation processes, oversight and control. Second, local governments have improved their capacity to implement social programmes and improved their proficiency in financial accounting, mobilization of resources and the quality of provision of services to the community. Women, in addition to producing food for the schools, have established themselves as primary players in preparing and delivering healthy, high quality school meals for the programme. Finally, the schools have seen the school meal programme model as an opportunity to improve educational services together with the students' nutrition. At the same time, students learn about what is involved in producing legal crops, where their food comes from, and how to produce high quality nutritious food right from their own gardens. These experiences demonstrate the positive impact that community-based actions can have on nutrition, rural economies, educational attainment and peace-building.

Figure 2. PRE-SCHOOL CHILDREN IN FLORENCIA CAQUETÁ ENJOYING A LOCALLY PRODUCED MEAL AS PART OF THE SCHOOL MEALS PROGRAMME



References

Government of Colombia (2007) Document of the Economic and Social Policy Committee, Conpes-social 113. National Policy on Food Security and Nutrition (PSAN). <https://www.minsalud.gov.co/Documentos%20y%20Publicaciones/POL%C3%8DTICA%20NACIONAL%20DE%20SEGURIDAD%20ALIMENTARIA%20Y%20NUTRICIONAL.pdf>.

Government of Colombia (2010) *National Nutrition Survey for Colombia* (ENSIN). Colombia Ministry of Social Protection (PS) and Colombian Institute for Family Wellbeing (ICBF): Sucre. www.javeriana.edu.co/documents/245769/3025871/Resumen_Ejecutivo_ENSIN_2010.pdf/160e9856-006d-4a60-9da3-d71606703609.

Government of Colombia (2016) *Administrative-technical guidelines, standards and minimum conditions of the School Feeding Programme*. 30 December 2016. Resolution 24371 of the Ministry of National Education (MEN).

Perry S (2010). *La Pobreza rural en Colombia* (Rural poverty in Colombia). Documento preparado para ser distribuido en la reunión de conformación del Grupo de Trabajo sobre Pobreza Rural. Centro Latinoamericano Para El Desarrollo Rural (RIMISP): Bogotá. http://www.rimisp.org/wp-content/files_mf/1366386291DocumentoDiagnosticoColombia.pdf.

United Nations Children's Fund (UNICEF) and Economic Commission for Latin America (CEPAL) (2006) *Challenges, Bulletin of Infancy and adolescence on advances toward Millennium development objectives*. CEPAL/UNICEF: Santiago. [www.unicef.org/lac/Desafiosnutricion\(13\).pdf](http://www.unicef.org/lac/Desafiosnutricion(13).pdf).

United Nations Development Programme (UNDP) (2014) *Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. UNDP: New York. www.undp.org/content/undp/es/home/librarypage/hdr/2014-human-development-report.html.

World Food Programme (WFP) (2017) *Colombia Country Strategic Plan (2017-2021)*. <http://www1.wfp.org/operations/na-colombia-country-strategic-plan-2017-2021>.



Group dynamics in urban food systems: Implications for nutrition governance

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ABSTRACT

Based on a fieldwork in the city of Mumbai in India, it has been observed that due to identity-driven factors, some groups remain disadvantaged within the food system. This occurs due to group difference in the entitlement relations or the relationship between the group's endowment and its exchange options, which in turn is mediated by group members' religious or locational identity. Thus, some sort of group dynamics is necessarily inherent within urban food systems, which can be analysed through the entitlement approach, proposed by Amartya Sen (1981). It is concluded that policy interventions designed to expand individual capabilities, such as nutrition security, would need to be preceded by an analysis of his or her entitlements, including in relation to his or her group affiliations.

INTRODUCTION

Although socio-economic inequality in malnutrition has been studied extensively (Garcia 2012; Kumar, Kumari and Singh 2015), the focus here is primarily on vertical (income) inequality. The urban poor, however, is not a homogeneous category (Sen 1981), especially when seen horizontally. At similar levels of income poverty, non-income dimensions of deprivation such as nutrition may vary significantly among the poor, delineated along lines of caste, religion, location and so on. The consequent group dynamics is likely to be more prominent in the urban context, due to the inherently greater population and cultural diversity in urban areas, which attract populations from varying contexts in search of growth and livelihoods. As such, it is important to consider a

group perspective to understand why a certain group within the poor is relatively better off or why it is able to escape extreme misery over time, while several others may remain entrapped. As would be shown later in this paper, this leads to question the role of local governance towards food and nutrition security in urban areas. The role of municipalities in urban nutrition governance and food planning is well recognized today (FAO 2014). However, in developing countries like India, urban food and nutrition security is yet to become a prominent issue and is conspicuous by its absence on the agenda of urban local governance despite its importance. By disentangling the inter-group disparity in malnutrition, this paper brings forth the critical role of municipalities in food and nutrition security in urban areas and provides important lessons for urban nutrition governance.

Drawing upon fieldwork conducted in Mumbai (Maharashtra, India) in 2009-2010, this paper deals with child malnutrition in four population settlements (see table 1). Data collection was carried out using a mixed-method approach. A primary survey using a structured questionnaire on 86 children was conducted in the slum of Chamunda Nagar. This was designed to capture households' child health and nutrition practices. A review of the children's health cards issued by primary health centres proved helpful in this regard. Child nutrition data for the slum of Rafi Nagar was obtained from the non-government organization Apnalaya; the Integrated Child Development Services (ICDS) Centre provided nutrition data for Chikuwadi and Padma Nagar. The second major set of data comprised individual and focus group interviews conducted in each of the four spatial clusters. Individual interviewees included: (i) key representatives from two NGOs, Apnalaya and Social Action for Literacy and Health (SALAH); (ii) community leaders from each of the four settlements;

(iii) a group of women from the reproductive age group in each slum; (iv) doctors and medical staff in Primary Health Centres (PHCs); and (v) a concerned functionary from the respective ward offices of the Greater Mumbai Municipal Corporation. Focus group interviews in each of the four slums involved women of the reproductive age group (14 years and above) as well as men of the age group of 15 years and above. This paper revisits the status in studied slums through a review

of more recent evidences, particularly observations by the civil society. The objective of this intensive field study has been to capture how group affiliation has resulted into perpetual nutritional deprivation for some groups as compared to others, despite having similar initial endowments. It further analyses the pathways of how local government and public transfer facilitate or constrain upward inter-generation mobility of population groups in Mumbai.

Table 1. CHARACTERISTICS OF THE FOUR SLUM SETTLEMENTS

Sub-urban area	Name of settlements	Number of households	Community characteristics	Years of existence	Place of origin	Initial occupation	Property ownership
Govandi	Rafi Nagar	455	Illegal Muslim migrants	20-25	Neighbouring nation of Bangladesh	Unskilled labourer	Nil
	Padma Nagar	898	Muslims	30-32	Other parts of the state and country	Unskilled labourer	Negligible
Mankhurd	Mankhurd Chikuwadi	635	Hindu Marathas	40-42	Other parts of the state	Unskilled labourer	Negligible
Bhadup	Chamunda Nagar	130	Hindu (socially backward class)	15-18	North India (Uttar Pradesh)	Unskilled labourer	Negligible at rural home

Dealing with such group differentials in (basic) capabilities (e.g. nutrition) necessitates entitlement analysis of vulnerable groups (Sen 1981). Sen (1981) describes entitlement as the set of all possible combinations of goods and services that an individual can legally obtain using the resources from his or her endowments based on means of production, labour, trade and/or exchange (Osmani 1993). However, he recognizes that the notion is unclear to some extent, particularly in transitional contexts where informal considerations based on social beliefs and attitudes towards certain groups take precedence over formal provisions, and constrain these groups' access to legal entitlements. This has also been observed in carrying out this study.

OPERATIONALIZING THE ENTITLEMENT FRAMEWORK

The four slum groups have unique identities and social positioning, although there are overlaps. First, except for the Chikuwadi slum, all remaining three are informal settlements, i.e. not notified by the Greater Mumbai Municipal Corporation (BMC). Second, Chamunda Nagar is mainly populated by migrants pushed out of their villages in North India. Beginning with a few hut settlements, this slum now inhabits 130 such households. Third, both Rafi Nagar and Padma Nagar slums are inhabited by Muslim minority community. Finally, Rafi Nagar is inhabited by

allegedly illegal in-migrants from the neighbouring nation of Bangladesh. As would subsequently be observed, these characteristics or identities manifest into unique group dynamics for the slums.

Transforming labour – differential opportunities for individual endowment

At the beginning of their settlements, all of the four slums shared a similar endowment basket, i.e. of unskilled and illiterate labour. The difference between them lies in the differential degree of assimilation of these groups in their local environment. This is an important factor given that the youngest of the four slums was established nearly 15 years ago, a duration long enough for social and institutional assimilation. Rafi Nagar and Chamunda Nagar remain completely alienated from the local environments, whereas Padma Nagar appears to be partially assimilated. Cheevadi, however, has been able to assimilate holistically in the city. The focus group discussions seem to attribute this contrast to varying social, cultural and political backdrops in Mumbai corresponding to emergence of these slums. Chikuwadi, the oldest among the four slums, grew at a time when urban space and resources were not a constraint and, therefore, both administrative and cultural sentiments towards migrants were not hostile. In fact, attempts were made to mainstream the slum in terms of education and to provide housing support, which proved helpful. In addition, Chikuwadi also benefitted from a public establishment in the vicinity, where many of its residents obtained employment. Access to public employment, even if at the lowest scale, guaranteed them social security and other benefits. Clearly, Chikuwadi had a favourable environment that offered better opportunities for labour transformation. The subsequent generation living in this slum were able to acquire new skills and to have better opportunities.

In contrast, the other three slums fall back solely on informal livelihood opportunities, based on unfavourable terms. Again, among these, Padma Nagar is relatively better off in terms of stability of employment and regularity of income due to the growth of a small carpet factory and embroidery units nearby. Yet, it does not have the advantages of Chikuwadi; it remains non-notified, although it has been tacitly accepted.

Rafi Nagar and Chamunda Nagar have extremely limited opportunities of labour transformation. Most women and girls in Chamunda work as domestic labourers while most men and boys work as construction labourers. These are low wage activities and there is significant uncertainty

associated with the latter. There are long spells without any paid work. The entire settlement of Rafi Nagar was built on one of Mumbai's garbage dumps, whose activities are concentrated in rag management. The average daily income is very low among these people.

Group inequality in entitlement: interface with local governance

Community or group endowments become an important source of entitlements for vulnerable groups (Stewart 2004), yet group affiliation may also be disadvantageous and result in social exclusion in access to tangible and non-tangible resources. "Many group boundaries are created or accentuated by others in order to justify discrimination and enrich and empower those who do the classification" (Stewart 2004, p. 3). As such, Rafi Nagar, Chamunda Nagar and Padma Nagar have been undergoing large-scale social exclusion, informally perpetuated along group identities.

Denial of access to food and nutrition entitlements: vulnerability of migrants

The Public Distribution System (PDS) and the Integrated Child Development Scheme (ICDS) are two key nationwide schemes that entitle the target group from among people below the poverty line to food and nutrition support from the state. Beneficiaries can access PDS with their identity cards. Since Rafi Nagar, Chamunda Nagar and Padma Nagar are informal settlements of in-migrants, they usually fail to produce a proof of identity and are bypassed by the PDS system. Issuance of the identity card is constrained partly by the widespread corruption sweeping the PDS mechanism and partly by systemic bias against migrants and minority communities in Mumbai. Thus, these three slums need to rely on the market for meeting their food needs. The inability to do so has resulted in starvation, especially in Rafi Nagar and Chamunda Nagar slums.

ICDS provides for nutrition support centres in the neighbourhood including the slums. All the four slums have access to ICDS centres. However, respondents during the interview expressed their dissatisfaction over the quality of access. Children remain deprived of nutritional value prescribed under the scheme. Being illiterate and vulnerable, inhabitants in Chamunda Nagar and Rafi Nagar are unable to monitor or question the centres. The situation in Chikuwadi is much better due to greater awareness and influence among its people. There is no inherent bias from society towards Chikuwadi. Here, some of the slum women have also joined the ICDS centre as staff members. The situation

in Padma Nagar slum is mediocre but better than the other two non-notified slums. Due to better options of labour transformation leading to regular and stable source of income, Padma Nagar is better than Rafi Nagar and Chamunda Nagar.

Denial of access to municipal entitlements

One key source of exclusion for these slums is the denial of access to basic municipal entitlements – the civic supplies. Rafi Nagar and Chamunda Nagar are the worst affected owing to their very low income entitlement, whereas Padma Nagar, although is denied access, has been able to develop on its own due to income security. According to the coordinator of Apnalaya, there is no legal violation in not supplying municipal civic services to non-notified slums. In addition, they are several barriers informally created in the process of their legal notification, which has become politicized and unjustifiable. Although the three slums were built between 15 and 20 years ago, they have not been notified and there is no legal justification for this. Growing cultural intolerance towards minority and migrant communities in Mumbai has influenced local bureaucracy including the Brihanmumbai (Greater Mumbai) Municipal Corporation (BMC). This is visible from the opinion of a BMC official (2009) shared anonymously during an interview by the author.

Let's us not talk about these slums, every few days migrants come to the city and settle illegally and start demanding from us... Slum A is group of illegal migrants, why should we be supporting them?...¹

As observed by various civil society members, these problems pertaining to migrants in sub-urban areas of Mumbai including Govandi and Bhandup remain unaddressed since there is no separate policy consideration for migrant population (Barnagarwala 2016). Thus, as Stewart (1999, p. 9) notes, "democratic institutions are not sufficient to prevent such inequalities partly because majorities can discriminate against minorities, and partly because even with 'shared' power at the top, lower level elements may involve inequalities".

Denial of quality care from municipal health system is another visible source of exclusion for all the poor in general. For example, the poor have to rely exclusively on the market for medication, and given the extent of their poverty, they cannot afford it. What is inexplicable in this case is the deliberate refusal to address the cases succumbing to chronic malnutrition or naming it as such on paper.

