# The #FutureFortified Global Summit on Food Fortification

## Event Proceedings and Recommendations for Food Fortification Programs

Micronutrient FORUM

#FutureFortified GLOBAL SUMMIT on Food Fortification

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# Foreword

Hundreds of millions still go to bed hungry every night. Many more suffer from micronutrient malnutrition or "hidden hunger," experiencing deficiencies in key vitamins and minerals such as vitamin A, iodine, iron and folate.[1] Most of these individuals live in low- and middle-income countries (LMIC), and they are often deficient in more than one vitamin or mineral. The groups most vulnerable to vitamin and mineral deficiencies include pregnant women, lactating women and young children.[2,3] These deficiencies are associated with cognitive impairment, reduced immunity, and increased incidence and severity of infectious illness as well as associated mortality.[4] The consequences of micronutrient malnutrition are not limited to health parameters alone but have far-reaching effects on economies through secondary physical and mental disabilities and reduced work productivity.

> "Micronutrient malnutrition has far-reaching effects through secondary physical and mental disabilities and reduced work productivity"

Fortunately, part of the solution is the fortification of staples and condiments with essential vitamins and minerals. This intervention has gained global traction, and its health impact in LMIC is growing. Over 140 countries implement national salt iodization programs, 85 mandate at least one kind of cereal grain fortification, and over 40 mandate the fortification of edible oils and ghee.[5] Important experience is now being accrued globally in reducing the prevalence of micronutrient deficiencies through fortification. Despite this, many fortification programs require targeted and aligned efforts by government, the private sector, academia, consumer groups, international agencies and donors to ensure effective and compliant coverage in order to achieve optimal and sustained impact.

It was against this backdrop that the Global Alliance for Improved Nutrition (GAIN) and the Government of Tanzania resolved in 2015 to co-host the first-ever Global Summit on Food Fortification in Arusha, Tanzania, in order to: **1)** review achievements and challenges; **2)** understand the current evidence; and **3)** align among partners on the way forward.

The event was co-convened in September 2015 by the Government of Tanzania, GAIN, the African Union Commission, the Bill & Melinda Gates Foundation, the United States Agency for International Development (USAID), UNICEF, the World Food Programme (WFP), and the Scaling Up Nutrition (SUN) Movement Secretariat. The planning of the agenda and key messages, as well as post-Summit deliberations on the way forward, were complemented by a fortification Technical Advisory Group (TAG) comprising over 20 development agencies engaged in fortification (see Box in Part B, p. 34).

This supplement summarizes the Summit proceedings and the recommendations arising from the event to improve fortification programs moving forward. **Part A** of the supplement is the "Proceedings of the #FutureFortified Global Summit on Food Fortification." This includes the Summit content, its partnerships, conclusions, and the first-ever global consensus document on fortification: "The Arusha Statement on Food Fortification." **Part B** comprises "Recommendations for Food Fortification Programs." This is the fortification TAG report elaborating on the five Summit Statement recommendations on regulatory monitoring, evidence and guidelines, advocacy, resourcing and transparent reporting.

It is anticipated that this supplement will help implementing agencies, policy-makers and donors, in particular, to improve coordination in the nutrition and food sectors. This in turn will help expand, improve and sustain national fortification programs, and ensure they help achieve public health objectives and relevant sustainable development goals.

**Representatives of the Co-Hosts of the Global Summit on Food Fortification: Steve Godfrey (Executive Director a.i., GAIN) and Greg S Garrett (Director, Food Fortification, GAIN); Obey Assery-Nkya (Office of the Prime Minister, Government of the United Republic of Tanzania) and Vincent Assey (Ministry of Health and Social Welfare, Government of the United Republic of Tanzania).**

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# Inspiring action to reach billions through one of the world's most cost-effective development solutions

# Table of Contents



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# A

# The #FutureFortified Global Summit on Food Fortification: Event Proceedings

**Report prepared by**

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**Naura Springs Hotel, Arusha**
**The United Republic of Tanzania**
**September 9–11, 2015**

The Global Summit on Food Fortification was made possible through the financial support of donors including the Bill & Melinda Gates Foundation (BMGF) and the United States Agency for International Development (USAID); international agencies including GAIN, FHI 360, IGN, CDC Impact, Helen Keller International (HKI), the Micronutrient Initiative (MI), PATH, Project Healthy Children (PHC), *Sight and Life*/DSM, United Nations World Food Programme (WFP); and private sector sponsors including BASF, BioAnalyt, Family Health International, Stern-Wywiol Gruppe, Unilever and the Wright Group.

# Global Summit on Food Fortification: #FutureFortified

## 01 Background

This Global Summit on Food Fortification comes at an important time both for large-scale fortification and for micronutrient deficiencies. Due largely to the fortification of salt, iodine deficiency disorders are close to no longer being a serious public health problem, as goiter rates approach elimination levels. Important experience is now accruing with iron deficiency anemia. Progress in reducing prevalence has been slow over the decades, but advances are now being made in countries where wheat and maize flour, and products made from them, are fortified with iron. Fortifying flour with folic acid has undoubtedly reduced the incidence of neural tube defects, and vitamin A fortification of cooking oils is increasing in low- and middle-income countries (LMIC).

Quite apart from being the first international meeting devoted to large-scale food fortification, this Summit was important for several critical reasons.

> "This Summit demonstrated again the key role that partnerships have to play in bringing about large-scale fortification"

Firstly, it pertained specifically to LMIC, and drew directly on evidence relating to, and experiences gathered in, these countries. It also involved the active participation of these countries themselves. Secondly, it demonstrated again the key role that partnerships have to play in bringing about large-scale fortification, as evidenced by the attendance of 450 delegates from 57 countries, including 29 country delegations, alongside leaders from related business, academic and international organizations. Thirdly, while building on global experience, the meeting was firmly about experiences drawn from less affluent commercial settings, and about the future of these parts of the world. Fourthly, while the success of many countries was highlighted, there was an openness regarding challenges and evidence gaps, and concern with how these might be addressed. And finally, the meeting was an opportunity to advocate broadly and globally for the scaling up of this intervention so as to extend its benefits to the many more millions who are currently at risk of micronutrient deficiencies.

**Why the Summit was so important and timely**

1. Emphasis on low- to middle-income countries (LMIC)
2. Wide spread of attendees, demonstrating the necessity of partnerships
3. Focus on extensive global experience, including from LMIC
4. Discussion of existing challenges and evidence gaps
5. Opportunities for advocacy at the national level in many countries

The objectives for the meeting, agreed by all the co-conveners, were that the Summit would bring together governments, business, international organizations, civil society, academia and donor agencies that have contributed to the food fortification effort, in order to:

- Share achievements, challenges and lessons learned by reviewing country successes in food fortification and examining the contextual factors which drive reach, impact, and sustainability;
- Understand currently available evidence concerning the fortification of staples by reviewing evidence-based guidelines and discussing the latest consensus on the impact of fortification on health and nutrition and the implications for improving programming; and
- Align on the way forward by agreeing on the major tasks to be completed, by identifying national leaders and champions, by catalyzing partnerships and resources, and by ensuring that food fortification programs are expanded,

Hon. Mizengo Kayanza Peter Pinda, Prime Minister of Tanzania. The Summit brought together governments, business, international organizations, civil society, academia and donor agencies.

improved and sustained within the broader context of health and development efforts.

Reflecting the above, the Summit was attended by partnerships that provide the most compelling example of public-private partnership within the context of public health: millers fortify the food vehicle while governments ensure compliance, to the benefit of consumers. Of course, life is rarely so simple, and the meeting drew on the direct experience of eight national programs, as well as reviewing the experience of at least a further 25 countries, while referencing experiences from yet other countries to inform the discussions. There was a new systematic review of the experiences of LMIC – the first to directly address the effectiveness and impact of large-scale fortification in LMIC in particular. There was also a review of the cost-effectiveness and cost:benefit ratio of large-scale fortification in LMIC. This focus amplified the usefulness of the final conclusions and the proposed next steps.

## 02 Summit content and more

In the sessions, the current extraordinary increase in the number and volume of staples being fortified was presented, and the numbers and countries being reached with micronutrient-fortified foods highlighted. As estimated by the Food Fortification Initiative (FFI), 30% of the world's industrially milled wheat flour, 48% of industrially milled maize flour, and 1% of industrially milled rice is now being fortified with at least iron or folic acid, through both mandatory and voluntary initiatives.

> "30% of the world's industrially milled wheat flour and 48% of industrially milled maize flour is now being fortified with at least iron or folic acid"

The Summit was held over two days, and had a packed agenda (**Annex 2**), with an extra day beforehand, consisting of Parallel Learning Sessions (**Annex 3**). These evidence-based sessions, by a roll call of the global experts in the field, as well as country implementers and legislators, covered the current positions on food fortification and micronutrient deficiency prevention and control, program compliance, areas of current interest, and gaps in program coverage.

#FutureFortified attracted 450 delegates from 57 countries

Current ambiguities and uncertainties were also identified and discussed – the weighing up of risks and benefits, the best methods for assessing progress, the challenges of rice fortification, aspects of small-scale fortification, and novel complementary foods for Africa. Dr Quentin Johnson, for example, noted – when discussing the economies of small-scale fortification – that in most LMIC, over 50% of flour comes from small-scale mills, which also frequently provide a cheaper source of flour for the poorer sections of society. Another interesting side session led by Phillip Makhumula and Greg S Garrett noted that while food fortification has gone to scale (e.g. more than 80 countries have mandated the fortification of wheat flour, maize flour, and/or rice with iron and folic acid), compliance and quality remain as issues. While full-scale national compliance is largely unknown, one important study suggested that the current level of quality fortification (against national standards) may be only around 50%. Strengthening compliance would ensure even greater impact, and the session focused on the challenges of doing this, and presented some successes to date. This was followed by a noteworthy session on policies and programs in India given by senior representatives of state and federal government, civil society, UN agencies and academia, which led to important national and state policy recommendations. This was complemented by the next session, which was on lessons learned and good practice for regional harmonization. This built on, among other things, the considerable history of sugar fortification in Guatemala and its spread to the rest of Central America (and later, Zambia).

For the start of the official Summit, which followed on from the "Parallel Learning Sessions" on the next day, the scene was set by Jay Naidoo, the Chair of the Partnership Council of GAIN, who introduced the keynote speaker, Dr Chris Elias of the Bill & Melinda Gates Foundation. Dr Elias spoke on "Food for thought: where do we stand after a century of fortification?" The rest of the first morning included presentations on cost-effectiveness and benefit:cost ratios; the evidence for food fortification (including an update of the global picture on behalf of the Micronutrient Forum); a systematic review; and explorations of the first 1,000 days with regard to iodine and salt fortification and then folic acid, including aspects of living with NTDs (neural tube defects). This last contribution, by Dr Margo Whiteford of the International Federation for Spina Bifida and Hydrocephalus, brought a personal perspective to the topic of mass fortification.

Powerful statistics, including those presented by Dr Michael Cannon of the US Centers for Disease Control (CDC), showed that in the 18 countries with data on coverage of industrially milled wheat flour, 136,000 NTDs still occur annually. Encouragingly, however, 19,000 a year are currently being averted by fortification. There is also the potential to scale up these efforts so as to prevent the annual occurrence of 32,000 births with NTDs if all industrial wheat flour can be fortified or 103,000 births with NTDs if all wheat flour can be fortified. Prof. Michael Zimmermann noted the great public health success of salt iodization. Now only 25 countries are considered iodine deficient – down from 110 in 1993. But Prof. Zimmermann asked the question as to whether salt iodization is reaching babies growing *in utero* during the first 1,000 days when it is critical – not only for brain development but also because salt iodization can ensure appropriate levels of iodine in the thyroid gland of women

H.E. Dr Mustapha Sidiki Kaloko, Commissioner for Social Affairs of the African Union: a key supporter of #FutureFortified


Dr Chris Elias: "Where do we stand after a century of fortification?"

pre-pregnancy. This is an important source of iodine during pregnancy itself. The data from this session, appropriately updated, will have an important role to play in supporting advocacy efforts directed at decision-makers.

> "In the 18 countries with data on coverage of industrially milled wheat flour, 136,000 NTDs still occur annually"

A notable presentation, provided by Prof. Zulfiqar Bhutta and co-authors, was a systematic evaluation of 76 studies and 41 contextual reports which concluded that fortification of staples with vitamin A, iron and iodine can confidently be expected to be effective in LMIC. Prof. Bhutta's presentation concluded that there is now "strong evidence of important and measurable improvements in micronutrient status and health outcomes in women and children in wide geographic settings in LMIC." Fortifying with vitamin A was estimated to reduce the prevalence of deficiency in children less than five years of age from 33.3% to 25.7% globally; effectively fortifying with iron would be expected to reduce anemia by 14%; salt iodization has reduced goiter by 40% in countries such as Pakistan; and fortifying flour with folic acid has reduced NTDs by 40–50%.

Following Dr Francesco Branca of WHO on translating evidence into policy and programming, a number of case studies were presented, including (in the earlier session) lessons learned from Latin America, and then from Tanzania (a panel from the host country and partners), from Egypt (from the Ministries of Health and Supply and Internal Trade with UNICEF), from Uganda (the country's history with oil fortification by Patricia Njeru and Beguine Esaul of the country's National Bureau of Standards) and from China (describing progress made with salt iodization from endemicity to universal salt iodization) by Ms Yan Jun of the Chinese National Health and Family Planning Commission. The scope of the speakers demonstrated the wide range of different sectors necessary to the success of national programs.

Another major topic receiving considerable attention was compliance, which was reported as being adequate in approximately half the programs of the limited number of countries in whose context it was explored. Often countries have appropriate regulations or legislation, but if this is not properly mandated or enforced by governments, these will not be effective. Ineffective programs waste resources and can potentially lead to disillusionment by policy-makers and industry. Besides the lack of enforcement, quite different perceptions and priorities were identified, as well as problems with communication between the enforcers and those who are being enforced. It was frequently observed that programs, and dietary intakes, are not static and so change over time, and that this needs to be carefully monitored and appropriately calibrated. A third large area of concern was whether the populations that most need the fortified product are actually being reached, due to lack of availability or poor accessibility. This was further addressed, from a scientific monitoring perspective, in one of the final sessions by

Dr Francesco Branca, Director of Nutrition for Health and Development, WHO

Mount Meru, Tanzania – the fifth highest mountain in Africa, situated 70 kilometers (43 miles) west of Mount Kilimanjaro

Dr Lynnette Neufeld of GAIN, who outlined the increasing rigor in assessing "effective coverage" of large-scale food fortification and why this is so important. Drawing on the experience from four country programs, Dr Neufeld pointed out that, contrary to common assumptions, in some contexts, the fortification of staple foods such as oil may be making an important contribution to improved micronutrient intake even among poor and rural populations. These findings however, vary by vehicle and country context.

> "An area of concern was whether the populations that most need the fortified product are actually being reached, due to lack of availability or poor accessibility"

## 03 Partnerships

Hosted by the Government of the United Republic of Tanzania and GAIN at Arusha under Mount Meru in Tanzania from September 9–11, 2015, this was truly a meeting that brought together parties interested in large-scale fortification: millers; the food industry; implementing agencies, and governments. Co-Conveners were the AU (African Union), the Bill & Melinda Gates Foundation, the United Nations (UNICEF, WFP), and USAID (the United States Agency for International Development), along with technical partners: the CDC, IMMPaCt, the Food Fortification Initiative, Helen Keller International, the Iodine Global Network (previously ICCIDD), MNF (the Micronutrient Forum), MI (the Micronutrient Initiative), PATH, PHC (Project Healthy Children), *Sight and Life*, and Smarter Futures. Demonstrating the full range of the partners involved, other partners included ETHZ (Swiss Federal Institute of Technology in Zurich, Switzerland), FANTA III, FHI360, the UN SUN (Scaling Up Nutrition) Movement, and WHO (the World Health Organization). The stated aim of the Summit was to inspire "action to reach billions through one of the world's most cost-effective development solutions."

## 04 The Summit continued

Of the estimated two billion people suffering from micronutrient deficiencies – sometimes referred to as "hidden hunger" – the most vulnerable are women and children. Such deficiencies are now recognized as leading to compromised health and well-being, reduced cognitive development, poor reproductive outcomes, increased maternal and infant and young child mortality, and negative impacts on each nation's health and productivity. In combination, these consequences undermine efforts to end global poverty. Billed as "#FutureFortified Global Summit on Food Fortification," the three-day event represented the culmination to date of extensive international efforts to encourage interest in scaling up existing food fortification programs, raising political awareness, and reviewing the evidence-base –

Caption: Bjørn Lomborg, co-founder of the Copenhagen Consensus in 2002 and author of Global Problems, Smart Solutions: Costs and Benefits (Cambridge University Press, 2013)

Prof. Susan Horton: "Food fortification represents an important economic investment."

all as a way of increasing both internal and external investment in food fortification. A measure of the reach of the broader advocacy effort included reaching a total of four million people's accounts in over 35 countries through two 1-hour live chats, 1,000 unique tweets using #FutureFortified with over 1,300 tweets using #FutureFortified during the three days of the summit, with a total 2.4 million impressions.

One measure of success, besides the presence of country delegations and leaders in business, academia and international organizations, was the extensive media coverage by the BBC, Al Jazeera and other international and national print media and the development media platforms Devex and +Social Good. Prof. Susan Horton – who along with Prof. Bjørn Lomborg and Prof. John Hoddinott is probably one of the most well-recognized economists in this area – noted that governments are currently contributing an average of about 5% of the funds needed, and donors another 5%, while the rest comes from the private sector, millers and consumers. Prof. Horton also clearly demonstrated the important economic investment that food fortification represents. In the case of iron, for instance, the median benefit:cost ratio (in 10 countries with high levels of anemia) is 8.7:1. For iodization of salt, benefit:cost is around 30:1; for folic acid, in a range extending from 11.8:1 for Chile to 30:1 in South Africa. For fortification with vitamin A, meanwhile, cost is estimated at a very cost-effective US$81/DALY. The cost estimate for 25 LMIC placed the donor investment necessary for building, improving, and sustaining programming over 15 years at US$120–150 million, which is a very achievable figure. The emphasis was on large-scale mandatory fortification of staple foods in LMIC, such as wheat and maize flours and rice, and widely consumed condiments such as salt, although edible oils are playing an increasing role.

That afternoon the case studies continued, including one on wheat flour fortification in North America ("It's not just about poverty…") by Dr Elizabeth Yetley of the USA National Institutes of Health (NIH), followed by more on the Guatemalan sugar fortification experience. Case studies on achieving impact on anemia through multiple vehicle fortification vehicles in Costa Rica, and Indonesia's experience with vitamin A and cooking oils, led into a wide-ranging panel discussion with representatives from the private sector (Cargill and DSM), government (M. Ousmane Mbaye of the Ministry of Trade of Senegal), the UN, and FFI. It was observed in this session that the business publication Fortune had just featured Cargill India's efforts in fortifying its range of oils. Fortune presented these as a sustainable model which was helping to address the acute problem of malnutrition in India.

## "Wheat flour fortification is not just about poverty"

The Summit opening ceremony (with Henry Bonsu as MC), was held during the Gala Dinner and included statements from the Hon. Kebwe Stephen K Kebwe (Minister of Health and Social Welfare of Tanzania, and Host of the Summit); Marc Van Ameringen (Executive Director GAIN and Co-Host); His Excel-

Broadcaster Henry Bonsu emcees the opening ceremony of the Summit

His Majesty King Letsie III of Lesotho, AUC's Nutrition Champion, addresses delegates.

lency the AU Commissioner for Social Affairs, Dr Mustapha Sidiki Kaloko; AU Nutrition champion His Majesty King Letsie III of Lesotho; and H.E. the Prime Minister of the United Republic of Tanzania, the Right Honorable Mizengo Kayanza Peter Pinda. Following the high-level observations, participants continued the conference dinner and informal networking. As this was predominantly an advocacy meeting in support of expanding proven and effective technology to populations in LMIC, it was noteworthy that there was high-level representation from H.E. Dr Mustapha Kaloko, and H.E. Kalilou Traore, ECOWAS Commissioner. There was also high-level country representation, with at least four Ministers, four Secretaries, three Deputy Ministers of Health, and key Members of Parliament. These participants attended with the understanding (in response to the Arusha statement [**Annex 1**]), that they would facilitate progress in their home countries.

In the first session of the very full final morning, there was a further multi-partner panel discussion – this time with Dr Shawn Baker, Director of Nutrition of the Bill & Melinda Gates Foundation, as moderator, plus representatives of the government sector (Nigeria), WHO, HKI and SUN. Panelists discussed framing fortification in the context of national nutrition strategies under the umbrella of the SUN Movement. This session concluded with an emphasis on the importance of building on existing activities and strengths so as to make fortification programs an integral part of national strategies for the prevention and control of micronutrient deficiencies. To ensure lasting impact, national strategies must not attempt to do "everything, everywhere, forever," but rather use decision-making tools such as optimization modeling (presented by Dr Reina Engle-Stone of UC Davis) to balance the costs and benefits. For fortification programs, ensuring quality in production is critical, and effective coverage should be regularly measured to ensure potential for impact is continually tracked and used to refine such strategies.

The last session before the final wrap-up posed the question as to whether the food fortification partnerships are ready for the future food system. With contributions from the agriculture sector (Mr Mawuli Sablah of FAO) as well as Asia (Buisanto Wijaya of the Indonesian private-sector firm Bungasari Mills) asking if we are in fact fortifying the right foods, this working session concluded with a panel on biofortification and staple food fortification. The question addressed was whether these technologies are competing or complementary. It was concluded they were complementary. Then the final panel discussion was moderated by Marc Van Ameringen of GAIN – again with sector representation from civil society, donors, academia, government and the World Bank reminding all present of the unfinished agenda gap, the investments that are still needed, and the potential for enhanced impact. Just before the formal clos-

ing, the Representative of the United Republic of Tanzania, H.E. Tumusiime Rhoda Peace, Commissioner for Rural Economy and Agriculture of the African Union, flanked by representatives of the co-convening organizations, delivered the Arusha Conference Statement on Food Fortification (**Annex 1**). That afternoon, participants had the opportunity to visit local fortification industries, millers, wholesalers, a hospital, and a rehabilitation center – this last field visit organized by the International Federation for Spina Bifida and Hydrocephalus.