Intra-group dynamics and malnutrition: resources to functionings

Since determinants of malnutrition include several non-food and non-tangible factors such as health care, gender, reproductive health and fertility behaviour, among others, access to food and cash may not solve the problem completely. Food utilization and care practices are culturally determined. Thus, the correlation between low income and low capability is variable between different communities (Sen 1999). Intra-community dynamics is usually manifested through cultural beliefs and practices. Gendered processes are salient manifestations of cultural norms in less developed contexts, often resulting into intra-household discrimination in food and nutrition entitlement (Agarwala 1996). For example, there is a higher proportion of girls than boys who have not been vaccinated. Also, fewer girls have health cards – a proxy for access to attentive care. Further, negligence of reproductive health is also a manifestation of negligence towards women's health. This is particularly visible within the Muslim minority communities of the slums of Rafi Nagar and Padma Nagar, where women are burdened with repeated child bearing due to religious taboos. The low status of women, uncontrolled fertility and poor reproductive health care – key factors underlying mother-child transmission of malnutrition – are typical of these slums including in Padma Nagar, where access to food is adequate.

The situation in Chikuwadi is slightly better due to relatively controlled fertility behaviour owing to greater access to education and exposure. However, due to inadequate nutrition knowledge, low female education, inadequate public health services and persistent son preference, Chikuwadi is also unable to escape the malnutrition trap.

Group disparity in malnutrition outcomes: inheriting vulnerability

The varying nature of the entitlement relation and the differential degree of entitlement failure among the four slums is a clear representation of inter-sectionality between class, religion and place of residence. An entitlement collapse of the highest degree occurs when a group is disadvantaged simultaneously in all three dimensions.

¹ BMC Official (2009) Personal communication.

Bottom of the pyramid: alarming state of malnutrition

Rafi Nagar and Chamunda Nagar are at an alarming stage of malnutrition. As per the data from the field survey (2009-10), in Padmanagar, 42 per cent of the children of the 0-14 year age group lack a health card; and 30 per cent of the households reported having undergone at least one phase of starvation during the preceding year.

The situation in Rafi Nagar is similar, with 81 per cent of children in the 0-5 year age group being underweight; 47 per cent of them weigh 60-70 per cent of the reference weight; and 30 per cent suffer from third degree malnutrition (Apnalaya 2009). Chronic malnutrition is both the cause and consequence of high morbidity in Rafi Nagar and Chamunda Nagar. Both of these slums rank at the bottom of the nutrition security pyramid.

The worse-off: widespread malnutrition

The severity of malnutrition in Padma Nagar is relatively lower, although the incidence is very high, with 80 per cent of children under five underweight. Grade I and II malnutrition is widespread here. Due to poor reproductive care and frequent child bearing, children born in Padma Nagar are likely to be underweight and vulnerable to morbidity.

The better-off: the top of the pyramid

In Chikuwadi, the incidence of malnutrition is much lower than the other three slums. Around 37 per cent of the children in 0-5 year age group are underweight (Apnalaya 2009). There are no cases of malnutrition of grade II, III and IV here. Chikuwadi is thus better-off than other three slums studied here. However, the incidence of child malnutrition at 37 per cent in Chikuwadi is nonetheless considerable. This is indicative of the scale of the malnutrition problem in slums of cities like Mumbai. Recent evidences reveal that the situation does not seem to have improved in these slums. Boga (2015) highlights how Govandi, the Mumbai sub-urban areas where Rafi Nagar and Padma Nagar slums are located, remains a microcosm of urban India's poverty and malnutrition despite the attention it attracted due to infant death. This is due to the city's development plan, which ghettoizes people, leading to a cycle of denial of housing, amenities, schools, open spaces and health care. The same observations were made during the field visits in 2009-2010.

The above reflection exemplifies that pockets of extreme vulnerability may coexist amidst overall better-off urban environment. At least eight children suffering from

malnutrition died in 2015-2016, of whom five were under one year of age, and three were between three and six years of age (Barnagarwala 2016). Many similar cases of malnourishment occurred in Bhandup and Govandi, where the three vulnerable slums, Rafi Nagar, Chamunda Nagar and Padma Nagar, are located.

This recent evidence corroborates that the children in these slums, particularly in Rafi Nagar and Chamunda Nagar, inherit vulnerability, fail to participate in inter-generational mobility, and are perpetually confined in the malnutrition trap, through the processes that were analysed on the basis of the field study. Although the four slums are endowed with similarly inadequate resources, due to ease of assimilation in host environment supported by public transfer through municipal support to its earlier generation, Chikuwadi is subsequently able to escape extreme vulnerability. The remaining three slums, especially Rafi Nagar and Chamunda Nagar, seem to be trapped in persistent vulnerability. These two slums do not display any sign of upward mobility, and the younger generation in these slums witness vulnerability transfer from their parents, i.e. they inherit poverty (SAHRC and UNICEF 2014). To break free of the vicious cycle, these slums need strong, targeted interventions from the state.

Moreover, health and nutrition are an important mechanism of poverty traps among children, and the agency of the state is crucial to enable children of deprived segments to achieve upward mobility (SAHRC and UNICEF 2014). Indeed, it is public transfer programmes and a favourable environment that underlie the improved position of Chikuwadi with respect to the other three. Without local government support, Padma Nagar, despite having been created long ago and having livelihood certainty, continues to suffer from significant capability deprivation, and its current generations remain vulnerable to capability failure. At the same time, Rafi Nagar and Chamunda Nagar, which are acutely nutrition-insecure, are under extreme vulnerability.

Given meagre labour options and disparity in access, these groups are structurally less capable of assimilation into mainstream processes. They are also unable to defend their rights due to high transaction costs of accessing formal juridical systems (Birner 2007). In such a scenario, tackling deprivation and poverty reduction among vulnerable groups may require tackling the position of the group as well (IPC IG 2007).

SUMMING UP: REORIENTING GOVERNANCE TOWARDS NUTRITIONAL GOALS

For the urban poor, labour is primary individual endowment and source of entitlements. In the four slums discussed above, most of the labour is unskilled and informally employed except one, which has benefitted from growth of formal enterprise in proximity. However, the four slums – Chamunda Nagar, Rafi Nagar, Padma Nagar and Chikuwadi – have shared characteristics in terms of their initial endowments, i.e. endowments of their first generation in Mumbai. It is due to their differential degree of assimilation in the local environment, mediated by informal considerations, that they have differential access to urban food systems and suffer from significantly different levels of food and nutrition insecurities.

To conclude, it may be argued that the issue of nutrition security has an indispensable and direct role for the state's agency, especially in wake of identity-based discriminations observed in the food system dynamics at the local level. Given the culturally diverse nature of the Indian society, there is much scope for mediation of food access by identity-based issues such as race, caste, religion or gender. While the role of civil society and community leaders becomes critical in this regard, this does not absolve the state of its obligations to ensure constitutional guarantees to its people. Despite their importance in political dynamics, identity-based discriminations have failed to receive adequate attention in the processes of development intervention. Thus, issues such as race, religion, caste and migration status continue to distort the group's entitlement structure and its access to basic survival options.

This paper builds on an existing paper entitled "Identity and Group Dynamics in Urban Food Systems". www.researchgate.net/publication/283198078_Identity_and_Group_Dynamics_in_Urban_Food_Systems

References

- Agarwal B (1996) Conceptualizing gender relations. In Agarwal B (ed.) *A Field of One's Own: Gender and Land Rights in South Asia*, pp. 51-132. Cambridge University Press: Cambridge.
- Apnalaya (2009) *Malnutrition survey for Rafi Nagar, Padma Nagar and Cheekuwadi*. Unpublished document available from Apnalaya, Govandi, Mumbai, Maharashtra 400043.
- Barnagarwala T (2016) More than 3000 children severely underweight in Mumbai slums: Integrated Child Development Services. *The Indian Express*. 19 September 2016. <http://indianexpress.com/article/india/india-news-india/more-than-3000-children-severely-underweight-in-mumbai-slums-integrated-child-development-services-3038095/>.
- Birner R (2007) *Improving governance to eradicate hunger and poverty*. International Food Policy Research Institute (IFPRI) 2020 Focus Brief on World's Poor and Hungry People. IFPRI: Washington DC. <https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/37182/127830.pdf?sequence=1>.
- Boga D (2015) Why malnutrition grows in rising urban India? *Indian Spend*. 3 June 2015. www.indiaspend.com/cover-story/why-malnutrition-grows-in-rising-urban-india-77051.
- Field Survey (2010) in four slums under Brihanmumbai Municipal Corporation (BMC). India, 2009-2010.
- Food and Agriculture Organization of the United Nations (FAO) (2014) *Food security for sustainable development and urbanization: inputs for FAO's contribution to the 2014 ECOSOC Integration Segment, 27-29 May*. FAO: Rome. www.un.org/en/ecosoc/integration/pdf/foodandagricultureorganization.pdf.
- Garcia V (2012) *Children malnutrition and horizontal inequalities in Sub-Saharan Africa: a focus on contrasting domestic trajectories*. United Nations Development Programme (UNDP) Working Paper No. 2012-019. UNDP Regional Bureau for Africa: New York. <http://www.pnud.org/content/dam/rba/docs/Working%20Papers/Child%20Malnutrition%20and%20Inequality.pdf>.
- International Policy Centre for Inclusive Growth (IPC IG) (2007) *The Challenge of Inequality, Poverty in Focus*. International Poverty Centre: Brasilia. <http://www.ipc-undp.org/pub/IPCPovertyInFocus11.pdf>.
- Kumar A, Kumari D and Singh A (2015) Increasing socioeconomic inequality in childhood undernutrition in urban India: trends between 1992-93, 1998-99 and 2005-06. *Health Policy and Planning* 30(8): 1003-16. <https://www.ncbi.nlm.nih.gov/pubmed/25339635>.
- Osmani SR (1993) *The entitlement approach to famine: an assessment*. United Nations University World Institute for Development Economics Research (UNU-WIDER). Working Paper No. 107. UNU-WIDER: Helsinki. <http://collections.unu.edu/view/UNU:5291#viewMetadata>.
- Overseas Development Institute (ODI) (2001) *Economic theory, freedom and human rights: the work of Amartya Sen*. ODI Briefing Paper. ODI: London. <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2321.pdf>.
- Sen A (1981) *Poverty and famines: An Essay on Entitlement and Deprivation*. Clarendon Press: Oxford.
- Sen A (1999) *Development and Freedom*. Oxford University Press: Oxford.
- South African Human Rights Commission (SAHRC) and United Nations Children's Fund (UNICEF) (2014) *Poverty traps and social exclusion among children in South Africa*. SAHRC: Pretoria.
- Stewart F (1999) *Crisis Prevention: Tackling Horizontal Inequalities*. World Bank Conference on Evaluation and Poverty Reduction, June 14-15 1999. Washington D.C.
- Stewart F (2004) *Groups and capabilities*. Fourth Conference on the Capability Approach: Enhancing Human Security, September 5-7 2004. University of Pavia, Italy.

Speakers Corner

Civil society “Manifesto” on Decade of Action on Nutrition

This document conveys the collective position of the platform of public interest civil society organizations and social movements that have actively engaged in the preparatory process for the Second International Conference on Nutrition (ICN2) and continue to advance its follow-up, including the Decade of Action on Nutrition, in the context of the civil society vision statement on nutrition.

OUR UNDERSTANDING OF THE CHALLENGES OF MALNUTRITION IN ALL ITS FORMS¹

A common understanding of the complex and multidimensional challenges of malnutrition in all its forms is the basis for building lasting solutions. It requires a holistic and multidisciplinary analysis that combines both political and technical perspectives.

We understand food as the expression of values, cultures, social relations and self-determination. In nourishing ourselves, and eating with our family, friends and community, we reaffirm our cultural identities, our ownership over our lives, and our human dignity. Nutrition is the basis for our personal development and our overall well-being.

We identify the following as major causes for malnutrition in all its forms. They are closely interrelated and must be addressed in the broader context of their social, political and economic determinants.

1. Lack of access to adequate and diverse diets, decent living conditions, and public services (e.g., health, education, water and sanitation);
2. Widespread violations of women’s and girls’ rights, including sexual and reproductive rights;

3. The generalized sexual division of labour, result of a patriarchal system, which materialises in the invisibility and lack of value attributed to women’s work, both in their role as food producers and their (unequal) role as care givers.
4. Lack of access to and control over natural resources, including land, water and seeds;
5. Promotion of unsustainable food systems based on agro-industrial food production; lack of support for local food systems and markets that benefit small-scale food producers;
6. Unjust international trade and investment rules; eco-destruction and climate-change;
7. Lack of protection of, promotion of and support for breastfeeding;
8. Unemployment, precarious and unhealthy working conditions, wages below subsistence level;
9. Widespread impunity for corporate human rights abuses and inadequate regulatory frameworks to prevent corporate practices that interfere with public health goals;

Based on this common understanding, we propose four central pillars around which action under the Decade of Action on Nutrition should evolve²

¹ Based on Civil Society Vision Statement on Nutrition.

² Other social policy domains that closely intersect with the four pillars are health, water and sanitation, climate change and social protection.

Pillar 1: Human rights as framework for the Decade

- Nutrition action under the Decade must be firmly grounded in the universal realization of human rights, including the human rights to food and nutrition, to health, to water, to self-determination, decent work, control over natural resources, and education. Focus must be on advancing the rights of disadvantaged and marginalised groups, including those mentioned below, who are particularly affected by and vulnerable to malnutrition.
- As children are the first victims of malnutrition, the Decade should also focus on protecting and fulfilling children rights, especially the right to survival, the right to health and the right to adequate food and nutrition.
- Strengthening of women's rights, including sexual and reproductive rights, and the elimination of violence and discrimination against women is key for addressing malnutrition. The realization of these rights has to pass through a recognition of the patriarchal system and a rupture with the sexual division of labour that perpetuates unequal power relations and makes real empowerment of women impossible.
- Small-scale food producers (in their majority women), who provide most of the food for consumption, particularly for marginalised groups, must be placed at the centre of efforts to tackle malnutrition. Widespread violations of their rights, including those relating to access and control over natural resources as well as those related to the rights of agricultural workers, must be urgently addressed.
- Consumers' rights must be strengthened. We define consumers as people who access food through any of the possible means, from monetary exchanges to food aid or assistance. These rights should be strengthened, inter alia, through regulations to prevent aggressive and misleading marketing, especially to children, of unhealthy food and beverages that promote overweight and diet-related NCDs, and breastmilk substitutes. Macro-economic policies (e.g., fiscal and trade) must be aligned with nutritional goals and human rights more broadly.

Pillar 2: Management of malnutrition throughout the life-cycle

- Policies and initiatives must ensure healthy diets throughout the life course, taking into account and addressing the nutritional needs in different phases of life and of particular groups.

- The thousand days from a woman's pregnancy to her child's second birthday, as well as the promotion and protection of women's and girls' rights, are crucial for ensuring women's and child's nutritional well-being, and interrupting the inter-generational circle of malnutrition. Of particular importance in this context is the protection, promotion and support of breastfeeding and appropriate complementary feeding.
- Overweight and diet-related non-communicable diseases must be recognized as severe challenges and progress towards achieving the WHO Global NCD Action Plan accelerated. Indeed, poor diet is now the biggest underlying cause of ill health and disease globally.
- Governments must adopt systemic and multi-sectoral approaches to addressing the underlying causes of undernutrition and the profound social, environmental, economic and political determinants of this situation, so that existing product-based approaches (e.g., vitamin capsules, ready-to-use therapeutic foods) are limited, exclusively targeted to those who actually require treatment, and are implemented in full coherence with broader holistic human rights-based approaches.
- The urgency of acute malnutrition must be addressed through a twin-track approach, by ensuring availability and access to treatment of severe acute malnutrition, but also by establishing proper systemic frameworks that ensure the realization of people's right to food and nutrition and related rights.

Pillar 3: Sovereign local food systems based on biodiversity

- Governments must play a strong role in reshaping food systems that are capable of providing diversified and nutritious diets for both current and future generations, while ensuring secure livelihoods for small-scale food producers, and preserving/strengthening eco-systems and bio-diversity. This requires a conscious move away from agro-industrial modes of food production based on mono-cropping and high chemical inputs, towards food systems based on diversified agro-ecological practices and small-scale food producers.
- People – producers and consumers – must be at the heart of food systems. Territorial and informal markets should be strengthened, and protected against the influx of ultra-processed foods, including breastmilk substitutes. Public procurement should prioritise fresh produce from small-scale local producers.
- Biodiversity constitutes the foundation of a healthy and diversified diet that responds to a biological and social co-evolution of natural and cultural processes. It must be protected as such. Natural resources must be managed at the community level.

Pillar 4: Democratic governance and global regulatory framework

- Governance of food and nutrition must be firmly located within government-led normative and regulatory frameworks. The effective participation of rights-holders, in particular groups most affected by hunger and malnutrition, in the elaboration, implementation, and monitoring of policies that concern them is key. At the same time, adequate safeguards must be put in place to protect public policy space from undue influence by powerful economic actors.
- Strong inclusive monitoring and accountability mechanisms must be in place to measure progress and hold States accountable to their obligations and commitments in nutrition.
- A central pillar of nutrition and food governance must be the regulation of private corporations to prevent their actions from negatively impacting on nutrition and human rights more broadly.
- The implementation of international commitments by States on nutrition, such as the Rome Declaration and Plan of Action and the World Health Assembly global nutrition targets, must be aligned with existing obligations and commitments, including those under international human rights law.
- WHO and FAO have a key role to play in guiding States in their actions under the Decade and should address nutrition in a holistic manner, by strengthening the nexus between health, food security and nutrition and enhancing coherence between the Rome Declaration and Plan of Action and the WHA global nutrition targets. They should do so in coordination with other UN bodies, especially the CFS and SCN. CFS has a central role to play in promoting, in accordance with its mandate, coordinated and coherent food and nutrition security policies in line with the right to food, and strengthening the nexus between the health and food angles of a holistic understanding of nutrition.

KEY EXPECTATIONS FOR THE DECADE

1. The Decade should be framed around the universal realisation of human rights. The recognition of the interrelatedness and indivisibility of human rights, such as the right to food and nutrition, the right to health, the right to water and sanitation, women's human rights, decent work, or the

access to and control over natural resources, is key for addressing the root causes of malnutrition.

2. States and UN agencies should commit to implementing a binding regulatory frameworks to protect public institutions (and officials) from undue influence by powerful economic actors and resulting conflicts of interest. All Public-Private Partnerships (PPP) in nutrition and related fields should be placed on hold until reviewed to ensure that no further harm is done. Due attention must also be placed on the devising of safeguards for the interaction with non-State actors within the Decade.
3. States, individually and jointly, should implement policies to address the underlying and structural causes of malnutrition in a comprehensive, integrated and coordinated fashion, while also ensuring access to and availability of culturally-appropriate and sustainable treatment of severe acute malnutrition.
4. States and UN agencies should protect and promote local food and agricultural systems based on food sovereignty, small-scale food producers, biodiversity, deep ecological foundations and sustainable use of natural resources, native seeds and traditional knowledge and practices, as well as local markets and value chains, that are capable of guaranteeing the availability of and accessibility to diversified, healthy and culturally adequate diets for all.
5. States must ensure strong democratic governance for nutrition, both at national and international level. Especially, they must:
 - Guarantee the meaningful participation of civil society, including women's groups, and representatives of constituencies most affected by hunger and malnutrition at all levels of planning, design, implementation, follow-up and review of policies and other interventions on nutrition.
 - Adopt of a consensual architecture of global nutrition governance firmly grounded in Member States decision making and democratic intergovernmental normative and regulatory bodies, with a clear identification of the roles of implementing partners within the UN system and existing coordinating mechanisms, both at international and regional level.
 - Ensure accountability for obligations and commitments related to nutrition, including obligations under international human rights law and commitments under the sustainable development agenda, the Rome Declaration and Plan of Action and the World Health Assembly global nutrition targets, through the definition of a robust, transparent and independent monitoring and accountability framework, based on the direct and experiential participation of rights-holders.

- Adopt a clear timeline and clear indicators to be included in the work programme in order to regularly assess and track progresses and achievements.
6. WHO and FAO should maintain the momentum on nutrition and provide continued initiative to advance the nutrition agenda by fostering strong commitments from States and other actors for nutrition and their implementation. More specifically, they should:
- Urge Member States to set ambitious national nutrition targets, informed by global nutrition targets and in line with national priorities and contexts, as well as with international human rights obligations, to adopt concrete plans for their implementation with adequate resources and to collect and provide the data necessary to measure progress towards these national targets.
 - Call on Member States and all relevant actors to ensure an enabling international environment, including the mobilization of adequate resources, for addressing the underlying causes of malnutrition in all its forms.

OUR INVOLVEMENT AND CONTRIBUTION TO THE DECADE

Launching a People's Decade of Action on Nutrition based on Civil Society' Vision Statement and facilitate people's engagement in the UN Decade in accordance to this Manifesto

1. Ensure the effective participation and voice of those most affected by hunger and malnutrition in all its forms in the development, implementation and monitoring of the Decade of Action.
2. Advocate for actions under the Decade to be compliant with all human rights, in particular those directly related to nutrition, including: the rights to adequate food and nutrition, health, women's rights, including sexual and reproductive rights, social protection, clean water, sanitation and hygienic conditions, access to and control over natural resources, indigenous rights, decent work and self-determination.
3. Advocate for State actions in other policy fields, including trade, investment, finances, and development cooperation, to be coherent with their nutrition commitments in the broader context of their domestic and extraterritorial human rights obligations.
4. Draw attention to and ensure a focus on all basic causes of malnutrition in all its forms in State/ UN actions, as well as in our own actions.
5. Support UN member States in the development of the work programme for the Decade of Action and its implementation.
6. Support UN member States in setting nutrition commitments in active participation with the affected communities, adapted to their national contexts, including national nutrition targets, and aligned to their human rights obligations, and contribute to their achievement through various actions.
7. Participate in holding governments and other actors accountable to their nutrition commitments and other actions/ policies that may harm nutrition outcomes by developing adequate accountability tools and contributing actively in the monitoring and evaluation of the Decade of action by ensuring the voice of communities is heard. The effective participation of the constituencies most affected by malnutrition is key in the monitoring of the Decade.

Tackling the double-burden through public-private partnerships

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The impact of obesity on people's lives, healthcare systems and economies is being debated in the media, by academics, industry, governments and regulators, almost daily.

In Asia, while there has been a sharp growth in obesity rates, the number of people who suffer from hunger also remains steady (a recent study in Malaysia pointed to nearly 50 per cent of the adult population being overweight or obese). This double burden of obesity and undernutrition has become an emerging threat to health and healthcare systems in the region. It requires both immediate action driven by government and regulators and also innovations in the food industry driven the private sector and scientist and academics operating in the region. Partnerships between the public and private sector is an approach that could potentially deliver a range of solutions in dealing with this issue.

PARTNERING FOR SUCCESS

Singapore is home to one such public-private initiative, the Asia Roundtable on Food Innovation for Improved Nutrition (ARoFIIN), convened by Singapore government agencies including the Health Promotion Board, the Agency for Science Technology and Research, the Singapore Institute for Clinical Sciences and Food Industry Asia.

Set up at the beginning of 2015, ARoFIIN leverages public-private partnerships to bring together a range of experts from academia, government, industry and civil society sectors from across the Asian region in order to initiate and sustain regional, multi-stakeholder dialogue on the role of food innovation in tackling obesity and chronic disease in the region.

This group of key decision-makers works toward fostering a conducive forum to support dissemination of science-based information on the causes and drivers of obesity and chronic disease, as well as improve clarity on the barriers and enablers for food innovation and research and development in the region. ARoFIIN leverages effective public-private partnerships and stimulates scalable, cost-effective and multi-stakeholder strategies that seek to drive food innovation and positive change in consumer behaviour.

DELIVERING OUTCOMES

To deliver the goals of this partnership, four task forces have been set up within the ARoFIIN umbrella, with members of Taskforce 2 (which focuses on consumers) having a role in establishing a research consortium to facilitate research and development in food innovation related to diets and consumer preferences in Asia. Taskforce 3 looks at processes and enablers that will cultivate a positive regulatory climate for innovation, while Taskforce 4, with a focus on the double burden challenge, will assess food supply-distribution mechanisms, working towards optimizing the best distribution channels and harmonizing dialogue in inter-governmental forums.

"To effectively tackle a global issue like obesity, which is becoming more prevalent in Asia, along with under-nutrition, collaboration between multiple stakeholders – particularly public-private partnerships – are vital," says Matt Kovac, Executive Director Food Industry Asia (FIA), one of the partners. "Public-private partnerships like ARoFIIN presents us with a great opportunity to bring a diverse range of multi-disciplinary experts to the table" he said.

FIA believes that the food industry has an important role to play in participating in and driving forward initiatives like ARoFIIN. Recognizing that healthy eating is a key factor in the fight against the dual burden as well as non-communicable diseases such as diabetes and hypertension, FIA's members share common values on the responsible promotion of balanced diets and lifestyles. FIA members continuously improve product offerings to create products that offer healthier options with more whole grains and fibre, more calcium, vitamins and minerals, more low-fat dairy, more vegetables and fruit, reduced sodium, less fat, less sugar and fewer calories.

SUCCESS STORIES

There are some great examples within the food industry in Asia of companies working in public-private partnerships to deliver successful outcomes related to obesity, under-nutrition and non-communicable diseases. One such example is a partnership that deals with hidden hunger, an issue faced by Singapore's foreign migrant worker population. The food that is catered to them through contract food catering services is typically extremely poor in nutritional value; a partnership between the Singapore-based business accelerator platform BoP Hub and healthcare multi-national DSM aims to address this problem. An element of the solution they have identified is fortifying the rice that reaches the migrant workers, with essential vitamins and minerals. DSM has developed and patented a state-of-the-art technology to produce extruded rice pellets, which are then mixed into normal rice to obtain fortified rice.

DSM also maintains a very successful partnership with the World Food Programme (WFP), in which DSM provides scientific support to guarantee optimum nutrition for the WFP beneficiaries while WFP allows DSM employees to contribute to WFP programmes in countries like Zambia. Specifically, DSM provides WFP with technical and scientific expertise in the field of high nutrient products and financial assistance. The partnership focuses on developing new and improved nutritious products, such as micronutrient powders and fortified rice, that help WFP not just deliver more food but also provide the nutrients necessary to fight hunger and prevent micronutrient deficiencies in vulnerable communities. Another partnership is the Amsterdam Initiative against Malnutrition (AIM), where the Dutch companies – DSM, Akzo Nobel and Unilever – collaborate with the Dutch Foreign Ministry Buitenlandse Zaken, the University of Wageningen and the Geneva-based Global Alliance for Improved Nutrition (GAIN) to improve the nutritional status of targeted populations and close scientific knowledge gaps.

In Bangladesh, Danone has a partnership with the Mohammed Yunus Foundation, where it produces locally fortified yoghurt and distributes it in rural areas through women-owned small business enterprises. The profits go to the Foundation, which provides micro-credits to small business start-ups in Bangladesh.

There are also numerous other examples of successful public-private partnerships from within the food industry such as: Friesland Campina's programme, which champions good health and nutrition in South-East Asia through multi-stakeholder engagements; school milk programmes; junior National Basketball Association camps and product renovation; The Coca Cola Company's partnerships with Singapore's Health Promotion Board on sharing consumer insights; the promotion of balanced diets and active lifestyles adoption through the Movement is Happiness platform; and the promotion of a healthy breakfast education through partnership between the Food and Nutrition Society of Indonesia and the Ministry of Health and industry.

FIA believes that the more effective measures with long-term impact to combat obesity are those aimed at influencing the behaviours and habits of consumers, which can be achieved through comprehensive policy actions and public education, prevention and promotion of healthy lifestyles. From an industry perspective, this entails innovation, product reformulation, portion control, restrictions on the marketing of certain foods and beverages to children under 13, promotion of nutrition literacy and labelling, and public education on diet and the importance of physical activity. To achieve all of this, the private sector must work closely with public institutions and other stakeholders.