## 05 Outcomes

The participants constituted a broad spectrum of potential partners, experts and champions whose object is to achieve commitment, resources and immediate intentions on scaling up (**Annex 4**). High-level support was given by the Prime Minister of the United Republic of Tanzania, the Rt. Hon. Mizengo Pinda; HM King Letsie III of the Kingdom of Lesotho in his role as the Nutrition Champion of the African Union; ministers of health; and ministers of other vital sectors such as trade, finance and development. Supporting their advocacy with scientific evidence and experience were the scientists, public health policy-makers, the food industry, development partners, and the UN agencies. The role of an active civil society of local and international non-governmental organizations was emphasized, as was the role of the different sectors responsible for compliance. There was welcome participation from countries with active and effective programs, those needing to scale up or encourage their more active monitoring and compliance, and those countries embarking on such programs. As observed by Dr Omar Dary of USAID, "the principles are universal, the solutions are local."

Patrizia Fracassi, Senior Nutrition Analyst and Policy Advisor in the SUN Movement Secretariat



Dr Omar Dary, Senior Nutrition Adviser, USAID

> "The principles are universal, the solutions are local"

The unfinished agenda session attracted a great deal of attention. Using the framework of the proposed conference proceedings, this session, building on earlier presentations, contributed to the two substantive questions "Where do we stand?" and "How do we move forward?" From the evidence and experience presented and discussed at the Summit, the following conclusions may be drawn:

**Where do we stand?**

- Global progress has been considerable, and encouragingly much of the recent activity has been in LMIC; WHO evidence-informed guidelines being developed for various aspects of fortification, including for maize and rice, will be critical in furthering current progress, given the extensive input that has gone into developing them, including essential industry experience.
- Constraints, especially in monitoring compliance, equity and small-scale milling, are now well identified, and one of the commitments made during the Summit was to address these more aggressively.
- Barriers included economic ones such as the price of premix – often attributable to import duties and taxes –

Margaret E Eshiett, Deputy Director
in Standards Organisation of Nigeria (SON)

compliance issues (including competition with non-fortifying mills, poor national laboratory capacity and a lack of regulatory capacity), fortification equipment, product/market demand, and even technical capacity to properly fortify.

- Other factors that will affect uptake of fortified foods included urbanization, changing food systems, climate change and volatility in food prices.
- Impact and benefit:cost were both covered, encouragingly with positive outcomes, by a systematic analysis of effectiveness in LMIC programs and a review of both cost-effectiveness and benefit:cost.
- Gaps were identified and further itemized in a background paper for the Summit around evidence gaps (both technological and public health); effective coverage; quality control and compliance; and accessibility and equity.

**The way forward**

- Increased attention by governments to monitoring compliance and enforcing regulations, leadership and championship, and resources are all actions that country representations mentioned.
- Governments must remain "center stage" in the overall process, with national ownership of monitoring and effectiveness; both require trust from other international partners.
- The food industry acknowledged the opportunities presented by working more closely with other sectors, and increased commitment to the industry side of monitoring compliance.
- Improving the above would also result in increased and more accurate data on exactly which populations are receiving sufficient dietary micronutrients and on "effective coverage," and so help extend equity and access – and the central role that women occupy in the food chain to help achieve this was frequently noted.
- Regularly assessing coverage and potential for impact, modifying non-performing aspects of programs as appropriate, and measuring impact when evidence gaps remain were all emphasized.
- Although a start has been made, increasing utilization of the modeling of fortification profiles, and costs, in order to expand, improve and sustain fortification in LMIC.

Finally the Conference declaration – the "Arusha Statement on Food Fortification" – was presented as a blueprint for mobilizing resources for the spread of the large-scale intervention, improving compliance to regulations and improving monitoring and evaluation.

## 06 Conclusions, consensus and next steps

Food fortification is one of the least expensive and most effective nutrition interventions to tackle hidden hunger on a huge scale. There is a long history of over almost 100 years in high-income countries, where specific deficiency diseases such as rickets and pellagra were eliminated halfway through the last century. The iodization of salt, starting in Switzerland in 1922 and introduced to the USA soon after, has been one of the great public health success stories of the world. The Summit aimed to develop a vision and strategy for fortification that would contribute to the Sustainable Development Goals, and beyond.

> "Food fortification is one of the least expensive and most effective nutrition interventions to tackle hidden hunger on a huge scale"

The Arusha Statement on Food Fortification (**Annex 1**) closed the meeting and was delivered by H.E. Tumusiime Rhoda Peace, Commissioner for Rural Economy and Agriculture, African Union, on behalf of the Summit Co-Hosts. The statement (**Annex 1**) included six critical areas needing to be addressed for immediate progress. These may be summarized as follows:

Lauren Landis, WFP Director of Nutrition

1. **Modest but new investment is essential.** Fortification has been clearly demonstrated as cost-effective and largely self-sustainable, with costs being built into markets and so typically not requiring further public subsidies. Governments do, however, need to invest in technical support and capacity, oversight and compliance – an investment that is small in relation to leveraged costs, cost per beneficiary, and overall returns, and which was described as a "tiny" proportion of health spending. The additional donor costs over 15 years to build, improve and sustain fortification in 25 low- and middle-income countries was estimated at US$150 million, effectively reaching an additional billion people, while triggering significant co-investment by the private sector.

2. **A major effort to improve the oversight and enforcement of food fortification standards and regulations.** Poor compliance with laws and regulations (as low as 50% on average) was demonstrated as a barrier. It limits the potential impact, undermines the effectiveness, and ultimately undermines the credibility of the intervention. It was noted that improved inspection and enforcement systems require consistent, and adequate, national budget allocations.

3. **A need to generate more evidence to guide fortification policy and program design,** in order to continually improve programs and demonstrate impact.

4. **Progress requires more transparent accountability and global reporting.** The Statement supported a call for a global observatory or an annual report of the state of fortification.

5. **Continuing advocacy remains a high priority,** and all partners and stakeholders such as the SUN Movement and the African Union need to contribute their special perspective and expertise to advocate for greater attention by governments.

6. **Finally, the Summit Technical Advisory Group should continue to work together post-Summit, and should consolidate and elaborate these recommendations and chart a path forward by January 2016.**

The closing sentences of the Arusha Statement speak of what is required if we are to achieve the above six points: better leadership, better accountability, increased attention to policy support, improved quality control, monitoring compliance, and a more frequent assessment of impact. As the Declaration notes, the tools are known, the intervention is relatively simple and very cost-effective, and it helps to promote equity – so what is needed now is a determination to finish a job that has been in progress for some considerable time. The Arusha Summit will no doubt come to be seen as an important milestone in extending the large-scale food fortification of staples beyond the existing countries in which it has been so successful for over seven and a half decades.

"The Arusha Summit will no doubt come to be seen as an important milestone in extending the large-scale food fortification of staples"

# Annex 1
## The Arusha Statement on Food Fortification

### Statement Delivered by H.E. Tumusiime Rhoda Peace, Commissioner for Rural Economy and Agriculture, African Union, on behalf of the Summit Co-Conveners

I am pleased to make this Arusha Statement on Food Fortification on behalf of the Summit Co-Conveners in my capacity as a member of the board of directors of the Global Alliance for Improved Nutrition.

The first ever Summit on fortification was opened by the Prime Minister of the United Republic of Tanzania, the Rt. Hon. Mizengo Kayanza Peter Pinda, and was addressed by HM King Letsie III of the Kingdom of Lesotho, the AU Nutrition Champion. Four hundred and fifty delegates from 57 countries attended, including 29 country delegations, as well as leaders from business, academia and international organizations.

We took stock of global food fortification and assessed its role and potential in addressing public health goals, by tackling "hidden hunger" or micronutrient deficiencies – which cause 10% of global disease, inhibit human development, and perpetuate poverty and deprivation.

Preventable deficiencies of critical vitamins and minerals such as vitamins A and D, iron, iodine, folic acid, and zinc, contribute to the occurrence of up to three million child deaths annually. The best available estimates are that two billion people are affected by micronutrient malnutrition, but the true burden is probably even greater, as we lack precise data. This has far-reaching effects on individuals, and also impedes the economic development of nations. GDP losses from undernutrition can be 2%–3% per year.

The central message of this Summit is that food fortification should become a critical pillar of national food and nutrition security plans. Unless we can rapidly scale up the availability, and the consumption, of fortified foods, the achievement of some of the Sustainable Development Goals (SDGs) will be impossible. Food fortification is a vital tool to make progress towards the World Health Assembly goal to reduce anemia among women of reproductive age.

In the words of HM King Letsie III, the AU Nutrition Champion, we need to put food fortification back on the development agenda.

According to the Copenhagen Consensus, the return on investment in food fortification is one of the highest development dividends. For example, in the case of iodine, it saves as much as US$30 in higher medical and non-medical expenditures for every $1 spent. Salt iodization costs pennies – 20 cents per person per year. A rough estimate for LMIC suggests the cost:benefit ratio of fortification is around 30:1.

Progress has accelerated in the past decade. Today there are salt iodization programs in approximately 140 countries worldwide, 83 countries have mandated at least one kind of cereal grain fortification, 20 countries edible oils, 9 countries sugar, and several others rice, milk, and condiments. But without further investment, we risk losing this momentum. We have the unprecedented opportunity to virtually eliminate iodine deficiency if we scale up salt iodization efforts. By effectively fortifying grains with iron, we can expect to achieve a 2.4% reduction per annum in anemia. Fortification of wheat flour with folic acid in 18 countries in Africa and Asia could prevent the occurrence of more than 50,000 debilitating neural tube defects annually. We cannot lose these opportunities.

Food systems and eating habits are changing rapidly due to urbanization, changing climate, land and water use, and a younger population. While food fortification alone cannot end malnutrition, it is critical to micronutrient deficiency prevention and control strategies, and is an underexploited public health tool.

**What are the critical areas for action highlighted at this Summit?**

- **First, modest but new investment is essential.** Fortification is cost-effective and is largely self-sustainable, and costs are built into markets and typically do not require further or continuous public subsidy. Governments need to invest in technical support, oversight and compliance.

  The new investments are needed to build, improve and sustain fortification programs. They are small in relation to leveraged costs, cost per beneficiary and overall returns, and are tiny as a proportion of health spending.

  For example, it was estimated that the additional donor


H.E. Tumusiime Rhoda Peace, Commissioner for Rural Economy and Agriculture of the African Union, delivers the Arusha Statement.


Greg S Garrett, GAIN (extreme right), leads a panel discussion on fortification in Tanzania with Vincent Assay (Government of Tanzania) and Erin Smith (HKI).

costs over 15 years to build, improve and sustain fortification in 25 LMIC for multiple food vehicles would be US$150 million. This could effectively cover an additional billion people. Further investment in fortification would trigger significant co-investment by the private sector and would motivate national governments to allocate resources.

- **Second, there is need for a major effort to improve the oversight and enforcement of food fortification standards and regulations.** Poor compliance with laws and regulations limits the potential for impact and undermines effectiveness. Available data show adequate compliance with standards as low as 50% in many contexts. Governments should improve their inspection and enforcement systems to ensure high-quality fortification and a level playing field for the producers. Effective regulatory monitoring and enforcement will notably require more robust national budget allocations.

- **Third, there is a need to generate more evidence to guide fortification policy and program design,** to continually improve programs, and to demonstrate impact. For example, there is a lack of detail regarding foods consumed by various target groups, which limits our understanding of potential food vehicles, the use of fortified foods and the quantification of the dietary gap we must address in the case of some nutrients.