A ROLE FOR PUBLIC-PRIVATE PARTNERSHIPS

Public-private partnerships such as ARoFIIN can play an increasingly important role in the debate on the impact of obesity and under-nutrition on people's lives, healthcare systems and economies globally and in Asia. They are not only being recognized by the public affairs professionals in the private sector as a means of delivering successful and sustainable results, but also by government and civil society.

A report by McKinsey & Company, *Public-Private Partnerships: Harnessing the Private Sector's Unique Ability to Enhance Social Impact*, highlighted that "collaborative efforts between the public, private and civil sectors to address major societal challenges have delivered progress". The report stated that:

... participation in PPPs can create a virtuous cycle of mutual benefit for all concerned; in particular, for private sector entities traditionally seen solely as benefactors and not as beneficiaries. One of our most striking findings is that the most effective PPPs understand that part of their strategy must be to explain to companies the benefits of greater involvement and to create an environment to engage their private sector partners more deeply.

For all stakeholders involved, public-private partnerships provide an opportunity to bring about change and have a wider social impact. Through industry, non-governmental organizations (NGOs), inter-governmental organizations and governments, who all strive to deliver successful outcomes for the UN Decade of Action on Nutrition, public-private partnerships have a platform and an opportunity to truly show how they can create shared value.

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FAO/JAKE SALVADOR

If nutrition was at the heart of climate change policies

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CLIMATE CHANGE THREATENS NUTRITION SECURITY IN SEVERAL WAYS

Nutrition and climate change might seem unconnected at a first glance, but the link between these themes is becoming increasingly clear. The Global Nutrition Report (IFPRI 2015) dedicated an entire chapter to the pathways through which climate change affects nutrition, i.e. food insecurity, diseases outbreaks, water scarcity and contamination, among others. In fact, all the pillars of nutrition security are threatened. According to the definition from the World Health Organisation (2013), nutrition security is achieved when “food security is combined with a clean environment, adequate health services, and appropriate care and feeding practices, to ensure a healthy life for all household members”.

Facing climate change, food security is the most affected constituent of nutrition security. Climate change already disrupts local climate conditions (Rosenzweig et al. 2001) and will reduce agricultural output (IPCC 2007), and the nutritious content of crops could decrease by 10 per cent, especially iron, zinc and proteins (Myers et al. 2014). Per-capita availability of fruits and vegetables will decrease, with projected 534 000 annual deaths per year in 2050 due to the resulting lower micronutrient intake (Springmann et al. 2016). Furthermore, 26 million more people will be pushed into poverty every year because of climate change (World Bank 2015). Finally, climate change will cause more seasonal and interannual variability (Feng, Porporato and Rodriguez-Iturbe 2013), which plays a highly significant role in undernutrition.

Then, the cleanliness of the sanitary environment will be negatively affected, with increased water stress (Vörösmarty et al. 2000) and increased risks of water contamination (Hunter 2003) due to weather-related disasters. According to the Intergovernmental Panel on Climate Change (IPCC 2007), water stress will concern up to 600 million people in 2050 and up to three billion people could face water scarcity by 2080.

Health security is also directly affected by climate change with the increase of water-borne and vector-borne diseases, such as malaria (Martens 1995), dengue, which could threaten 2 billion people by 2080 (Patz et al. 1998; Hales et al. 2002), diarrhea (Kolstad and Johansson 2011) and cholera (Pascual et al. 2000). Climate change also has many other health implications (Patz et al. 2005; McMichael, Woodruff and Hales 2006; Costello et al. 2009), such as increased psychological stress due to heat and natural disasters, physical injuries, decreased labour capacity as well as the higher risks of pneumonia caused by climate change-generating toxic fumes. Furthermore, extreme weather events, since they destroy infrastructure, can impede access to health and care facilities (Watson, Gayer and Connolly 2007), pregnant women and infant children being most at risk (Callaghan et al. 2007).

Finally, care practices and education are more indirectly impacted. Indeed, climate change is a trigger for conflicts (Barnett and Adger 2007), forced displacements (Ionesco, Mokhnacheva and Gemenne 2016) and migration (Reuveny 2007), which lead to more stressful situations where access to education and implementation of good care practices are impeded (Machel 2001; Minoiu and Shemyakina 2014; Justino 2012). Climate change could also be responsible for 250 million forced displacements for environmental reasons by 2050 (Christian Aid 2007).

All of these impacts considered due to climate change, stunting could increase by 23 per cent in sub-Saharan Africa and by 62 per cent in South-East Asia by 2050 (Llyod, Kovats and Chalabi 2011) and the number of undernourished children in 2050 is estimated to increase by 25.2 million (Phalkey et al. 2015).

NUTRITION IS COMPLETELY ABSENT IN CLIMATE CHANGE POLICIES

Despite these dire perspectives, nutrition is not considered in international negotiations on climate change, and the nutrition community is only beginning to look at climate change policies and commitments as a relevant target for nutrition advocacy. Food security has been discussed among negotiators since 2014 and entered the Paris Agreement at COP21 in 2015, but it does not include references to nutrition, and most of the discussions tend to reduce it to agricultural production, leaving poverty issues and quality of food out of the equation.

Moreover, food systems have a heavy impact on climate change. The low hypothesis ranks food systems emission from 19 to 29% of global greenhouse gas emissions (Vermeulen, Campbell and Ingram 2012), while high hypothesis allocate them 44-57% of this total (GRAIN 2011). The analysis of food production systems is also important, because it reveals that 56% of all nitrous oxide and methane emissions come from agriculture only (Wollenberg et al. 2016), which has 24 and 236 times more of an impact, respectfully, than carbon dioxide. Thus, the globalized food system, responsible for the contemporary surge in food-related non-communicable diseases, is also substantially contributing to climate change.

REFRAMING CLIMATE CHANGE NEGOTIATIONS AND POLICIES THROUGH A FOCUS ON NUTRITION SECURITY

But what if nutrition was put at the heart of climate change policies? What if the impacts of climate change on nutrition security were fully considered? What if the impacts of our diets on climate change were addressed? These questions approach the climate change and nutrition nexus from different views but their answers converge.

Achieving good nutrition for all, in the context of climate change, calls for: *a holistic, inclusive approach, addressing all the drivers of child malnutrition at the same time, beyond the usual silos; addressing the drivers of climate change; ensuring food security, a sanitary environment, health security, and adequate education and care practices for all; reducing emissions.*

If nutrition was at the core of climate action, it would put the lives and future of children first. It would guide ambitious cross-sectoral policies set to adapt and mitigate climate change, and find solutions for consequent losses and damages in order to ensure that no lives are wasted.

SOLUTIONS EXIST FOR EVERY SECTOR INVOLVED IN NUTRITION SECURITY

It seems an unsurmountable challenge, but simple solutions exist and could be implemented, such as support to the development of small-scale farmers' agroecology for food security and good nutrition, and the promotion of disaster risk reduction in all health, water and sanitation infrastructures. More specifically:

- In the agriculture sector, international initiatives and institutions are promoting production at all costs in order to face the risks of future insecurity, ignoring industrial food systems' greenhouse gas emissions and their nutritional aspects such as micronutrient deficiencies, non-communicable food-related diseases and obesity. Nonetheless, the transition to agroecology could be an answer to agriculture-related issues linked to both nutrition and climate change with: diversified and resilient agro-ecosystems; increased diet diversity for improved household nutrition; integration of livestock, agriculture and forestry to increase fertility and reduce emissions; new rural employment opportunities to tackle rural poverty and exodus; urban food security through renewed and fair rural-urban connections.
- The health sector should be at the cutting edge of adaptation to climate change through reinforced health facilities and stocks, that are able to face more frequent natural disasters, and trained medical staff to face new diseases and surges in case of weather extremes and slow onset disasters such as protracted droughts or El Niño events.
- While promoting water and sanitation for all, infrastructures should be made resistant to floods and hurricanes, and consider the future local implications of climate change for a lasting impact.

- Concerning human security, among other solutions, tackling climate change and achieving high level of nutrition security plays a crucial role in helping foster the development of refugee and migration policies that protect human rights and ensure access to basic needs and services for all, especially for pregnant women and infant children.

But clearly, this is subject to the drastic reduction of all sources of greenhouse gas emissions, being the pre-requisite to limit global warming to 1.5 degrees Celsius in 2100 and to be able to face the dreadful impacts of climate change on the most vulnerable.

EMBRACE THE OPPORTUNITY TO INTEGRATE CLIMATE CHANGE AND NUTRITION SECURITY CHALLENGES

The nutrition community should embrace the climate change and nutrition security theme, mainstreaming nutrition issues in climate change policies at local, national, regional and international level, while ensuring climate change impacts are equally taken into account in all policies related to nutrition security and its pillars.

The UN Decade of Action for Nutrition offers a good opportunity to put nutrition security at the heart of climate change policies and commitments. It is a chance to reframe it; putting the most vulnerable, pregnant women and infant children at the centre of international action to adapt and combat climate change. But this mainstreaming must go both ways in order to achieve the 2030 Sustainable Development Goals.

References

Barnett J and Adger NW (2007) Climate change, human security and violent conflict. *Political Geography* 26: 639-55. <http://www.gsdr.org/document-library/climate-change-human-security-and-violent-conflict/>.

Callaghan WM, Rasmussen SA, Jamieson DJ, Ventura SJ, Farr SL, Sutton PD, Mathews TJ, Hamilton BE, Shealy KR, Brantley D and Posner SF (2007) Health Concerns of Women and Infants in Times of Natural Disasters: Lessons Learned from Hurricane Katrina. *Maternal and Child Health Journal* 11(4): 307-11.

Christian Aid (2007) *Human tide: the real migration crisis*, by Baird R, Migiro K, Nutt D, Kwatra A, Wilson S, Melby J, Pendleton A, Rodgers M and Davison J (2007). Christian Aid: London. <https://www.christianaid.org.uk/Images/human-tide.pdf>.

Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R and Lee M (2009) Managing the health effects of climate change. *Lancet* 373(9676): 1693-733. <https://www.ncbi.nlm.nih.gov/pubmed/19447250>.

Feng X, Porporato A and Rodriguez-Iturbe I (2013) Changes in rainfall seasonality in the tropics. *Nature Climate Change* 3(9): 811-5.

GRAIN (2011) *Food and climate change: the forgotten link. Against the Grain*. GRAIN: Barcelona. <https://www.grain.org/article/entries/4357-food-and-climate-change-the-forgotten-link>.

Hales S, De Wet N, Maimonald J and Woodward A (2002) Potential effect of population and climate changes on global distribution of dengue fever: an empirical model. *Lancet* 360 (9336): pp. 830-4. www.ncbi.nlm.nih.gov/pubmed/12243917.

Hunter PR (2003) Climate change and waterborne and vector-borne disease. *Journal of applied microbiology* 94(Suppl. 1): 37-46. <http://onlinelibrary.wiley.com/doi/10.1046/j.1365-2672.94.s1.5.x.full>.

Intergovernmental Panel on Climate Change (IPCC) (2007) Chapter 9: Africa. In Parry ML, Canziani OF, Palutikof JP, van der Linden PJ and Hanson CE (eds.) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press: Cambridge. www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg2_report_impacts_adaptation_and_vulnerability.htm.

International Food Policy Research Institute (IFPRI) (2015) *Global Nutrition Report 2015: Actions and Accountability to Advance Nutrition and Sustainable Development*. IFPRI: Washington DC. www.ifpri.org/publication/global-nutrition-report-2015.

Ionesco D, Mokhnacheva D and Gemenne F (2016) *The Atlas of Environmental Migration*. Presses de la fondation nationale des sciences politiques: Paris. <https://environmentalmigration.iom.int/atlas-environmental-migration>.

Justino P (2012) Nutrition, Governance and Violence: A Framework for the Analysis of Resilience and Vulnerability to Food Insecurity in Contexts of Violent Conflict. *Household in Conflict Network Working Paper* 132. <https://ideas.repec.org/p/hic/wpaper/132.html>.

Kolstad EW and Johansson KA (2011) Uncertainties Associated with Quantifying Climate Change Impacts on Human Health: A Case Study for Diarrhea. *Environmental Health Perspectives* 119 (3): 299-305. www.ncbi.nlm.nih.gov/pmc/articles/PMC3059990/.

Llyod SJ, Kovats RS and Chalabi Z (2011) Climate Change, Crop Yields, and Undernutrition: Development of a Model to Quantify the Impact of Climate Scenarios on Child Undernutrition. *Environmental health perspectives* 119(12): 1817-23. <https://researchonline.lshtm.ac.uk/186/1/ehp.1003311.pdf>.

Machel G (2001) *The Impact of War on Children: A Review of Progress Since the 1996 United Nations Report on the Impact of Armed Conflict on Children*. United Nations Children's Fund (UNICEF): New York.

Martens WJM, Niessen LW, Rotmans J, Jetten TH and McMichael AJ (1995) Potential impact of global climate change on malaria risk. *Environmental Health Perspectives* 103(5): 458-64. www.ncbi.nlm.nih.gov/pmc/articles/PMC1523278/.

McMichael AJ, Woodruff RE and Hales S (2006) Climate change and human health: present and future risks. *Lancet* 367(9513): 859-69. [www.thelancet.com/journals/lancet/article/PIIS0140-6736\(06\)68079-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(06)68079-3/abstract).

Minoiu C and Shemyakina ON (2014) Armed conflict, household victimization, and child health in Côte d'Ivoire. *Journal of Development Economics* 108: 237-55. www.sciencedirect.com/science/article/pii/S0304387814000339.

Myers SS, Zanobetti A, Kloog I, Huybers P, Leakey AD, Bloom AJ and Holbrook NM (2014) Increasing CO2 threatens human nutrition. *Nature* 510(7503): 139-42. www.ncbi.nlm.nih.gov/pubmed/24805231.

Pascual M, Rodó X, Ellner SP, Colwell R and Bouma MJ (2000) Cholera Dynamics and El Niño-Southern Oscillation. *Science* 289: 1766-9.

Patz JA, Campbell-Lendrum D, Holloway T and Foley JA (2005) Impact of regional climate change on human health. *Nature* 438(7066): 310-7. www.ncbi.nlm.nih.gov/pubmed/16292302.

Patz JA, Martens WJM, Focks DA and Jetten TH (1998) Dengue fever epidemic potential as projected by general circulation models of global climate change. *Environmental health perspectives* 106 (3): 147-53. www.ncbi.nlm.nih.gov/pmc/articles/PMC1533051/.

Phalkey RK, Aranda-Jan C, Marx S, Höfle B and Sauerborn R (2015) Systematic review of current efforts to quantify the impacts of climate change on undernutrition. *Proceedings of the National Academy of Sciences of the United States of America* 112(33): 4522-9.

Reuveny R (2007) Climate change-induced migration and violent conflict. *Political geography* 26(6): 656-73. <http://www.csun.edu/~dtf46560/630/Misc/Reuveny-ClimateChangeMigration-2007.pdf>.

Rosenzweig C, Iglesias A, Yang XB, Epstein PR and Chivian E (2001) Climate change and extreme weather events; implications for food production, plant diseases, and pests. *Global change and human health* 2(2): 90-104. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1023&context=nasapub>.

Springmann M, Mason-D'Croz D, Robinson S, Garnett T, Godfray HCJ, Gollin D and Scarborough P (2016) Global and regional health effects of future food production under climate change: a modelling study. *Lancet* 387(10031): 1937-46.

Vermeulen SJ, Campbell BM and Ingram JS (2012) Climate change and food systems. *Annual Review of Environment and Resources* (37): 195-222.

Vörösmarty CJ, Green P, Salisbury J and Lammers RB (2000) Global water resources: vulnerability from climate change and population growth. *Science* 289(5477): 284-8. <https://www.ncbi.nlm.nih.gov/pubmed/10894773>.

Watson JT, Gayer M and Connolly MA (2007) Epidemics after Natural Disasters. *Emerging Infectious Diseases* 13(1): 1. <https://dx.doi.org/10.3201/eid1301.060779>.

Wollenberg E, Richards M, Smith P, Havlík P, Obersteiner M, Tubiello FN, Vuuren DP, Dickie A, Neufeldt H, Sander BO, Wassmann R, Sommer R, Amonette JE, Falcucci A, Herrero M, Opio C, Roman-Cuesta RM, Stehfest E, Westhoek H, Ortiz-Monasterio I, Sapkota T, Rufino MC, Thornton PK, Verchot L, West PC, Soussana JF, Baedeker T, Sadler M, Vermeulen S and Campbell BM (2016) Reducing emissions from agriculture to meet the 2 C target. *Global change biology* 22(12): 3859-64. <http://onlinelibrary.wiley.com/doi/10.1111/gcb.13340/full>.

World Bank (2015) *Shock waves: managing the impacts of climate change on poverty*, by Hallegatte S, Fay M, Bangalore M, Kane T and Bonzanigo L. World Bank Publications: Washington. <https://openknowledge.worldbank.org/handle/10986/22787>.

World Health Organization (WHO) (2013) *Global nutrition policy review: what does it take to scale up nutrition action?* WHO: Geneva. <http://apps.who.int/iris/handle/10665/84408> [last access on 19 April 2017].



Letter to the Editor

As I see the challenges of the Decade of Nutrition: Some key points

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1. The experience from past United Nations-sponsored Decades has not been very positive. We need to do better – this is indeed a challenge. Since changes will not come from above, a significant difference will only be made if public interest civil society organizations and social movements push Member States to commit to action plans and then hold them accountable for this commitment at least on a year-to-year basis. Moreover, it is time that we begin talking about food and nutrition security and not food security and nutrition. Even better, we need to get UN agencies to adopt the already widely accepted concept of Food Sovereignty.
2. As soon as possible, it is critical to refocus the Decade on the Human Rights framework clearly identifying claim holders and duty bearers, as well as carrying out a capacity analysis of their expected roles; a massive HR learning process is essential in order to achieve this. A process of empowering claim holders to organize, mobilize and demand needed changes is key. Without this, we can anticipate little progress or just token steps 'to keep up with the Joneses' and save face in front of the international community. Moreover, and most importantly, it is not for us to decide on priorities from top-down! It is the claim holders suffering violations of their right to nutrition who should lead in deciding on priority actions.
3. The core issue of the Decade is a push or pull question. Only pulling by claim holders will move the Decade ahead. UN and other international agencies can do little to push Member States to commit. History is clear about this.
4. Furthermore, we must be much more skeptical about private sector actors – working for the nutrition interests and rights of claim holders is counterintuitive to them. This is why so many of us are sceptical about the Scaling Up Nutrition (SUN) Initiative with its well-exposed conflicts of interest. As mentioned above, public interest civil society organizations and social movements have the crucial role in monitoring progress made in the progressive realization of a ten-year plan to fulfil the right to nutrition. Annual benchmarks of processes to be set in motion have to be set so that civil society organizations can annually assess progress, stagnation or retrogression, for example, through shadow reports.
5. The contributions to the Decade of the UNSCN, of the Committee on Food Security (including the Civil Society Mechanism) is indeed very important; it is hoped they will be by championing the points made in this letter. Otherwise, we will be discussing the same shortcomings by the end of the Decade.

Point: A one-sided understanding of the foreseen role of the key actors of the private sector in the Decade and in the food and nutrition realm in general is clearly unhelpful.

Previous SCN News carried a section on Private Sector Perspectives. Stordalen and Mushtaq's article on feeding the world in SCN News #41, purports to speak about the role of the private sector in the Agenda 2030 (pp. 80-82). I believe that it was clearly misleading in advocating for, in my opinion, the wrong road map to the future.

Let me make myself clear. It is certainly not true that public health and environmental sciences are now converging with business needs and opportunities – and this surely is not a win-win proposition for victory. It is further untrue that our food supply needs to be profitable for the business sector for things to work for the better. The vast millions in need of fair access to food certainly need another kind of food security. Other issues are also in need of debunking.

Point: Half-truths and, worse, distortions and biases should definitely not be our guide in the implementation of the Decade.

- Today, the global food system is increasingly agro-industrial, which is why it is unsustainable; it undermines the environment and is oblivious to climate change and to the loss of biodiversity. It further certainly does not deliver nutrition equitably.
- It is not true that non-communicable diseases surpass infectious diseases as the leading cause of death worldwide if we consider absolute numbers.
- Sustainable food systems are at the very centre of the already unfolding Decade's agenda.
- The current Decade of Nutrition agenda certainly does not call for a paradigm shift that blocks the chances of businesses in the Big Food sector to grab.
- Furthermore, it would be a good idea if consumer demand for healthy foods would reward good businesses. But this is far from the truth. It is actually Big Food that entices and manipulates the consumers to purchase their ultra-processed products. The quick transformation that businesses aim for is actually a token reformulation of junk foods to cut their salt, sugar and trans fats content – but still producing and aggressively marketing ...junk food!

Point: Is the Decade of Nutrition really calling for a roadmap for transformative change in the food industry?

As mentioned above, a transformative change towards token reformulation is a clever and quick reaction or gimmick (mostly a whitewashing one) that purports that industry empathizes and complies with our worries about non-communicable diseases (NCDs). This is not a significant enough change of behaviour of industry; much less is it radical. Rather, it is forced upon them already from the NCDs High Level UN Meeting on NCDs in New York in 2012 – and has created a brilliant opportunity for them for yet more sales. What is actually needed is to challenge existing business models all along the food value chain.

For these and many other reasons, one can confidently disagree with the often heard assertion that reliable business models are 'essential' to direct private capital and investments in the direction of better nutrition. If the business community interprets the new Decade's agenda as a roadmap for transformative change, we have yet to hear what they intend to do – this is where the real challenge lies right now. Industry has been, is and will be mapping out future markets, further profitability and ways to influence new legislation favourable to them. This is their leitmotif. Let us not be deceived by what we read about Big Food and Big Soda bringing a new set of ethical values, greater transparency and catering to consumer aspirations. If they have not yet done so, why would they do it now? A truly good reason would be this: business needs to make operations more sustainable, yes, but certainly not by exploiting the new opportunities that allow them to become yet more profitable from now on. A chameleon position?

Moreover, in the realm of food production practices, land, food, water, energy and minerals are increasingly exploited – in large part by transnational corporations, be it in palm oil plantations or by outright land grabbing. To date, nothing is said about this in Decade documents. No justification is either given for why higher volumes of food need to be produced when a large portion of it is being grown for animal feed or to be used as biofuels. I cannot figure out why we so often read that we need to increase plant-based foods if used to produce more meat and dairy products, because this can potentially increase profit margins. If industry thinks that there is no longer a trade-off between sustainability and profit, I simply ask: How aspirational is this assertion?

Point: New partnerships to bring about change?

Profit-driven actions can and do deviate from the interests of society. But then, can 'well-regulated private sector forces'

drive forward rapid positive change? The key question in this is: Are these forces well-regulated in our food and nutrition sector? Of course not. But worse, can the private sector have an important role to play in contributing to the political discussions ensuring that business needs are taken into account when implementing the Decade of Nutrition? Decisions in our field (and other global concerns) are the prerogative of Member States in the public domain. Period. The private sector is not to be a central engine in the transformative shift of the next ten years; at the most, perhaps just one of the four wheels. The contributions from the private sector have simply not been transparent and accountable with respect to the business engagement in global policy processes. There is no room for them in global policymaking. Do we need to be reminded of the baby milk industry? We are often made to believe that there are positive, historically transformative shifts attributable to Big Food to be cited, but I cannot find them. Finally here, in an exaggerated fashion, we are also often told that one of the strongest calls for action in the global conversation on the Decade's agenda has been to enable new partnerships to be the main engine of change. Really? What about the strong rebuttal in the literature about public-private partnerships and their letting-the-public-sector-take-the-risks-with-the-private-partner-reaping-the-benefits? Or, what about the flagrant conflict of interest of the private sector in many so-called multi-stakeholder platforms?

Point: A new model for transformative change?

If what we read above about public private partnerships and multistakeholder platforms is to be the new model during the coming years of the Decade, I strongly purport both are, not only out of place, but outright dangerous.

Yes, business strategies are needed in both the short and long term. Yes, guidance from the scientific community is

needed. But what is needed more is guidance from public interest civil society organizations and social movements representing claim holders whose right to nutrition is being violated. Not enough is emerging about the latter beyond lip service. As set up, platforms between science, policy, civil society and business can – and if not careful will – distort the balance of these actors by biasing it towards the purportedly key role of the private sector. How much of what we get to read is said directly or indirectly (using a front organization) in the name of big private sector players will be difficult to determine. But the risk of this model becomes clearer day after day and is not worth running. I apologize for saying so, but how could I not strongly suspect it? (Note that I do not chastise all actors of the private sector, but a majority of the big players.)

IN SUMMARY

Yes, we are all in search of a new paradigm of universal prosperity and good nutrition, but certainly not a paradigm of profitability. Yes, we need to channel economic forces in a more prudent direction, and certainly not in the direction that unfortunately they have been pointed towards at the beginning of the Decade. Public interest simply must prevail; platforms that align public and private sector interests cannot just give lip service to the role of the public interest sector.

In short, I find elements in the Decade that have a high risk of being misguided in terms of the direction they point to, especially since, when so doing, I find a whole lot of contradictory statements that ultimately go against the grain of the true spirit of the Decade and of the post-2015 Development Agenda. I will be glad to be refuted if wrong in my perceptions.

Anyone for a counterpoint?

Awards and Obituaries

Mohamed Ag Bendeche honoured with the Distinguished Nutrition Award for Africa

AWARD

The Africa Nutrition Society at the 7th Africa Nutrition Epidemiology Conference (ANEC VII), held in Marrakech in October 2016, honoured Mohamed Ag Bendeche, Senior Food and Nutrition Officer for the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Africa, with the prestigious Africa Award for Distinguished Services to Nutrition on the Continent. In recognition for his outstanding and distinguished contribution to nutrition training, capacity development, research and service to improving nutrition outcomes, he received a standing ovation by the over 400 participants that attended the Conference. In a citation during the award ceremony, the Executive Council of the Africa Nutrition Society lauded Mohammed's humility and dedication to improving nutrition in Africa, beginning in his home country of Mali where he started his research in Nutrition Epidemiology in the early 1990s, rose to become the Africa Regional Nutrition Adviser for Helen Keller International and consequently joined the United Nations Children's Fund (UNICEF), eventually becoming the Regional Senior Food and Nutrition Officer for FAO Regional Office for Africa. Mohamed shaped flagship programmes during his career in nutrition, which include vitamin A supplementation through child health days, reaching over 50 million children twice yearly, food fortification programmes, reaching over 130 million consumers, and sustainable nutrition-sensitive agriculture and food systems across several countries and regional economic communities in Africa. Mohamed was instrumental in leading the prioritization of nutrition in national as well as regional agriculture and food security investment plans



and strategies across Africa. He also pioneered Urban Food Systems Analysis and the Renewed Effort against Child Hunger on the continent. He continues to mentor several young African nutrition professionals and lectures on strategic regional nutrition capacity development programmes and institutions in Africa. Over the course of his career, Mohamed has authored and co-authored several peer-reviewed scientific publications, and chapters of books and reports on nutrition. He is currently a member of the Independent Expert Group (IEG) of the Global Nutrition Report (GNR).

In his pre-award presentation, Mohamed indicated that Africa is facing multiple and overlapping burdens of malnutrition with high socio-economic effects. Overall progress on the World Health Assembly nutrition target indicators is mixed, calling for continued determination and resolve to reduce and prevent malnutrition in all its forms on the continent of Africa and globally. This could be achieved with the right focus, interventions, policies, sustained commitments, and stakeholder accountability mechanisms. There is need for predictable and dedicated nutrition financing, better allocation of resources, data generation and doing business differently.

The nutrition community extends hearty congratulations and acknowledges with pride the contribution of Mohamed Ag Bendeche to reducing and eliminating malnutrition in all its forms. We wish him all the best as he begins his retirement.