- **Fourth, progress requires more transparent accountability and global reporting.** We support the call for a global observatory or annual report on the state of fortification.

- **Fifth, continuing advocacy is a high priority,** and we will work together with stakeholders such as the SUN Movement and the African Union to advocate for greater attention by governments. Finally, **we ask the Summit Technical Advisory Group to continue to work together post-Summit, and to consolidate and elaborate these recommendations and chart a path forward by January 2016.**

Achievement of these recommendations needs to be underpinned by better leadership and accountability within the sector. Increased attention to policy support, quality control, monitoring compliance and assessment of impact are needed to extend and maximize the potential of food fortification to improve levels of nutrition and consequently health.

We leave Arusha with a determination to build a new movement – a future fortified with improved food and nutrition security. We have the tools. We need to finish the job that was started a hundred years ago and make the benefits of this simple and cost-effective approach to improving diets available to all.

September 11, 2015, Arusha, Tanzania

"We leave Arusha with a determination to build a new movement"

The Government of the Republic of Tanzania and the Global Alliance for Improved Nutrition are Summit Co-Hosts. Summit Co-Conveners include the African Union (AU), the Bill & Melinda Gates Foundation (BMGF), UNICEF, USAID, WFP and the Scaling Up Nutrition (SUN) Movement. The Technical Advisory Group for the Summit includes the US Centers for Disease Control and Prevention (CDC), ETH Zurich, the Food Fortification Initiative (FFI), FHI 360/Food and Nutrition Technical Assistance (FANTA), Helen Keller International (HKI), the Iodine Global Network (formerly ICCIDD GN), the Micronutrient Forum, the Micronutrient Initiative (MI), PATH, Project Healthy Children (PHC), *Sight and Life*, and Smarter Futures.

# Annex 2
## Agenda

**Key code**

| | | |
|---|---|---|
| **Theme 1:** Understanding the current evidence | **Theme 2:** Sharing achievements, challenges and lessons learned | **Theme 3:** Align on the way forward |

**Day 1: Wednesday September 9, 2015**

| Time | Session title |
|---|---|
| 12:00 | Registration |
| | Parallel Learning Sessions |
| 14:30 | **Session I:** Food fortification and iron deficiency anemia: Improving impact through evidence-informed program guidance |
| | **Session 2:** Small-scale fortification: Opportunities and constraints |
| | **Session 3:** Let's improve quality: Good practices to increase compliance against national standards |
| | **Session 4:** Novel fortified complementary foods for Africa |
| **16:00** | **Break** |
| 16:30 – 18:00 | **Session 5**: Effective and safe micronutrient interventions: Weighing the risks against the benefits |
| | **Session 6**: Assessing progress in food fortification: Population-based coverage and utilization survey methodology |
| | **Session 7:** Regional harmonization: Lessons learned and good practice |
| | **Session 8:** Rice fortification: Evidence, opportunities, and country experiences |
| | **Session 9:** India: Policies and programmes supporting food fortification |
| **18:30** | **Summit opening ceremony and dinner** |

**Day 2: Thursday September 10, 2015**

| Time | Session title |
|---|---|
| 7:30 | |
| 8:00 | Arrival of participants |
| 8:30 | Welcome addresses |

**Key code**

| | | |
|---|---|---|
| Learning side sessions | Speeches, other | Sponsored side session |

| | Speaker(s) | Meeting room | Sponsored side session |
|---|---|---|---|
| | | | |
| | | | |
| | Dr Richard Hurrell, ETH Zurich; Dr Helena Pachon, Food Fortification Initiative (FFI); Dr Grant Aaron, GAIN | Maua | |
| | Quentin Johnson, FFI; Munir Hussain, Pakistan Salt Industry; Goodluck Mosha, MEDA; Felix Brooks Church, SANKU/Project Healthy Children (PHC); Abdulaziz Adish, Micronutrient Initiative (MI); moderated by John McCullough, MI | Kilimanjaro | |
| | Greg S Garrett, GAIN; Laura Rowe, PHC; Corey Luthringer, GAIN; Phillip Makhumula, Food Fortification Advisor, Malawi; Ousmane Mbaye, Senegal Ministry of Trade; Margaret Eshiett, Standards Organization of Nigeria; Mrs. Ancikaria Chigumira, Zimbabwe Ministry of Health and Child Care; moderated by Summit Master of Ceremonies Henry Bonsu | NgoroNgoro | |
| | Dr Sajid Alavi, Kansas State University, Hazvinei Mugwagwa, DSM Nutritional Products; Jonathan Thomas, Chief of Party, SAFE/TechnoServe; Paul Alberghine, US Department of Agriculture/ Foreign Agricultural Service | Victoria | |
| | | | |
| | Dr Klaus Kraemer, *Sight and Life*; Dr Maaike Bruins, DSM; Dr Roland Kupka, UNICEF; Georg Lietz, Newcastle University; Dr Reina Engle-Stone, University of California Davis; Dr Michael Zimmerman, ETH Zurich | NgoroNgoro | |
| | Dr Helena Pachon, FFI; Dr. Grant J. Aaron, GAIN; Valerie Friesen, GAIN; Dr Maria Elena Jefferds, CDC | Maua | |
| | Dr Omar Dary, USAID; Dr Fred Grant, Helen Keller International (HKI), Doreen Marandu, ECSA-Health Secretariat; Mensan Lawson-Hechelli, ECOWAS; Milton Quexel, Association of Sugar Producers of Guatemala | Horoma | |
| | Jane Badham, JB Consultancy; Peiman Milani, PATH; Rizwan Yusufali, World Food Programme (WFP); Saskia DePee, WFP; Karen Codling, FFI; Thelma Alfaro, INCIENSA Costa Rica; Zakir Hossain, Ministry of Women & Children Affairs Bangladesh | Victoria | |
| | Representatives from UNICEF, GAIN, PATH, WFP, MI, FFI; Dr Rajan Sankar, GAIN/Tata Trusts; Dr Rajesh Kumar, Ministry of Human Resource and Development, GoI; Mr J Alam, Ministry of Health and Family Welfare, GoI; Dr Subodh Agarwal, Department of Food and Civil Supplies, Gov. of Rajasthan; Dr Pramod Verma, MP Council for Science and Technology, Gov. of Madhya Pradesh; Dr Rakesh Gupta, Office of the Chief Minister, Gov. of Haryana; Mr. Naveen Jain, National Health Mission and Special Secretary, Health, Gov. of Rajasthan; Dr Rajesh Kapur, Ministry of Science and Technology; Chairs: Dr Rakesh Gupta; Mr Mukesh Sharma, Department of Health, Gov. of Rajasthan | Kilimanjaro | |
| | **Summit Master of Ceremonies (MC) Henry Bonsu, Hon. Dr Stephen K Kebwe (MP), Deputy Minister for Health and Social Welfare**<br>**> Marc Van Ameringen, Executive Director, GAIN, Summit Host**<br>**> His Excellency The African Union Commissioner for Social Affairs, Dr Mustapha Kaloko**<br>**> African Union Nutrition Champion, His Majesty King Letsie III, Kingdom of Lesotho**<br>**> His Excellency The President of the United Republic of Tanzania, Jakaya Kikwete** | **Mount Meru** | |

| | Speaker(s) | Meeting room | Sponsored side session |
|---|---|---|---|
| | | | Breakfast sponsored by Unilever |
| | Summit Master of Ceremonies Henry Bonsu | | Breakfast sponsored by Unilever |
| | Representatives of the Co-Convening Organizations | Kilimanjaro | |

| Time | Session title |
|---|---|
| **9:15** | **Setting the scene** |
| 9:15 | Keynote - Food for Thought: Where do we stand after a century of fortification? |
| 10:00 | Cost effectiveness and cost benefits of large scale food fortification |
| 10:45 | Protecting life before it begins: The impact of spina bifida |
| **11:15** | **Break** |
| 11:30 – 13:00 | **The Evidence for food fortification** |
| | Why fortify? The consequences of micronutrient malnutrition and current state of food fortification programs |
| | What is the latest impact? A systematic review of fortification in LMIC |
| | Fortification and the 1,000 day window with a special focus on iodine and folic acid |
| | Components of a successful fortification program: Lessons learned from Latin America |
| | WHO Fortification guidelines: Translating evidence to policy and programming |
| **13:00** | **Lunch** |
| | **Case studies session 1. From start-up through scale-up: Lessons learned from programs at different stages** |
| 14:00 – 14:30 | Tanzania fortification program: Country experience |
| 14:30 – 14:50 | Egypt's food fortification experiences: Highlights and key achievements |
| 14:50 – 15:10 | Uganda: History of oil fortification since 1990 |
| 15:10 – 15:30 | From endemicity to USI achieved and sustained: China |
| **15:30 – 15:45** | **Break** |
| | **Case studies session 2: Lessons learned on impact in diverse contexts** |
| 15:45 – 16:05 | It's not just about poverty: Wheat flour fortification in North America |
| 16:05 – 16:25 | Guatemala sugar fortification: 25 years of learning and success |
| 16:25 – 16:45 | Achieving impact on anemia through multiple vehicle fortification: Costa Rica |
| 16:45 – 17:00 | Indonesia, vitamin A and edible oils: Results of a 1 year effectiveness study |
| 17:00 – 17:30 | Questions & answers session with all case study presenters |
| **17:30** | **Panel discussion** |
| 17:30 – 18:30 | Accelerating public-private collaboration for fortification and impact |
| 18:30 | End of day 2 sessions |
| 18:45 | |
| **19:30** | **Gala Dinner** |

**Day 3: Friday September 11, 2015**

| Time | Session title |
|---|---|
| 8:00 | Arrival of participants |
| **8:30** | **Food fortification: A key tool for public health and nutrition** |
| 8:30 | Framing fortification in the context of national nutrition strategies under the SUN movement |
| | Effective coverage of large-scale food fortification |
| | Optimization modelling to enhance the cost-effectiveness and coherence of national micronutrient intervention programs: Business-as-usual and alternative strategies in Cameroon |
| **9:30** | **Break** |

| Speaker(s) | Meeting room | Sponsored side session |
|---|---|---|
| **Moderator: Jay Naidoo** | **Kilimanjaro** | |
| Dr Chris Elias, Bill & Melinda Gates Foundation | Kilimanjaro | |
| Dr Bjorn Lomborg, Copenhagen Consensus; Dr Sue Horton, University of Waterloo | Kilimanjaro | |
| Dr Margo Whiteford, President of International Federation for Spina Bifida and Hydrocephalus | Kilimanjaro | |
| | | |
| **Moderator: Dr Lynnette Neufeld, GAIN** | | |
| Prof Ian Darnton-Hill, University of Sydney and Tufts University | Kilimanjaro | |
| Dr Zulfiqar Bhutta, Hospital for Sick Kids; Aga Khan University | Kilimanjaro | |
| Dr Michael Zimmerman, IGN/ETH; Michael Cannon, CDC Birth Defects | Kilimanjaro | |
| Dr Reynaldo Martorell, Emory University | Kilimanjaro | |
| Dr Francesco Branca, WHO | Kilimanjaro | |
| | | |
| **Moderators: Greg S Garrett, GAIN and Dr Rafael Flores, US Centers for Disease Control and Prevention** | **Kilimanjaro** | |
| Dr Vincent Didas Assey, Ministry of Health and Social Welfare, Republic of Tanzania<br>Panel: Tanzania Food and Nutrition Centre, USAID, Helen Keller International (HKI), GAIN | Kilimanjaro | |
| Dr Emad Ezzat, Ministry of Health of the Government of Egypt; Dr Magdy El Sanady, UNICEF;<br>Dr Ahmed Khorshed, Ministry of Supply and Internal Trade of the Government of Egypt | Kilimanjaro | |
| Patricia Njeri Asiimwe Bageine Ejalu, Uganda National Bureau of Standards | Kilimanjaro | |
| Ms Yan Jun, Division of Endemic Disease Control and Prevention, the National Health and<br>Family Planning Commission of the People's Republic of China | Kilimanjaro | |
| | | |
| **Moderators: Dr Omar Dary, USAID and Dr Roland Kupka, UNICEF** | **Kilimanjaro** | |
| Dr Elizabeth Yetley, Office of Dietary Supplements, National Institutes of Health | Kilimanjaro | |
| Milton Quexel, Guatemalan Association of Sugar Producers | Kilimanjaro | |
| Thelma Alfaro, INCIENSA Costa Rica | Kilimanjaro | |
| Dr Drajat Martianto, Indonesian Nutrition Foundation for Food Fortification;<br>Ifrad, Institute of Nutrition Indonesia | Kilimanjaro | |
| Session Moderators | Kilimanjaro | |
| **Moderator: Vinita Bali, Chair of Board of Directors, GAIN** | **Kilimanjaro** | |
| Opening presentation: Siraj Chaudhry, Cargill India | Kilimanjaro | |
| Panel: Ousmane Mbaye, Senegal Ministry of Trade; Dr Martin Bloem, WFP; Scott Montgomery, FFI; Siraj Chaudhry, Cargill; Fokko Wientjes, DSM | | |
| | | |
| | Naura Springs | Drinks reception sponsored by BASF |
| **Summit MC Henry Bonsu, High Level Panel Discussion** | **Naura Springs** | |

| Speaker(s) | Meeting room | Sponsored side session |
|---|---|---|
| | Maua | |
| **Moderator: Shawn Baker, Bill & Melinda Gates Foundation** | **Kilimanjaro** | **8:45 –10:45 Wright Group "Rice Fortification: Quality perspectives" in Victoria Room** |
| Panel: Dr Francesco Branca, WHO; Rolf Klemm, HKI; Patrizia Fracassi, SUN Secretariat | Kilimanjaro | |
| Dr Lynnette Neufeld, GAIN | Kilimanjaro | |
| Dr Reina Engle-Stone, UC Davis | Kilimanjaro | |
| | | |

| Time | Session title | Speaker(s) | Meeting room | Sponsored side session |
|---|---|---|---|---|
| **9:45** | **Food Fortification: Are we ready for the future food system?** | **Dr Ian Darnton-Hill** | **Kilimanjaro** | |
| | Overview of changing agriculture landscape and consumption | Mawuli Sablah, FAO | Kilimanjaro | |
| | Are we fortifying the right foods? A perspective from Asia | Budianto Wijaya, Bungasari Flour Mills | Kilimanjaro | |
| | A perspective on new technologies and vehicles | Richa Arora, Tata Chemicals | Kilimanjaro | |
| | Biofortification and staple food fortification: Competing or complementary? | Panel Debate: Howarth Bouis, Harvest Plus; Marc Van Ameringen, GAIN; Damilola Emmanuel Eniaiyeju, Nigeria Federal Ministry of Agriculture & Rural Development, Nigeria | Kilimanjaro | |
| **10:45** | **Break** | | | |
| | **The Way Forward** | | **Kilimanjaro** | |
| 11:15 | Panel: Fortification & the unfinished agenda: Gaps, investments needed and potential for impact | Panel: Shawn Baker; Dr Sue Horton; Dr Reynaldo Martorell; Government Representatives; Dr Ziauddin Hyder, World Bank | Kilimanjaro | |
| 12:15 | Arusha Conference Statement on Food Fortification | Moderator: Summit MC Henry Bonsu Representative of the United Republic of Tanzania and Representatives of the Co-Convening Organizations | Kilimanjaro | |
| 12:45 | Formal Closing | | Kilimanjaro | |
| **13:00** | **Lunch** | | | |
| 14:00 – 17:30 | Field visits | | | |
| | Potential ½ day tour | | | |
| **17:30** | **End of day 3 sessions** | | | |

# Annex 3
## Parallel Learning Sessions

**Session 1:** Food fortification and iron deficiency anemia: improving impact through evidence-informed program guidance

**Session 2:** Small-scale fortification: opportunities and constraints

**Session 3:** Let's improve quality: good practices to increase compliance with national standards

**Session 4:** Novel fortified complementary foods for Africa

**Session 5:** Effective and safe micronutrient interventions: weighing the risks against the benefits

**Session 6:** Assessing progress in food fortification: population-based coverage and utilization survey methodology

**Session 7:** Regional harmonization: lessons learned and good practice

**Session 8:** Rice fortification: evidence, opportunities, and country experiences

**Session 9:** India: policies and programs supporting food fortification

# Annex 4

## Closing acknowledgements to the Global Summit on Food Fortification Arusha, Tanzania

Jay Naidoo, Chair, Partnership Council, GAIN

Jay Naidoo, the Chair of the Partnership Council of GAIN, closes the Summit.

I would like to thank:

The Government of Tanzania, and especially Prime Minister Mizengo Pinda, for hosting the first-ever Global Summit on Food Fortification in Arusha, Tanzania.

His Majesty King Letsie III, AU Nutrition Champion, for his inspiring address, and AU Commissioner for Social Affairs H.E. Dr Mustapha Kaloko for his leadership and support for the Summit.

The Ministers and senior officials who spoke, and each of the 29 country delegations who attended from Latin America, Africa and Asia.

Our Co-Conveners – the African Union Commission, the Bill & Melinda Gates Foundation, the Scaling Up Nutrition Movement, the United States Agency for International Development, UNICEF, and the World Food Programme. Particular thanks go to the Foundation for providing the bulk of the financial support for this event, and to USAID and the Technical Advisory Group members for their financial contributions.

The Technical Advisory Group (TAG) of the Summit comprised the hosts and co-conveners as well as ETH Zurich, FHI360/FANTA, the Food Fortification Initiative, the Iodine Global Network, Helen Keller International, PATH, Project Healthy Children, the Micronutrient Forum, the Micronutrient Initiative, *Sight and Life*, Smarter Futures, and the US Centers for Disease Control and Prevention. The TAG members not only helped form the agenda and mobilize speakers, but also worked hard to bring country delegations together.

The Tanzanian Task Force that brought together national stakeholders.

Thanks to all the speakers and presenters. We heard over 70 presentations.

My GAIN Board colleagues, and especially H.E. Tumusiime Rhoda Peace, AU Commissioner for Rural Economy and Agriculture, for delivering the final Arusha Statement on Food Fortification.

On behalf of GAIN, our particular thanks in recognition of Mr Obey in the Prime Minister's Office, and his colleagues in the PMO and Ministry of Health, who worked with us throughout.

Finally, let me on your behalf thank the GAIN team for their efforts in pulling this Summit together.

I wish you a safe and speedy return home.

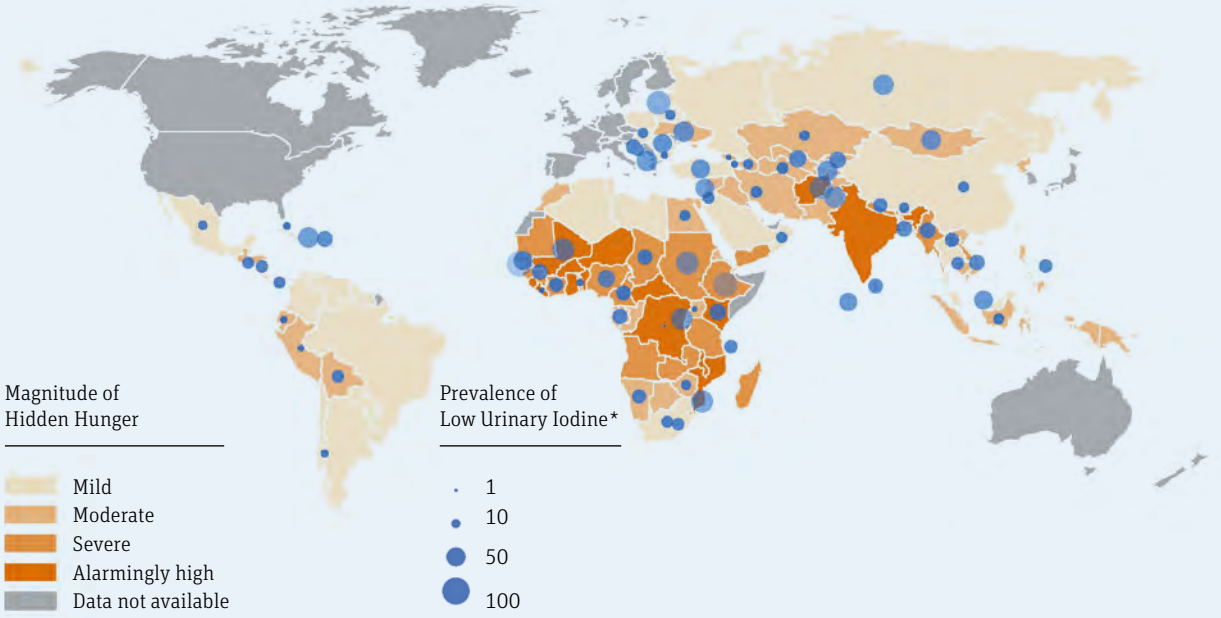
September 11, 2015

> "Thanks to the GAIN team for their efforts in pulling this Summit together"

# Annex 5

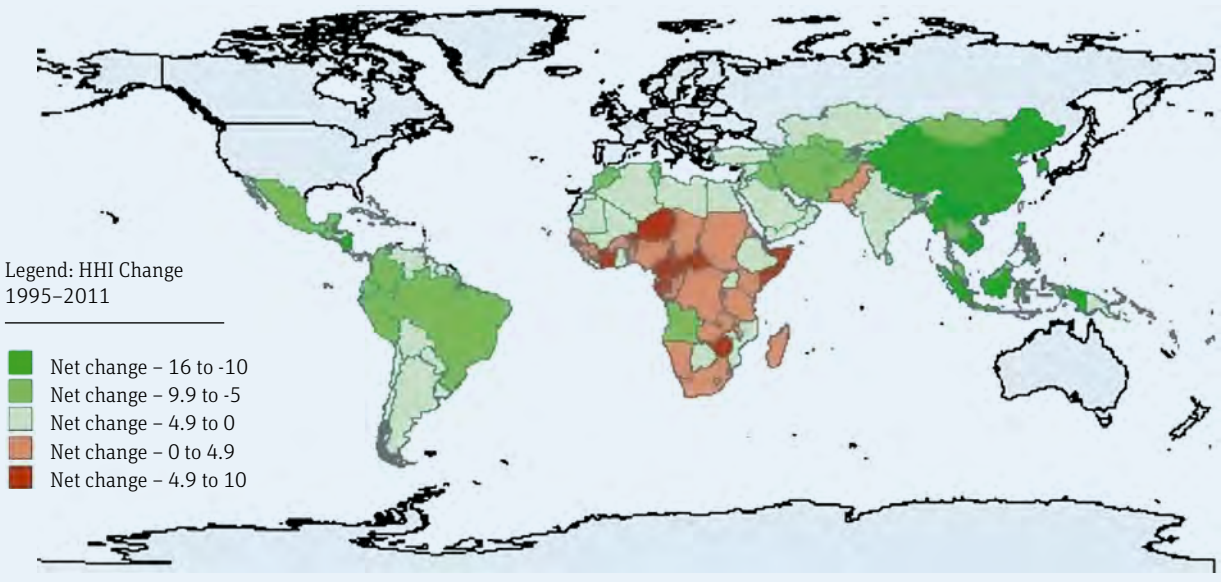
## Map of global distribution of micronutrient deficiencies

**FIGURE 1:** The magnitude of hidden hunger




**Source:** Muthayya S, Rah JH, Sugimoto JD et al. The global hidden hunger indices and maps: an advocacy tool for action. PLoS ONE 2013;8(6):e67860. doi: 10.1371/journal.pone.0067860.
*Prevalence of low urinary iodine is based on the percentage of children with a urinary iodine concentration <100 micrograms per liter.