Leslie Burgess

Technical Secretary of the UNSCN 1978-1985

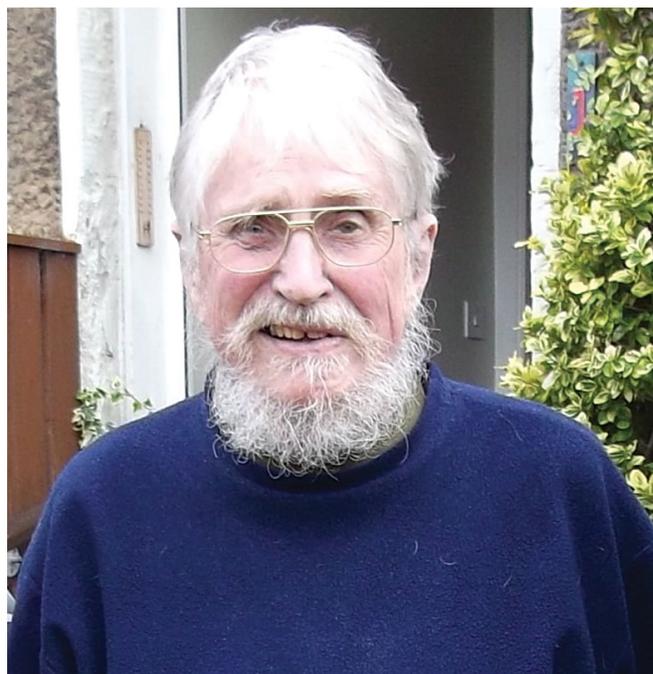
1930 – 2017

OBITUARY

All of us at the UNSCN offices were very sad to hear of the passing of Dr Leslie Burgess, the former Technical Secretary of the UNSCN.

Henry Jacques Leslie Burgess (known as Leslie) was born in Dundee, Scotland on 11 August 1930. He attended Edinburgh Academy and graduated in medicine from St Andrews University in 1956. In 1958, he joined the Colonial Service, earned a Diploma in Tropical Medicine and Hygiene from the University of Liverpool and worked in Uganda as a Medical Officer. In 1959, he moved from Tororo to Kampala to run the Government Nutrition Unit and worked closely with the Medical Research Council's Infantile Malnutrition Research Unit conducting surveys on the prevalence of child malnutrition in Uganda.

In 1960, he married Ann Farmer; their three sons were born in 1961, 1963 and 1966. In 1961, Leslie went to the London School of Hygiene & Tropical Medicine where he earned a Diploma in Public Health. Leslie joined the World Health Organization (WHO) in 1965 and served as WHO's Inter-country Nutrition Consultant for East and Southern Africa until 1971, based first in Dar es Salaam, United Republic of Tanzania and then Blantyre, Malawi. In 1972, Leslie earned a Master of Science in Nutrition from



Harvard University and was appointed Regional Advisor in Nutrition for the Western Pacific Region based in Manila, Philippines. In June 1978, Dr Leslie Burgess was appointed Secretary of the then UN Administrative Committee on Coordination (ACC) Sub-Committee on Nutrition based at FAO headquarters, Rome.

In August 1985, Leslie retired to a cottage in the Scottish Highlands, while, for several years, carrying out consultancies for WHO in Malaysia, Nepal, the Philippines and China. Leslie prepared many publications and reports, and co-authored the 1972 edition of 'Nutrition for Developing Countries'.

Leslie was the UNSCN's first Technical Secretary following the winding-up of its predecessor, the Protein Advisory Group. As would be expected, this transition period faced many problems, but Leslie's strong technical background, dedication to the importance of nutrition, and quiet, warm and supportive style were ideally suited to making everybody feel that they had a strong contribution to make to the UNSCN.

Dr Leslie Burgess was truly a nutrition pioneer, and we all owe a large debt to him.

Urban Jonsson

1944 – 2016

OBITUARY

Urban Jonsson, who left us in March 2016, at the age of 72, was born in a small village in northern Sweden, where he first developed an interest in food science and technology, eventually receiving a Ph.D. from Chalmers University of Technology in Gothenburg.

Urban credited Olof Melander, one of the founders of the Ethiopian Nutrition Institute in the 1960s, for sparking his passion in nutrition. It was this interest that took him to Tanzania in 1973. He lived there for five years, although, as he later wrote: "I really never left Tanzania after that. Tanzania has become my second, or maybe my first, home country."

From Tanzania, Urban took a post at the United Nations University World Hunger Programme in Tokyo. However, a position with the United Nations Children's Fund (UNICEF) soon took him back to Tanzania as country representative for eight years. He also served as Chief of Nutrition in UNICEF headquarters in New York, and then successively Regional Director for South Asia, and Regional Director for East and Southern Africa.

For many years, Urban was an active member of the UN Standing Committee on Nutrition, where he initiated the SCN Working Group on Nutrition as a Human Right.

In his last year at UNICEF, he served as Senior Advisor to the Executive Director on Human Rights. He led the groundbreaking work to develop UNICEF's conceptual framework for nutrition causal analysis, now universally adopted. He was also well known for his deep insights into the links between human rights, development and democracy.



Urban was a conceptual thinker. He understood the importance of politics in nutrition. He was a master communicator and he also understood how to move things forward on nutrition, even when seemingly impossible. He was practical yet idealistic. His endless search and resolute commitment to results propelled him to levels of accomplishment that most can only wish for.

Urban provided voice to the voiceless and to the poor, promoting equality of both opportunity and outcome. He was never bogged down by difficult circumstances. He actually sharpened our thinking and action in nutrition, and made us step up our game.

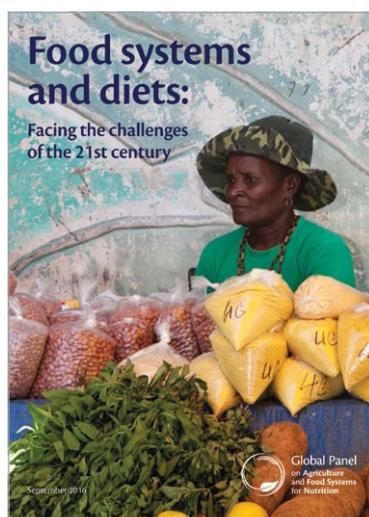
Urban's legacy will live on for many years to come. Let us celebrate his life.

"Urban was a genius, possessed rare knowledge of human rights and philosophy that he brought to bear to political processes especially in nutrition. I always learned from what he wrote," said Ted Greiner, a long-time friend.

Urban is survived by his wife Olivia Yambi and two daughters. When they ask us about him, we will not say he died. Like the old Romans did, we will say he lived.

See:

1. Jonsson, Urban. 2003. Human Rights Approach to Development Programming, UNICEF.
2. Urban Jonsson, Talk on WBCi Initiative 2013, available at www.youtube.com/watch?v=SyhdPejR4EE;2. https://books.google.co.uk/books/about/Human_Rights_Approach_to_Development_Pro.html?id=l-bwfNDp1YAC&redir_esc=y



Food systems and diets: Facing the challenges of the 21st century

Food systems and diets: Facing the challenges of the 21st century, published by the Global Panel on Agriculture and Food Systems for Nutrition, uses modelling and trend analysis to describe how diets and food systems could change by 2030.

Drawing on over 250 data sources and peer-reviewed articles, the report provides recommendations for policymakers in low and middle income countries, through a 'Call to Action'. This is supplemented by an article in Nature listing 10 specific priorities for research.

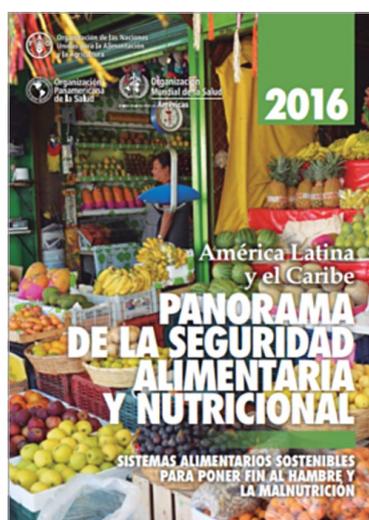
Food systems need to be repositioned from feeding people to nourishing people, through actions that go beyond agriculture to encompass trade, the environment and health, harnessing the power of the private sector and empowering consumers to demand better diets.

Changing food systems, now and in the future, to deliver high quality, safe diets that do not undermine the environmental basis for nourishing future generations, will have multiple, positive economic health and social impacts. But a policy response, on the scale and commitment used to tackle HIV/AIDS and malaria will be required to meet this challenge.

Citations:

<http://www.glopan.org/foresight>.

<http://www.nature.com/news/a-new-global-research-agenda-for-food-1.21052>.



Regional Overview of Food and Nutrition Security in Latin America and the Caribbean 2016: Sustainable Food Systems to eradicate hunger and malnutrition

Food and Agriculture Organization of the United Nations (FAO) and Pan-American Health Organization (PAHO) ([online](#))

The Decade of Action on Nutrition and SDG 2030 Agenda put on the table new challenges for Latin America and the Caribbean. One of them, related to SDG 2, is about eradicate hunger and all forms of malnutrition, in a regional context on which deficiency nutrition-related problems are decreasing, but still important hunger and undernourishment prevalence coexists with increasing numbers of overweight and obesity and non-communicable chronic diseases (NCDs).

In this first joint effort of FAO and PAHO/WHO co-editing one of the most important FSN publications of the region, changes on global and regional food patterns in the last decades are identified as one of the main reasons of the increasing overweight and obesity rates, in countries which still are fighting against hunger and undernourishment, as Latin America and the Caribbean ones. Emphasis is put on how sustainable food systems can promote healthy diets, as a common strategy which could face hunger and malnutrition. Public policies focused on promoting healthy diets and facilitating the supply of healthy food are analysed, as well as the situation of the 4 dimensions of food security and nutrition in Latin America and the Caribbean.

For more information, please contact:

Ricardo Rapallo, FAO, Regional Food Security Officer (ricardo.rapallo@fao.org)

Programme News

Gardens for Health International

Marcella Canelo

Gardens for Health International (GHI) is an innovative organization that works to provide sustainable agricultural solutions to chronic childhood malnutrition in Rwanda. Working with government health centers, GHI offers comprehensive trainings to partner families in health and agriculture in order to treat and prevent malnutrition.

Clinical staff at partner health centers refer families of patients diagnosed with malnutrition to the program. Partner families are then enrolled in a 14-week training that covers important health and agriculture topics. By working directly with health centers and staffing field educators as part of clinical personnel, GHI is building capacity and targeting the most vulnerable children at the point of care.

GHI primarily works in Musanze district, where more than 90% of families are involved in agriculture, yet more than half of the households aren't receiving necessary nutrients. GHI's Home Garden Package helps families make the most of their existing resources by providing seeds and seedlings, as well as small livestock (chickens and rabbits), to promote both dietary diversity and biodiversity. Seeds alone will not solve malnutrition, so GHI also equips families with the knowledge and resources to keep their children healthy in the long term through health education. This education is based on community feedback to address many factors that are often overlooked, such as hygiene, family planning, breastfeeding and nutrition.

GHI is committed to innovation and it is this commitment that led to launch two pilot programs. Their latest antenatal care program works directly with pregnant women to improve health and nutrition outcomes, helping to reduce the risk of malnutrition even before birth. Men should be part of the solution so GHI uses savings groups as a launching point for men's education in our new men's engagement program.

GHI has made many strides to improve malnutrition in Rwanda, and we will continue to look for new ways to extend our reach and provide sustainable, lasting solutions.

Building the blocks for nutrition mainstreaming in Zambia-IFAD investments

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IFAD, a specialized UN agency committed to eradicating rural poverty in developing countries, is proactively promoting nutrition agenda in its various country programmes. IFAD believes that the focus on nutrition will improve quantity and diversity of rural food supply, enhance poor people's access to nutritious and safe foods, create employment opportunities, reduce poverty and improve overall wellbeing of rural populations. The Zambia portfolio is an example of IFAD investments in the East and Southern Africa region which has demonstrated a progressive approach from nutrition retrofitting and currently incorporating explicit nutrition focus at the early stage of programme design.

In 2015, the Government of the Republic of Zambia and IFAD undertook the task of Portfolio alignment. It was an opportunity to draw-out areas of complementarity among the 4 on-going IFAD programmes in Zambia. There were discussions on how to integrate nutrition in these programmes to build synergies for enhanced overall impact of project goals. Nutrition lens was used in aligning parallel activities of the portfolio for increased impact on malnutrition reduction. The portfolio alignment discussions resulted to a nutrition sensitization workshop implementation as an approach to accelerate operations.

It has been demonstrated that retrofitting nutrition in on-going programme had some challenges due to lack of nutrition concern at design stage. The 4 on-going programmes in Zambia portfolio and their implementers were engaged on nutrition awareness raising and they were tasked to develop actions for nutrition mainstreaming. One of the programmes - Smallholder Agribusiness Promotion Programme (SAPP) - developed an operational plan to address key issues raised from a food survey.

Food survey was conducted to assess food knowledge, attitude and practices (KAP) of the households benefitting from SAPP interventions. The integration of KAP in SAPP was associated with the fact that increased agricultural production and incomes does not guarantee adequate family diet. The survey probed for barriers hindering adequate dietary intake. Through engagement with nutrition officers at national and district levels, IFAD provided technical guidance to reach out to target groups on the insights of prevailing malnutrition situation. A policy brief was thereafter produced and used in sensitization sessions. SAPP was the first IFAD programme in Zambia to pilot the approach of food KAP survey.

To support the efforts of Zambia on nutrition-sensitive agriculture, an IFAD grant was approved to specifically strengthen capacity of local actors on nutrition-sensitive agri-food value chain. This on-going grant project is working with partners on analyzing food values chains to assess evolution of nutrients along the chain.

In light of accelerating nutrition-sensitive agriculture in Zambia, a new IFAD investment programme Enhanced Smallholder Agribusiness Promotion Programme (E-SAPP) is designed with the theory of change for integrated impact pathways for nutrition outcomes. E-SAPP is a second phase of SAPP with an integrated explicit nutrition objectives and an earmarked budget of USD1.2 million on nutrition-smart agri-food systems. It will take the pilot of KAP food survey in SAPP as an approach for learning and accelerating nutrition operations.

Canadian dietitians apply a sustainable food systems lens to promoting healthy diets

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Canada has a strong record of international commitment to funding nutrition (i.e. Nutrition for Growth 2013). Canada also recognizes the need for nutrition policy, promotion and intervention in its own back yard, where almost two-thirds of Canadians are overweight (IFPRI 2015) and household food insecurity affects almost 4 million people, with alarmingly high rates in some areas such as Nunavut – almost half of the population (PROOF 2017). Canada has prioritized nutrition in its domestic social policy, with current mandates including a Healthy Eating Strategy, National Food Policy, Nutrition North Canada and Canadian Poverty Reduction Strategy.

Dietitians of Canada (DC) is stepping up in support of a sustainable food systems perspective to enhancing nutrition at home (Dietitians of Canada, 2016). DC is the association of licensed nutrition professionals. In recognition of the UN Decade of Action on Nutrition and the Rome Declaration's commitment to enhance nutrition through sustainable food systems, DC launched a Sustainable Food Systems Leadership Team in 2016. The purpose of this Team is to inform evidence-based innovation and advocacy – providing dietitians with resources to “put on the table” in intersectoral dialogue with stakeholders and decision-makers. Thus far, the team has contributed sustainability perspective to government consultation on dietary guidance, and will continue to apply this lens to inform advocacy for regulatory approaches to support healthy food environments (e.g., food policy, nutrition labelling, and food marketing). The team also plans to contribute to knowledge translation in Practice-based Evidence in Nutrition (PEN®) and hands-on workshops.

In collaboration with food system researchers from Acadia University (Canada) and the Blekinge Institute of Technology (Sweden), dietitians are co-creating a meaning of “sustainable food systems that promote healthy diets” which they can stand behind. DC members are also identifying barriers and supports, actions, and indicators of progress towards a vision of success.

This research combines professional knowledge with expert-informed evidence on sustainable systems through *backcasting* from universally applicable, sustainability principles (Broman & Robert 2016). In this way the developed vision aligns with a sustainable future. This methodology does not dictate which actions are appropriate; only what principles must not be violated. In this way it is flexible for use in diverse socioecological settings.

Through this work, Canadian dietitians are contributing to a sustainable trajectory for food systems that promote healthy diets. Given the global reach of our food and natural systems, these efforts can have global reach to help support Canada's commitments to the Rome Declaration and Global Sustainable Development Goals.

References

- Broman, G. I., & Robèrt, K.-H. (2016). A framework for strategic sustainable development. *Journal of Cleaner Production*. <https://doi.org/10.1016/j.jclepro.2015.10.121>
- Dietitians of Canada. CEO ENDS interpretation [2016 - 2020]. Toronto, Ontario: Dietitians of Canada; 2016 May. (Vision 2020).
- International Food Policy Research Institute. (2015). *Global Nutrition Report 2015: Actions and Accountability to Advance Nutrition and Sustainable Development*. International Food Policy Research Institute.
- Nutrition For Growth. (2013). "Nutrition for Growth Commitments: Executive Summary." UK: DFID.
- PROOF. (2017). Monitoring Food Insecurity in Canada. Fact Sheet. Accessed February 7. <http://proof.utoronto.ca/resources/fact-sheets/#monitoring>

WHO recommendations on antenatal care for a positive pregnancy experience

A healthy pregnancy requires an optimal diet that includes an adequate intake of macro- and micro-nutrients. Both undernourishment and overnourishment have negative consequences to the pregnant woman and her baby. In order to support countries in addressing the challenges of preventing pregnancy-related mortality and morbidity, the World Health Organization (WHO), in accordance with their guideline development standards, have produced a comprehensive guideline on routine antenatal care. The guideline includes recommendations on 14 nutrition interventions that apply to pregnant women and adolescent girls within the context of routine antenatal care. See <http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf?ua=1>.

The Accelerating nutrition improvements: best practices for scaling up package (http://who.int/nutrition/ANI_project/en/) describes examples of best practices related to how nutrition surveillance and health information systems were strengthened and how nutrition interventions were scaled up in Ethiopia, Uganda and the United Republic of Tanzania. These best practices were documented as part of the Accelerating Nutrition Improvements in sub-Saharan Africa (ANI) project implemented by WHO, in partnership with ministries of health and local partners, in 11 countries [1] during the period 2013-2016. The ANI project was supported by Global Affairs Canada.

Realigning Agriculture to Improve Nutrition (RAIN) project

What was done?

The Realigning Agriculture to Improve Nutrition (RAIN) project and impact evaluation were designed to help address a critical gap in the evidence base regarding the degree to which agricultural interventions can improve child nutrition and ultimately reduce the prevalence of stunting in young children. RAIN aimed to establish 'proof of concept' for an intervention model that could be replicated and scaled up.

The RAIN project comprised of household level agricultural interventions to increase year round availability of, and access to, nutrient rich food, whilst in one study arm, the promotion of optimal health, nutrition and care seeking behaviour through the delivery of social behavioural change communication was added. Awareness raising and training to improve gender equality was conducted in both intervention areas. The third study arm was a control area. Support for coordination and alignment of multi-sectoral activities to reduce undernutrition at a District level (across all study arms) was given through the growth of a District Nutrition Coordinating Committee (DNCC).

What was found?

Over 4 years of intervention, RAIN was successful in increasing production of diversified micronutrient rich crops. The number of months in which Vitamin A rich foods and dairy were available increased and there was a significant increases in maternal diet diversity but not in child or household diet diversity. Women's decision making and empowerment improved across a range of domains. However, while stunting decreased across all areas from 44.8% to 28.5% the decrease was not greater in the intervention area when compared to the control.

What was learnt?

RAIN made progress on the early steps of the impact pathways that lead from agriculture to improved nutrition. Short project duration may have been a limiting factor in achieving greater impact, particularly in ensuring effective participation of families throughout the first

1000 days. Full population coverage was not achieved which could have diluted project impacts. While RAIN increased production of micronutrient rich foods, the project didn't quantify volumes, consumption, sales and food purchases and it is probable that year round access and availability remained constraining factors in achieving greater diet diversity, particularly given challenges in access to water for production during the long Zambian dry season. Lastly, the impact evaluation study was not designed to account for elements beyond the RAIN project and could explain very little of the decrease in stunting across the project area. Other factors, such as improvements of government services for example invite further exploration and analysis.

The RAIN project was implemented in Mumbwa District of Central Province, Zambia by Concern Worldwide and the Mumbwa Child Development Agency with funding from Irish Aid. The International Food Policy Research Institute (IFPRI) conducted the impact evaluation. More information can be found on www.concern.net/rain.

Tufts University-based Food Aid Quality Review activities

The UN Decade of Action on Nutrition calls for sustained commitment to six pillars identified in the ICN2 Framework for Action, which include strengthening nutrition governance and accountability.¹ Since 2009, the Tufts University-based Food Aid Quality Review (FAQR), funded by the US Agency for International Development's Office of Food for Peace (USAID/FFP), has engaged with experts worldwide to accomplish this in respect to food aid.² Two of FAQR's initiatives offer opportunities for decision-makers, researchers, and implementers to strengthen food aid governance supportive of nutrition through coordination, transparency, and evidence-based decision-making. They are, 1) harmonization of major agencies' food aid processes, specifications, and activities, and 2) Research Engagement on Food Interventions for Nutritional Effectiveness (REFINE).

The first initiative recognizes a critical need to coordinate overlapping activities of food aid providers. In 2016, FAQR facilitated the establishment of an "Inter-Agency Working Group for Specialized Nutritious Foods" consisting of USAID, United Nations Children's Fund (UNICEF), United Nations World Food Programme (WFP), and Médecins Sans Frontières (MSF) International. Drawing from normative and scientific guidance, this group aims to ensure food aid products are formulated, produced, and used in compliance with international standards. Overall, this work takes a traditional approach, facilitating high-level problem solving based on aggregated evidence and common experiences across agencies.

The second initiative, REFINE,³ supports generation of, access to, and use of rigorous evidence that fills gaps in the knowledge of how food aid can best improve nutrition. The project's website catalogs food aid-related research, aggregates grey and empirical literature, and identifies gaps in the empirical knowledge base. Its twitter and communications activities promote wide sharing of research conclusions. Through technology, REFINE provides neutral platforms for stakeholders to gather information.

The UN Decade of Action on Nutrition is a rallying point. These two FAQR activities can (and do) serve policymakers and implementers as they contribute to the global goal of ending malnutrition. For policymakers, they harness traditional and modern approaches to bolster evidence-based nutrition governance. For implementers, they are a reminder of the importance of their work in generating good data. Over the next nine years, these groups must collaborate so that the very best evidence is applied to meeting the world's nutrition goals.

IMMANA

Innovative Methods and Metrics for Agriculture and Nutrition Actions ([IMMANA](#)) is a research initiative funded by UK Aid and coordinated by the Leverhulme Centre for Integrative Research on Agriculture and Health ([LCIRAH](#)). IMMANA aims to accelerate the development of a robust scientific evidence base needed to guide changes in global agriculture and food systems to feed the world's population in a way that is both healthy and sustainable. The project consists of three interrelated work streams:

- Competitive Research Grants to develop innovative methods and metrics for agriculture and nutrition programming
- Post-doctoral fellowships for emerging leaders in the field of Agriculture, Nutrition and Health research
- The Agriculture, Nutrition and Health Academy, which is a global research network in agriculture and food systems

1 FAO. Conference Outcome Document: Framework for Action. Second International Conference of Nutrition (ICN2), Rome/Italy 2014.

2 Defined as in-kind food transfers. Schnepf R. US International Food Aid Programs: Background and Issues. Congressional Research Service. 2015.

3 REFINEnutrition.org.

Progress so far: Grants and Fellowships Round 1

Under the first round of awards, IMMANA funded seven grants and six fellowships: projects that explore a number of methodological issues in agriculture and nutrition research. These range from developing tools to better understand women's empowerment, intra-household dynamics, livelihoods of smallholder farmers and school feeding programmes, to advancing methodological approaches to macro topics including food system dynamics; the affordability of nutrition diets; surveillance for climate-smart agriculture and probabilistic causal models linking agriculture and nutrition.

New projects: Grants and Fellowships Round 2

IMMANA is proud to announce the recent award of a further eight grants and six fellowships. These projects – in countries including Bangladesh, India, Ethiopia and Ghana - address a spectrum of agriculture-nutrition linkages in need of improved methods and metrics.

Among the latest grants are those that investigate methods to estimate nutritional post-harvest losses and assess household water insecurity. Others seek to develop new tools that have the capacity to identify nutrient gaps in local food systems, as well as innovative methods for performing nutritional assessments.

Similarly, the second round of fellowships - now well underway – includes projects that confront challenges associated with adequately analysing agricultural trade policies, food prices and soil nutrients, and understanding links between crop choices, fish consumption and nutritional status.

No Wasted Lives: a joint effort to accelerate action on acute malnutrition

Severe acute malnutrition results in 1-2 million preventable child deaths each year making children 9 times more likely to die from common infection than their better-nourished peers. Treatment for this most lethal form of malnutrition is simple and effective. More than 70% of those treated are completely cured but less than 20% of children affected are able to access the treatment they need.

Recognising the scale of the challenge and the opportunity for change, UNICEF, the UK government, the European Commission, Action Against Hunger and the Children's Investment Fund Foundation have joined forces to accelerate collective global action. First announced during the UN's Decade of Action on Nutrition event at the 2016 UN General Assembly, the *No Wasted Lives* coalition committed to help accelerate a child survival revolution by building knowledge about prevention and treatment of acute malnutrition, catalysing investment, and doubling the number of children receiving treatment to 6 million a year by 2020.

By working together, with governments and other key players, No Wasted Lives will make severe acute malnutrition a political and public health priority, discover and disseminate effective ways to prevent and treat severe acute malnutrition, mobilise more money and maximise effectiveness of current spending.

For more information about global, regional and national activities supported by No Wasted Lives please visit www.nowastedlives.org.

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN): A country-focused nutrition knowledge initiative

POSHAN, a multi-year nutrition knowledge initiative led by [IFPRI](http://www.ifpri.org) and supported by the Bill and Melinda Gates Foundation, commenced activities in September 2011, with the goal of supporting policy and program decisions and actions to accelerate reductions in maternal and child undernutrition in India, through an extensive process of evidence synthesis, knowledge generation and knowledge mobilization. Over the last few years, POSHAN has worked actively on rallying and connecting the nutrition community at the national level on diverse topics related to delivering for nutrition, has supported networks of champions for nutrition, and has focused on raising the profile of issues related to data and quality evidence for decision-making for nutrition among diverse nutrition stakeholders in India. POSHAN's work aims to make more evidence publicly available for nutrition actors in India to use, to create more opportunities for engagement around nutrition evidence and data, and to bring diverse actors together around various issues related to delivering high impact nutrition interventions.

POSHAN's work over the last few years has revealed that:

- Policies exist for most of the essential nutrition interventions.
- Program platforms are in place for delivering at scale but operational guidelines and tools and/or monitoring indicators are not always available for all interventions.
- Translation of policies to actions on the ground is affected by an inadequate consideration of financing for nutrition, as well as variability in the existence and use of operational guidelines for specific interventions, monitoring of interventions, frontline worker role clarity and intervention-specific capacity, incentives, and other factors.
- An estimated 5.93 billion USD are required annually to deliver a core set of nutrition-specific interventions at scale.
- Effective multisectoral actions will require convergence, leadership and coordination from supra-ministerial entities.
- Engaging stakeholders around evidence for nutrition is best planned with a clear understanding of how stakeholders are positioned in the nutrition landscape, how they are linked, and how they perceive the value of data and evidence.
- That data and evidence are ever-evolving and sometimes contentious, sometimes difficult to interpret and that honest and dispassionate analyses are essential to harmonize interpretations.

Over the next few years, POSHAN will continue to invest in strengthening the use of data and evidence for nutrition decisions in India and in specific states within India. For more information and resources, visit: www.poshan.ifpri.info.

Food and Nutrition Education as Core Component of Sustainable School Feeding Programmes in Latin America and the Caribbean

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The UN Decade of Action on Nutrition calls on the global community to integrate and scale up best practices from existing nutrition efforts to ensure food and nutrition security for all. As part of these efforts, FAO in collaboration with [Humanitas Global](#) conducted a research study to identify current progress, best practices and policy implications to integrate and expand food and nutrition education (FNE) strategies within sustainable school feeding programs across Latin America and the Caribbean, to guide successful implementation of the [CELAC 2025 Plan for Food and Nutrition Security and the Eradication of Hunger](#).