**FIGURE 2:** Global map presenting Hidden Hunger Index scores




**Source:** Source: Ruel-Bergeron JC, Stevens GA, Sugimoto JD et al. Global update and trends of Hidden Hunger, 1995-2011: The Hidden Hunger Index-2. PLoS One;10(12):e0143497. ournal.pone.0143497.

# B

# Recommendations for Food Fortification Programs

## Technical Advisory Group report elaborating on the five recommendations from the #FutureFortified Global Summit on Food Fortification

**Report prepared by**

**Greg S Garrett, Rebecca Spohrer, Lynnette Neufeld**
Global Alliance for Improved Nutrition (GAIN), Geneva, Switzerland

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Evidence and Program Guidance, Department of Nutrition for Health and Development, World Health Organization, Geneva, Switzerland

**April 2016**

# Acknowledgements

The Summit and this report could not have been produced without the generous time and effort invested by the individual representatives of the organizations in the #FutureFortified Technical Advisory Group: Akoto Osei (African Union Commission); Shawn Baker and Senoe Torgerson (Bill & Melinda Gates Foundation); Richard Hurrell (ETH Zurich); Anna Lartey and Mawuli Sablah (FAO); Deborah Ash (FHI360/FANTA); Scott Montgomery, Helena Pachón, and Sarah Zimmerman (Food Fortification Initiative); Greg S Garrett, Steve Godfrey, Corey L Luthringer, Enock Musinguzi and Rebecca Spohrer (GAIN); Lynnette Neufeld (GAIN and Micronutrient Forum), Vincent Assey and Obey Assery Nkya (Government of Tanzania); Fred Grant and Mette Kjaer Kinoti (Helen Keller International); Gosia Gizak and Jonathan Gorstein (Iodine Global Network); Rafael Flores-Ayala and Maria Elena Jefferds (Micronutrient Forum and US Centers for Disease Control and Prevention); Noor Khan and Luz Maria De-Regil (Micronutrient Initiative), Peiman Milani and Ruchika Sachdeva (PATH); Laura Rowe (Project Healthy Children); Patrizia Fracassi (Scaling Up Nutrition Movement/SUN); Klaus Kraemer and Eva Monterrosa (*Sight and Life*); Lieven Bauwens and Anna Verster (Smarter Futures); Werner Schultink and Roland Kupka (UNICEF); Omar Dary and Mike Manske (USAID); Saskia de Pee, Katrien Ghoos, Lauren Landis, Shane Prigge and Rizwan Yusufali (WFP); Elizabeth Centeno Tablante, Juan Pablo Peña-Rosas, Lisa Rogers and Juan Antonio Solon (WHO); and Zia Hyder (World Bank). **Disclaimer:** The authors alone are responsible for the views expressed in this report and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated.

# List of Acronyms

| | |
|---|---|
| **AU** | African Union |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **FACT** | Fortification Assessment Coverage Tool |
| **FAOSTAT** | Food and Agriculture Organization of the United Nations Statistics Division |
| **FFI** | Food Fortification Initiative |
| **GAIN** | Global Alliance for Improved Nutrition |
| **GENuS** | Global Expanded Nutrient Supply Model |
| **HIES** | Household Income and Expenditure Surveys |
| **HMIS** | Health Management Information Systems |
| **IGN** | Iodine Global Network |
| **LMIC** | Low- and Middle-Income Countries |
| **NFA** | National Fortification Alliance |
| **NGOs** | Non-Governmental Organizations |
| **PHC** | Project Healthy Children |
| **QA/QC** | Quality Assurance and Quality Control |
| **SUN** | Scaling Up Nutrition Movement |
| **TAG** | Technical Advisory Group |
| **UN** | United Nations |
| **UNICEF** | United Nations Fund for Children |
| **USAID** | United States Agency for International Development |
| **WFP** | United Nations World Food Programme |
| **WHO** | World Health Organization |
| **UEMOA** | West African Economic and Monetary Union |

# Executive Summary

Fortification of staple foods and condiments with vitamins and minerals is a proven, cost-effective, and sustainable intervention to improve nutrient intakes at the population level. While there has been significant progress in terms of the number of countries mandating the fortification of staple foods and condiments, there is much work required to ensure the impact and sustainability of these programs.

> "#FutureFortified was the first ever Global Summit dedicated to large-scale food fortification"

In this context, the Global Alliance for Improved Nutrition, the Government of Tanzania, the Bill & Melinda Gates Foundation, USAID, the SUN Secretariat, the African Union, UNICEF, and WFP brought together a wider group of donors, international NGOs, UN agencies, academia, and government agencies to organize and convene the first ever Global Summit dedicated to large-scale food fortification. This meeting aimed to reinvigorate interest, awareness, and investment in food fortification. A Technical Advisory Group comprising 23 organizations working in nutrition was formed in the first quarter of 2015 in order to support the development of content and planning of the event.

The #FutureFortified Summit was held in Arusha, Tanzania, September 9–11, 2015, and culminated in the Arusha Statement on Food Fortification outlining five recommendations and joint priorities for fortification in low- and middle-income countries (found in **Annex 1** of these Proceedings). This statement asked for the Technical Advisory Group to elaborate and align on these recommendations as a follow-up action. Over the course of six months following the Summit, this group formed working groups to look at three of the themes in those recommendations: regulatory monitoring, evidence, and advocacy. The remaining two recommendations on global reporting and funding were analyzed by the entire Technical Advisory Group.

This report – an analysis of the Summit recommendations and prioritized next steps – is intended to provide guidance, foster coherence, and support collaboration and alignment in the sector in order to strengthen, scale up and ensure sustainability and optimal impact of national fortification programs. The audience envisioned is nutrition program practitioners including implementing agencies, policy-makers and donors.

# Introduction

Fortification of staple foods and condiments with vitamins and minerals is a powerful nutrition intervention that reaches hundreds of millions across the world. Today, over 140 countries support salt iodization,[1] 85 have mandated cereal grain fortification,[2] and dozens have programs focusing on fortifying edible oils and condiments. The evidence of the health impact of these programs is growing. However, despite this global traction and impact, in many countries fortification programs are not currently reaching their full potential. Reinforcement is needed in improving regulatory frameworks, monitoring, management, and quality control. It will take renewed commitments to expand, improve and sustain fortification programs in LMIC.

Given this context, a group of key partners including co-hosts the Government of Tanzania and GAIN along with co-conveners the African Union, the Bill & Melinda Gates Foundation, the SUN Secretariat, UNICEF, USAID and the World Food Programme (WFP) came together to organize the first global summit devoted to large-scale food fortification in September 2015. In order to make the event fully representative of the fortification sector, these hosts and co-conveners invited a wider group of partners to form a Fortification Technical Advisory Group (TAG) (**Box 1**) to develop the agenda, and messaging, and to identify speakers and participants over the course of six months prior to the Summit.

The event brought together governments, business, international organizations, civil society, academia and donor agencies to cover three main objectives: **1)** share achievements, challenges, and lessons learned; **2)** discuss the latest evidence and its implications; and **3)** align on the way forward for large-scale food fortification.[3]

The event highlighted the global progress made – which has been considerable, including recently in low- and middle-income countries. It also outlined the WHO evidence-informed guidelines for fortification, which are critical in furthering progress. A systematic analysis on the effectiveness of fortification programs in LMIC and analysis of the benefit:cost ratio showed that fortification is a strong public health investment. Challenges cited included data gaps for setting standards, regulatory capacity to monitor quality and compliance, and ensuring that fortification reaches the most vulnerable populations. Moving forward, it was noted that increasing urbanization, changing food environments and systems, climate change and volatility in food prices are likely going to make food fortification even more relevant. Better data on costs, compliance, performance, and effective coverage is needed in order to expand, improve and sustain fortification to achieve its optimal public health impact in LMIC.

**Box 1: Fortification Technical Advisory Group Members**

1. African Union Commission
2. Bill & Melinda Gates Foundation
3. FHI360/FANTA
4. ETH Zurich
5. Food and Agriculture Organization of the United Nations
6. Food Fortification Initiative
7. Global Alliance for Improved Nutrition
8. Government of Tanzania
9. Helen Keller International
10. Iodine Global Network
11. Micronutrient Forum
12. Micronutrient Initiative
13. PATH
14. Project Healthy Children
15. Scaling Up Nutrition Movement Secretariat
16. *Sight and Life*
17. Smarter Futures
18. UNICEF
19. US Agency for International Development
20. US Centers for Disease Control and Prevention
21. World Bank
22. UN World Food Programme
23. World Health Organization

"Better data on costs, compliance, performance, and effective coverage is needed in order to allow fortification to achieve its optimal public health impact in LMIC"

The Summit helped create a sector-wide consensus on evidence gaps, delivery models and pathways for fortification. It provided evidence that food fortification can improve, and has indeed improved, the dietary intakes of essential nutrients for the poor and those living in rural as well as urban poor areas. It forged a renewed vision for fortification to scale up and reach its potential for effectiveness. It identified five key recommendations as critical points for action (see **Box 2**) and requested that the TAG elaborate on these to chart a path forward. For the full Arusha Statement on Food Fortification, please see Annex 1 of the Event Proceedings.

**Box 2: The Arusha Statement on Food Fortification Recommendations**

1. Generate new investment in the sector
2. Improve oversight and enforcement of fortification
3. Generate more evidence to guide fortification policy and program design
4. Increase accountability and global reporting
5. Continue to advocate at the global and country level

Following the event, the Technical Advisory Group met monthly to review and analyze the Summit recommendations in order to translate them into concrete action points of benefit for the sector. In addition to monthly calls, three working groups were formed that met more frequently for this purpose (**Box 3**). Two cross-cutting recommendations – to generate new investments in the sector and to increase accountability and global reporting – were discussed among all three working groups and by the Technical Advisory Group as a whole.

**Box 3: Technical Advisory Working Groups**

**Working group: Regulatory monitoring**
**Members:** Laura A Rowe (lead, PHC), Greg S Garrett (GAIN), Corey Luthringer (GAIN), Helena Pachón (FFI), and Anna Verster (Smarter Futures)
**Objectives:** Conduct a review of the top regulatory monitoring barriers faced in countries that have adopted mandatory fortification programs, provide an outline of preliminary solutions with documented examples from country-specific programs, and suggest methods for disseminating proposed practices, as well as means for tracking global compliance.

**Working group: Evidence and guidelines**
**Members:** Juan Pablo Peña-Rosas (co-lead, WHO), Lynnette Neufeld (co-lead, GAIN), Jonathan Gorstein (IGN), Richard Hurrell (ETH), Saskia de Pee (WFP), Juan Antonio Solon (WHO) and Elizabeth Centeno Tablante (WHO)
**Objective:** Identify the critical evidence gaps where timely research can enable donors, policy-makers, advocates, regulatory authorities, researchers, businesses and governments to initiate and sustain efficient, effective and equitable mandatory, large-scale fortification programs with high potential to improve health/nutrition outcomes where needed.

**Working group: Advocacy**
**Members:** Sarah Zimmerman (lead, FFI), Marta Anguera (IF Global), Greg S Garrett (GAIN), Jonathan Gorstein (IGN), Gosia Gizak (IGN), Rebecca Spohrer (GAIN), and Senoe Torgerson (BMGF).
**Objective:** Identify opportunities to advocate to national policy-makers and government officials and their influencers to implement and improve mandatory fortification programs.

**The following report summarizes the priorities for all five of the recommendations from the Arusha Statement on Food Fortification.**

**References**
[1] Luthringer CL, Rowe LA, Vossenaar M et al. Regulatory monitoring of fortified foods: Identifying barriers and good practices. Glob Health Sci Pract 2015;3(3):446–461.
[2] Food Fortification Initiative Global Progress (2016). Available from: www.ffinetwork.org/global_progress/index.php. (Accessed 6 April 2016)
[3] The full Proceedings, including the objectives, content, description of participants, and recommendations, can be found in the Proceedings section of this supplement.

# Summit recommendation 2: Regulatory monitoring

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**Arusha Statement recommendation:**

**There is need for a major effort to improve oversight and enforcement of food fortification standards and regulations.** Poor compliance with laws and regulations limits potential for impact and undermines effectiveness. Available data show adequate compliance with standards as low as 50% in many contexts. Governments should improve their inspection and enforcement systems to ensure high-quality fortification and a level playing field for the producers. Effective regulatory monitoring and enforcement will notably require more robust national budget allocations.

**Objective:** Review key regulatory monitoring barriers faced in countries that have adopted mandatory fortification programs, outline preliminary solutions with examples, and propose methods for disseminating proposed practices and means for tracking global compliance.

**Background:** There are little data on how compliant national fortification programs are in comparison with national standards. For some programs, this means data are simply not collected, while for others it means the data are never collated and/or never reported on. Of the information we do have globally, it appears that roughly half of the samples meet national standards.[1] While that figure cannot be a data point for compliance and many caveats must be made in using it as an inference, it does point to the constraints both in effectively collecting, analyzing and reporting data and in ensuring the products meet national standards.

The goal of this working group was to elucidate the key barriers and propose pragmatic solutions for government and industry to improve fortification quality and compliance. Experience was gathered from published literature and program implementers (listed in **Annex 1**). Three priority areas emerged:

1. Simplifying the process of compliance data collection for inspectors
2. Identifying motivating factors for government to ensure compliance
3. Identifying and putting in place enablers for industry to comply with established regulatory frameworks

Regulatory monitoring, or food control, includes all monitoring activities along the value chain from production level (i.e., factories and packers) and imports to customs warehouses and retail stores.[2] For the purposes of this working group, regulatory monitoring refers to the collection of fortification compliance information by government inspectors from domestic producers (which can occur via industry audits or sample collection) and importers. This can include both developing and developed countries.

Suggested actions for implementation are outlined below:

### 1. Simplify the process of compliance data collection for inspectors

When conducting food industry audits, inspectors should have an official process to review the food processor's systems, proce-

dures, and records, also referred to as the "Systems Approach,"[3] in lieu of relying solely on final product quantitative testing. This approach to ensuring compliance has been an industry standard in many countries for the manufacture of pharmaceuticals and, in many cases, processed and fortified foods, for over a decade.[1] It reduces frequency (and therefore burden) of quantitative testing for inspectorate bodies that are often under-resourced.[2]

Industry should be sensitized to this approach and encouraged to work openly with government inspectors with the goal of improving production processes, and not as a means to find problems and subsequently penalize facilities. An environment of trust should be established between both parties and the approach viewed as part of food safety compliance.

**Adopting a Systems Approach to regulatory monitoring in Jordan**

In 2009, Jordan's fortification program implemented the use of key indicators to streamline data collection from domestic wheat flour producers. The program demonstrated how the collection of basic data on a regular basis can be compiled to give both a mill-specific and an aggregate picture of a fortification program's performance while being maintained by relatively few staff and easily interpreted and acted upon by program managers and / or government inspectors.

The program uses just two raw data sources that proved to be simple to collect, timely, and representative: **1)** monthly production of flour (obtained from mill production records) and **2)** number of boxes of premix used in the past month (obtained from premix storage logs). Indicators 1 and 2 are used to calculate the average addition rate and percentage of the target (in g/MT). In addition, the results of monthly external tests of iron concentration in flour at mill level are recorded as a means of further verification.[4]

Jordan's external monitoring system successfully documents the performance of each mill and the entire flour fortification program, and can serve as a model for other national fortification programs that are considering external monitoring approaches.

Food fortification indicators should not be considered as stand-alone, but rather should be streamlined as part of general food safety mandates and inspection forms.

Food safety actors such as the World Bank's Global Food Security Partnership, United Nations Industrial Development Organization (UNIDO), FAO, and Codex should be contacted

A child sitting on a salt pile

**Placing food fortification within the broader food safety system in Canada**

Canada provides an excellent example of where fortification monitoring is directly linked to food safety. In Canada, a standardized food which falls under the mandatory fortification program and is found to be unfortified is considered to be an unsafe food and therefore contravenes the Food and Drug Act.[5] This places a high priority on the appropriate monitoring of fortified foods.

to discuss how fortification could become part of their regular data collection and work streams.

### 2. Identify motivating factors for government to ensure compliance

The nutrition sector should identify motivating factors which would encourage countries to increase the regularity and quality of fortification reporting. In order to facilitate this, fortification indicators should be incorporated into the country's Health Management Information Systems (HMIS). In addition, relevant indicators should be standardized globally to track performance both within and across countries. The WHO's fortification indicator list can be used as a starting-point.[6] Reporting on compliance progress in global report cards such as the Global Nutrition Report (http://globalnutritionreport.org/), or tapping into "regional rivalries" (i.e., East vs. West Africa), can be used to spur action.

In order to garner high-level government support for fortification, one effective approach is through conducting and disseminating cost-benefit analyses which highlight that the costs of doing nothing are far greater than the cost of fortification. This is discussed in more detail below under "Working Group 3: Advocacy." Further deliberation is required by stakeholders in order to identify and develop other targeted advocacy tools (e.g., Cost of Inaction Toolkit).

### 3. Identify and put in place enablers for industry to fortify

In consultation with industry, effective incentives for compliance should be identified. These could include benefits such as tax exemptions, priority given to fortifying industries by public institutional buyers, or awards for achieving certain standards of quality. Once incentives are proposed, these should be discussed and proposed to government and relevant institutions to implement.

**Institutional buyer creates demand for fortified maize flour in Rwanda**

Rwanda's fortification program continues to face long delays in passing mandatory legislation due to various political challenges. As a result, industries have been reluctant to begin production without a level playing field. The country's only maize flour producer is an exception to this. With WFP agreeing to purchase its flour for distribution locally if the flour was adequately fortified, it made good economic sense for the facility to begin production. Having a large institutional buyer such as WFP as a customer the producer continues to lead the country in production despite a lack of national mandatory legislation.[7]

Consumer associations and media can be effective advocates for quality and compliance through praising compliant industries and identifying regular non-compliers in media channels.

**Consumer action triggering improved fortification compliance in South Africa**

Despite a well-established fortification program, in 2008 South Africa still faced high rates of child malnutrition. As a result, the National Consumer Forum undertook a market-based survey of national fortification levels. Maize meal products were sampled from supermarket shelves for laboratory testing of vitamin A, riboflavin, iron, and niacin. Results found brands of maize meal not adequately fortified to national standard. Following the publication of results, positive momentum was created, allowing both industry and the food authorities to work towards improving fortification levels.[8]

Distributing and conducting training on use of Rapid Test Kits (RTKs), which determine the presence of nutrients in staple foods, can also be an effective enabler to empower retailers to build demand and awareness.

**Empowering retailers and village health committees with rapid test kits in Kyrgyzstan**

In 2005, Kyrgyzstan had low coverage of iodized salt on the market (around 60%) and poor governmental regulatory monitoring systems. As a result, the government aimed to empower retailers and village health committees to test salt and drive non-iodized salt out of the market. Rapid test kits were distributed to volunteers from village health committees and personnel of Primary Health Care units living in the communities, and training was provided to verify the presence of iodine in salt. Results showed that iodized salt coverage increased from 60% to 90% in two years. Non-iodizers were subsequently pushed out of market. The Government continues to support purchase of test kits for retailers and village health committees annually.[9]

This demonstrates that retail self-regulation can be an effective approach to drive compliance forward, especially where consumer awareness is high and government monitoring systems are lacking.

Industry should be made aware of such efforts, with the understanding that these are meant to address issues they face with non- or under-fortifying competitors.

**Dissemination and further discussion**

There is a need to more widely disseminate these proposed solutions at country level in order to advance implementation. Discussion with countries will also help to generate consensus on indicators and build a more substantial library of best practice examples, e.g. inspection forms that have harmonized fortification inspection with existing food safety protocols.

Children enjoying a school lunch in Kenya

A number of platforms have been identified as potential tools to share and discuss these recommendations. These include the Micronutrient Form, USAID-funded Central Asia; East, Central, and Southern Africa (ECSA); USAID-funded West Africa initiative; and the GAIN-FFI-Kansas State University online fortification monitoring course.

**Human and financial resource mobilization**

The following actions are suggested to maintain coordination and advance the regulatory monitoring and compliance agenda:

1. Convene working group(s) to gain consensus on terminology and indicators to ensure a standardized approach:
   1) Systems Approach: which examples currently used are most effective?
   2) HMIS: which indicators currently used are most effective?
2. After gaining consensus on indicators and approach, conduct government inspector trainings on new approach (as well as use of consumer groups); publicize widely
3. Engagement of food safety actors at international, regional, and national levels
4. Commission a cost-benefit analysis isolating regulatory monitoring (see Advocacy working group section)
5. Secure commitment of UN agencies to make procurement policies about adequately fortified local products
6. Promote sub-regional harmonization of standards to advance intra-regional trade and create economy of scale for compliance by both local food industries and importers to standards on food fortification
7. Support the development of a global repository for tracking fortification programs

**References and notes**


[1] Luthringer CL, Rowe LA, Vossenaar M et al. Regulatory monitoring of fortified foods: Identifying barriers and good practices. Glob Health Sci Pract 2015;3(3): 446–461.