The study methodology included a systematic and participatory process with literature review, in-depth interviews with stakeholders at central and local levels, and webinars to discuss and validate the results and policy implications.

Overall, findings from this study support robust insights from FNE programs that call for more effective and responsive policies, programs and funding streams to strengthen school-based efforts, including:

- Strengthen FNE policy frameworks. Public policies that sustain FNE are essential for the success of national malnutrition and hunger plans and strategies. Unfortunately, few countries have any specific policy framework.
- Integration of FNE in curriculum. Aspects of FNE such as feeding and hygiene are included in school curricula, but behavioral-based FNE as a core educational subject is not present in most countries in the region. In many cases, FNE is limited to a few knowledge-based lessons per school year.
- The cross-promotion of FNE in schools is critical. FNE is most effective when it is promoted and integrated throughout the school environment. This includes the regulation of school kiosks to offer nutritious and local food, adequate physical activities, and presence of pedagogical school gardens.
- Comprehensive community participation. Members of the school community, including parents, faculty, community leaders and students, are an important resource to strengthen and extend the impact of actions within and outside the school environment. While most regions had some level of community participation, there is need for more thorough and active participation, including capacity development opportunities for teachers and parents.

Successful FNE promotes lifelong healthy eating habits and fosters food environments that enable and support nutrition security for individuals, families, communities and nations. This study aimed to fill knowledge gaps to better inform actions and investments in school-based FNE programs for food and nutrition security.

The Soy Dairy Entrepreneur Network

The Feed the Future Innovation Lab for Soybean Value Chain Research (Soybean Innovation Lab, "SIL") is one of eleven USAID-funded collaborative research support programs for agriculture and food security. SIL focuses on providing critical information needed for successful soybean development to researchers, extensionists, the private sector, NGOs, and funders operating across the entire soybean value chain. SIL brings together leading U.S. and African soybean scientists to provide evidence-based practice needed to develop and commercialize soy and its products in sub-Saharan Africa.

Soy is one of the few commercially available, plant-based sources of high-quality protein, making it an inexpensive alternative to animal-based protein. An 8-ounce serving of soymilk provides 11 grams of protein, just as much as a glass of milk. Due to its versatility, soy is an ideal ingredient for new food products expanding the economic and nutritional portfolio of entrepreneurs. In Africa, soy is used to make soymilk, yogurt, tofu, snacks, baked goods, complementary foods, and it is added to local cuisines as a protein supplement.

SIL's Human Nutrition Research Area focuses on integrating soy's high-quality protein into the diets of undernourished communities. One of its primary activities is providing technological support to soy food enterprises in the developing world through the Soy Dairy Entrepreneur Network, a virtual network of soy entrepreneurs around the world who work to identify and address barriers to developing a sustainable soy food business. The Network exchanges strategies for producing soy food and creating a business around it, and SIL facilitates this sharing of information through webinars, brochures, and local trainings to promote the expansion of the soy foods industry in Africa.

With over 30 entrepreneurs from 10 countries, the Network represents soy food production at all scales, from household start-ups that sell their products to local schools to well-established companies selling to international markets. Currently, SIL is working with the Network to determine the sustainability of the semi-automatic soymilk processing machine or "SoyCow." With the support of several soymilk companies, SIL is analyzing their operation records to determine optimal business models for mechanized soy dairies in different contexts. With its technical expertise, SIL also supports the Network with on-site technical training, new product development, packaging designs, food & labeling certification, business development, and soy cooking and utilization training.

Please contact SIL at soybeaninnovationlab@illinois.edu to get involved with the Network or other SIL initiatives.

The latest findings and tools from the SPRING project

[Understanding Anemia: Guidance for Conducting a Landscape Analysis](#)

Understanding the many possible causes of anaemia is the first step to reducing it, but experience in conducting landscape analyses is limited in many countries. This guide provides instructions to support government stakeholders and program implementers in gathering and interpreting anaemia-related data to strengthen the use of evidence-based and context-specific approaches for anaemia prevention and control.

[Case Studies on Nutrition Governance, Finance and Policy](#)

Based on data collected over two years in Uganda and Nepal, this series provides new evidence on how countries prioritize and fund nutrition-related activities, focusing on the role of national nutrition action plans and multi-sectoral coordination.

[AgNut Context Assessment Tool](#)

Adequate analysis of the factors that contribute to food insecurity and malnutrition in target communities and households is a critical first step to linking agriculture and nutrition. This interactive guide provides a directory of existing tools to help planners in designing or re-designing context-specific projects.

[Seeing is Believing](#)

This report presents results from a mixed-methods evaluation on the acceptability, effectiveness, and scalability of the SPRING community-led video approach on nutrition and hygiene behaviors in Niger.

[Community Health Workers in Nutrition Advocacy Tool](#)

Beautifully presented data to help policymakers better understand the nutrition services community health workers provide in 9 countries and counting. The tools identify gaps in nutrition service delivery to advocate for increased commitment to nutrition in countries' community health programs.

[Upcoming findings and learning opportunities with SPRING](#)

UNICEF C-IYCF Counseling Package in Nigeria: Evaluation Report

SPRING's evaluation of the impact of UNICEF's generic C-IYCF Counseling Package on IYCF behaviors in Nigeria is intended to inform future investments in C-IYCF programming nationally and globally. In addition to the forthcoming endline report, [related resources](#) include interim briefs, training materials, evaluation tools, and success stories, among others.

[Farmer Nutrition School Guide Series](#)

[Farmer Nutrition School \(FNS\)](#) is a community-based learning approach in India that promotes the essential nutrition actions and essential hygiene actions by teaching agriculture, dietary, and hygiene to household members. The FNS Sessions Guide, Technical Guide, and Advocacy Guide (forthcoming) give programs background and support in implementing the FNS approach.

[Communities of Practice](#)

SPRING's work has also contributed to the development and growth of the [Agriculture2Nutrition](#) and [Accelerated Reduction Effort on Anaemia](#) communities of practice, and co-led the development of the [strategic agenda for nutrition SBC at scale](#).

[Webinar series](#)

SPRING hosts monthly webinars to share the most up-to-date learning from our partnerships and research. These events are free and open to the public. [Register here](#).

Mobilising Public-Private Innovation Expertise to Tackle Obesity and Malnutrition

The Asia Roundtable on Food Innovation for Improved Nutrition, or ARoFIIN, was inaugurated on 30 January 2015 in Singapore, aimed to facilitate multi stakeholder dialogues to tackle Asia's biggest health challenges: obesity, malnutrition and non-communicable diseases NCDs like diabetes.

ARoFIIN initiates dialogue between government, academia, industry, non-governmental organisations and society to exchange views on the landscape as it relates to the social, economic and health opportunities on nutrition based R&D and innovation as well as consumer behaviour changes in the food and nutrition areas.

ARoFIIN has established four broad areas for collaborative activity:

- Platform: Establish a Knowledge Hub and continue critical ARoFIIN dialogue among parties
- Consumer: Commission research by filling knowledge gaps on diet, sources of nutrients and consumer preferences and the impact of obesity in the context of the Asian phenotype
- Regulation: Understand the barriers/enablers to innovation and cultivate a regulatory climate that stimulates innovation to address obesity and NCDs
- Double Burden: Embrace NGOs in the development of finance mechanisms and projects that address malnutrition at both ends of the spectrum

Launching into real action, the members of ARoFIIN identified key areas and worked on roadmap to achieve the objectives towards a healthier, happier Asia rely on the dynamism, dedication and commitment of everyone involved in this unique public private partnership. Some outcomes include:

- An Economic Intelligence Unit study has been commissioned to assess the economic cost of obesity in Asia and to identify possible interventions to reduce obesity. Draft results are expected in October 2016 with a possible report launch later in 2016. An inception report of the study was presented at the 2nd ARoFIIN Roundtable.

- Coordinated by AROFIIN, the industry members are invited to support Singapore's Health Promotion Board in the development of a mobile phone app which enables consumers to identify healthier food choices in supermarkets.
- AROFIIN is in progress of conducting individual studies in selected Asian countries on consumption data of pregnant and lactating mothers as well as schoolchildren. Once the data is available, the nutrient gap between actual consumption and WHO recommendations can be identified and interventions can be discussed.
- A dialogue with the food industry partners has been initiated to discuss the role of the food industry to provide the target population groups with improved nutrition via locally accepted, low cost but highly nutritious food solutions. The goal is to advocate for exclusive breastfeeding in the first six months but at the same time provide support to improve the nutritional status of adolescent girls, pregnant and lactating mothers.
- Leading non-government organisations (NGOs) such as Save the Children have been contacted to evaluate interest in entering into partnerships with the food industry to approve and distribute the developed food solutions in the region. Goal is that AROFIIN acts as a communication platform between the public and private segment so alignment of nutrition intervention strategies can be achieved and projects scaled up.

Baby-friendly Hospital Initiative Congress

WHO and UNICEF hosted the 2016 Baby-friendly Hospital Initiative Congress in October in Geneva, Switzerland to celebrate the 25th anniversary of the initiative. The objectives of the Congress were to:

- Celebrate achievements in improving quality of care for breastfeeding mothers
- Examine the current status of the Baby-friendly Hospital Initiative
- Discuss new guidance on country implementation of the Ten Steps for Successful Breastfeeding
- Form or strengthen regional networks to improve country programmes for maternity facilities

More than 300 people attended, representing over 130 government delegates, over 20 development partners (NGOs, international professional associations and donors) and a number of technical professionals from UNICEF and WHO country, regional and headquarter offices.

Much of the Congress was dedicated to discussion of the new draft guidance on the Ten Steps. Working groups in Arabic, English, Portuguese, Russian and Spanish discussed the key issues and reported back their feedback.

More information on the Congress and a report of the deliberations can be found at http://www.who.int/nutrition/events/2016_bfhi_congress_24to26oct/en/.

The Food and Agricultural Approaches to Malnutrition (FAARM) trial in Bangladesh

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Worldwide, undernutrition is estimated to be the underlying cause of almost half of all child deaths. Across low- and middle-income countries, about a quarter of children under five are stunted and 8% are wasted ([Black et al 2013](#)). Slightly higher prevalences are seen nationally in Bangladesh, while the situation is worse in Sylhet Division, with 44% of children under five stunted and 12% wasted – the highest in the country (HKI & JPGSPH 2016).

Since the 1990s, Helen Keller International (HKI) has been implementing and adapting a Homestead Food Production programme in Bangladesh, working with local community organisations, to address undernutrition in women and children. The programme includes women's group trainings on year-round vegetable and fruit gardening, poultry production, marketing, and nutrition and hygiene education. Such integrated agriculture-nutrition-hygiene interventions are a promising approach to sustainably tackle the problem of chronic undernutrition. However, evidence of their effect on nutritional status is surprisingly scant, due to short timelines and a lack of rigorous study methodologies ([e.g. Masset et al 2012](#)).

With the *Food and Agricultural Approaches to Reducing Malnutrition (FAARM)* cluster-randomized controlled trial ([Trial registration](#)), we aim to fill this research gap and test the hypothesis that integrated agriculture, nutrition and hygiene programmes can reduce undernutrition in women and young children. The objectives are to measure the intervention effect on stunting (primary outcome), wasting, micronutrient status (haemoglobin, iron, vitamin A) and diarrhoea prevalence in young children, as well as underweight and micronutrient deficiencies in their mothers. We will also investigate potential pathways through which these effects are thought to occur (food availability, dietary quality, household income, healthcare seeking, child care practices, food hygiene and women's empowerment).

The trial takes place in two sub-districts of Habiganj District, Sylhet Division, and includes 2,700 women in 96 villages (geographic clusters). The baseline survey was conducted in 2015, after which clusters were randomized into intervention and control groups. In the 48 intervention villages, women receive training and support in Homestead Food Production over three years. A birth, nutrition and disease surveillance system collects data every two months. The endline survey in 2019 will compare the nutritional status of the women and their children under age three between intervention and control. With this design, the children born during the trial should have benefitted throughout their crucial first 1,000 days, from conception through gestation and lactation to complementary feeding age.

For more information, contact sabine.gabrysch@uni-heidelberg.de

References

Black RE, Victora CG, Walker SP, Bhutta ZA, de Onis M, Ezzati M, Grantham-McGregor S, Katz, J, Martorell R, Uauy R, and the Maternal and Child Nutrition Study Group. (2013) Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 382, 427-451.

Helen Keller International (HKI), James P. Grant School of Public Health (JPGSPH) (2016) *State of food security and nutrition in Bangladesh: 2014*. Dhaka: HKI and JPGSPH.

Masset E, Haddad L, Cornelius A, Isaza-Castro J. (2012) Effectiveness of agricultural interventions that aim to improve nutritional status of children: systematic review. *BMJ* 344, d8222.

Technical Expert Advisory group on nutrition Monitoring (TEAM)

In 2015, WHO and UNICEF established a Technical Expert Advisory group on nutrition Monitoring (TEAM) to advise on improving the quality of monitoring of WHO's Global Nutrition Monitoring Framework (GNMF) indicators to be achieved by 2025. TEAM includes technical experts, including key and influential thinkers in global nutrition with a specific focus on monitoring. Convened jointly by WHO and UNICEF, TEAM meets twice a year to discuss technical work to facilitate systematic monitoring of the GNMF indicators across countries. For more information, follow the link: http://apps.who.int/nutrition/events/2015_onlineconsultation_team_july/en/index.html

In its 4th meeting in March 2017 in Geneva, Switzerland, TEAM discussed with key partners potential areas of collaboration to strengthen nutrition data and information systems for global nutrition monitoring. The meeting was followed by a larger meeting on *Strengthening and Implementing the Nutrition Monitoring and Surveillance: Lessons from the Field*, 23-24 March 2017 in Geneva, Switzerland.

More information on TEAM and GNMF can be found at: http://apps.who.int/nutrition/events/2015_onlineconsultation_team_july/en/index.html and http://www.who.int/nutrition/topics/proposed_indicators_framework/en/.



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