[2] van den Wijngaart A, Begin F, Codling K et al. Regulatory monitoring systems of fortified salt and wheat flour in selected ASEAN countries. Food Nutr Bull 2013;34(2):S102–S111.

[3] The "Systems Approach" facilitates industry to keep good records and entrusts them with the primary responsibility for safety and quality, leaving regulatory inspections to verify whether producers have the adequate raw materials, equipment, systems, and procedures in place for the manufacturing processes to result in consistent production of adequately fortified foods. This approach is implemented in conjunction with the principles of Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP). Testing product samples is still required but is relegated to a validation role.

[4] Wirth JP, Nichols E, Mas'd H et al. External mill monitoring of wheat flour fortification programs. An approach for program managers using experiences in Jordan. Nutrients 2013;5:4741–4759.

[5] Government of Canada: Food and Drugs Act. RSC, 1985, c. F-27. http://laws.justice.gc.ca/eng/acts/F%2D27/page-2.html#h-5.

[6] https://extranet.who.int/indcat.

[7] Personal communication with Laura Rowe from Project Healthy Children. December 8, 2015.

[8] Presentation obtained from GAIN, 2014.

[9] Schuth T, Jamanquloa T, Janikeeva S et al. Power from below: Enabling communities to ensure the provision of iodized salt in Kyrgyzstan. Food Nutr Bull 2005;26(4):366–375. Abstract: www.ingentaconnect.com/content/nsinf/fnb/2005/00000026/00000004/art00006?crawler=true&mimetype=application/pdf..

# Summit recommendation 3: Evidence and Guidelines

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**Arusha Statement recommendation:**

**There is a need to generate more evidence to guide fortification policy and program design, to continually improve programs and demonstrate impact.** For example, there is a lack of detail of foods consumed by various target groups, limiting our understanding of potential food vehicles, use of fortified foods and quantification of the dietary gap we must address for some nutrients.

**Objective:** Identify the critical evidence gaps where timely research can enable donors, policy-makers, advocates, regulatory authorities, researchers, businesses and governments to initiate and sustain efficient, effective and equitable mandatory, large-scale fortification programs with high potential to improve health/nutrition outcomes where needed.

**Background:** While food fortification benefits from a strong evidence base and a number of guidelines are available (list of guidelines included in **Annex 2**), many evidence gaps remain related to the food products themselves, and aspects of program design, delivery, and evaluation. The guidelines and evidence working group kept the scope of the review aligned with the primary purpose of the #FutureFortified Summit, i.e., program design, delivery and evaluation. As such the review of evidence gaps is not a comprehensive listing of all evidence gaps relevant for food fortification.

The group used the WHO Strategy for Health Research[1] as a framework for identifying research priorities in fortification. This framework includes five priority areas of research:

- **Strategic area 1:** Measuring the magnitude and distribution of the health problem
- **Strategic area 2:** Understanding the diverse causes of the problem
- **Strategic area 3:** Developing solutions or interventions
- **Strategic area 4:** Implementing or delivering solutions and monitoring progress
- **Strategic area 5:** Evaluating impact

**Process for identification of research priorities**

This working group discussed the current evidence base and gaps previously identified in WHO guidelines or other documents, programmatic evidence needs and the alignment between the current evidence base and those needs. The result of this discussion was a set of 19 priority research themes, across the five strategic areas mentioned above. The group then requested input including the identification of priorities not previously listed through an online survey form directed to those who had participated in the Summit. There were 20 respondents from 10 countries. The majority (14) of the respondents were affiliated with international organizations. Five respondents were affiliated with academia and one each from government and a national NGO. Thirteen replied that their work is global in scope, five that it is regional and two

**TABLE 1:** Roles of respondents in fortification evidence survey (n=20)

| Roles | Number of respondents (multiple responses permitted if appropriate) |
|---|---|
| Advocacy | 8 |
| Policy | 5 |
| Program implementation | 10 |
| Program management | 10 |
| Research | 7 |
| Monitoring / Evaluation | 2 |

that it is national. Most respondents cited multiple roles and responsibilities related to food fortification programs within their work. Ten were involved in nutrition program implementation or program management, eight in advocacy and seven in research (**Table 1**).

In general, respondents agreed with the priority areas of research and all but one provided additional questions; a total of 106 questions were added by participants across the five areas. Overlapping questions were identified, questions not directly relevant to the objective as stated above deleted, and a final set of new questions were formulated. The rest of this section provides an overview of the relevant available evidence and guidance to date, and summarizes the priority research categories identified under each strategic area. The full list of research questions can be found in **Annex 3**. It is important to note that the questions reflect many evidence gaps relevant across multiple contexts (e.g., better biomarkers) as well as gaps that would apply in all contexts where programs are implemented (e.g., up-to-date estimates of deficiency prevalence). Some of the identified gaps also call for synthesis and interpretation of current evidence into guidance, recommendations, or good practice statements rather than the generation of new evidence.

An operative in an oil factory

Quality testing in a food laboratory

### Strategic area 1: Measuring the magnitude and distribution of micronutrient malnutrition

Clear knowledge on the magnitude and distribution of health problems, in this case micronutrient deficiency and the preventable functional consequences of deficiency, should form the basis of program priority setting. Many countries have data available for key micronutrients and health outcomes, and some of these data have been compiled to global prevalence estimates (e.g., vitamin A and iodine status, anemia, live birth or total presence of neural tube defects or specifically spina bifida). However, for many countries such data are limited and/or out of date; furthermore data for other nutrients including other B vitamins (i.e., vitamin $B_{12}$, thiamin) are extremely limited. For most nutrients, such estimates are at national level and do not address the issue of distribution, i.e., the burden of deficiency across sub-regions within a country or specific subgroups of the population.

The accuracy of such data is dependent on the quality of the biomarkers available to assess status and on consensus related to cut-off points for those biomarkers that are reflective of functional consequences. The WHO published summary statements or guidelines on seven biomarkers covering iron and hemoglobin, vitamin A, iodine, and C-reactive protein, a marker for inflammation (see **Annex 2**). There is currently no summary recommendation from the WHO on the appropriate biomarkers for zinc or vitamin D.

Man carrying baladi bread in Egypt

The questions identified by the working group and survey respondents focused primarily on the following evidence gaps:

1. Addressing the lack of information about micronutrient deficiencies in countries, and particularly the challenges of assessing the distribution of such deficiencies among diverse sub-groups of the population.
2. Identifying resource efficient methods for the continual updating of such information, including the potential of national surveillance systems.
3. The need for further development and validation of biomarkers for micronutrient status, and the establishment of cut-off points, reflective of functional outcomes in diverse population groups.

**Strategic area 2: Understanding the diverse causes of micronutrient deficiencies**

Micronutrient malnutrition is a complex problem that is linked to income, gender, behavior, education, sanitation, and of course, diet. While inadequate dietary intake of micronutrients is the main driver of micronutrient deficiencies, the actual utilization of nutrients, or absorption, can be negatively impacted by parasitism, inflammation due to infection, and genetics. For example, the association of MTHFR 677C>T polymorphisms and blood folate concentrations may have implications on assessing risk of neural tube defects in populations.[2] These context-specific determinants influence the appropriate public health response. There is growing evidence, for example, of the diverse etiology of anemia.[3]

In addition to understanding the diverse causes, there are still remaining gaps in our understanding of patterns of dietary intake. Nationally representative data on micronutrient deficiencies are often insufficient to design an appropriate intervention to address the problem. Food availability at the national level can be estimated based on food balance data as maintained by FAOSTAT. New methods have been proposed to improve the quality of these estimates, including the global expanded nutrient supply (GENuS) model which models key micronutrient supplies factoring in different levels of fortification,[4] and another model which estimates dietary micronutrient supply and the prevalence of inadequate intakes using FAOSTAT and national food composition tables.[5] These may provide better national level estimates but don't address the limitations for estimating household or individual level intake. Recently, household income and expenditure surveys (HIES) have been used to assess household consumption, with some promise for extrapolation to individuals.[6] The method does not typically capture foods consumed outside the home, which may be an important limitation particularly in urban areas. Few countries have used method-

ologies that permit individual level estimate of intake such as 24-hour recalls or food frequency questionnaires.

The issues identified by the working group and survey respondents focus primarily on the following evidence gaps:

1. Creating better resources and tools for improving micronutrient surveillance systems to inform the nutritional situation in the population
2. Determining the attribution of micronutrient deficiencies to diverse factors including dietary intake, genetics, infection, inflammation, and others

**Strategic area 3: Developing large-scale fortification programs to reduce micronutrient malnutrition**

This area is about how to design appropriate food fortification programs with context-appropriate objectives, food vehicles, levels of nutrients added, and delivery platform(s). For simplicity we have divided this area into four sub-sections: a) analyze institutional and market factors relevant to implementation; b) select appropriate food vehicle and fortificants; c) formulate objectives; and d) plan for implementation.

In order to **analyze institutional and market factors relevant to implementation**, the working group identified two main areas of research:

1. Synthesis reviews of good program practice
2. Research on targeted fortification strategies or different distribution models to increase equitable coverage

A man at work in the salt fields

Guidance to implement the second step, selection of an appropriate fortificant and vehicle for the need, budget, and context; is available via WHO's Guidelines on food fortification with micronutrients;[7] Fortification of food-grade salt with iodine;[8] and Recommendations on maize and wheat flour[9] fortification with iron, folic acid, vitamin A, zinc and vitamin $B_{12}$ (listed in **Annex 2**). However, the WHO currently has no published guideline with fortification specifications for oils, sugar or rice.

The issues that arose from this step were related to the following three areas:

1. Food systems and diet: improving consumption information – including at sub-national level – to select appropriate vehicles and development and testing of better methods to do so.
2. Fortificants: selecting the right compounds and levels, based on highest absorption and lowest inhibitors for iron, vitamin A, and zinc, including when multiple food vehicles are fortified.
3. Efficacy: further evidence of impact of status and functional outcomes for those new vehicle/nutrient combinations.

In order to **formulate objectives which are achievable and appropriate,** the objectives must be consistent with the impact pathway for large-scale fortification based on the most recent evidence on efficacy and effectiveness. The primary focus of food fortification initiatives should be on increasing intake of micronutrients (as opposed to improving micronutrient status or reducing anemia, which are also affected by multiple other factors). Not all countries formulate objectives and targets for programs. For those that do have objectives and targets, they are not always realistic, appropriate and achievable within the impact pathway. The WHO/FAO Guidelines on food fortification with micronutrients[9] also provides countries with guidance on setting appropriate objectives. For iodine deficiency disorders, the WHO/CDC electronic catalogue of indicators for micronutrient programs includes core indicators for salt iodization programs.[10]

Priority research needs arising from this step included:

1. Potential for impact: evidence to guide the setting of realistic expectations and establishing appropriate metrics to attribute nutritional impact to food fortification
2. How to prioritize among nutrients and population groups, when there can be trade-offs; i.e., evidence to guide decision-making that will maximize benefits and minimize risks

Finally, the last step under this strategic area is to plan for implementation. This involves listing the activities required to implement the program, the duration of these activities, the accompanying resources needed to perform them, and risk mitigation strategies.

Priority research needs arising from this step included:

1. Sustainability and scaling up: evidence of key factors that will facilitate sustainability
2. Stakeholders: who needs to be engaged, how to ensure accountability, and how can the National Fortification Alliance be strengthened
3. Supply issues: e.g., good premix procurement mechanisms, quality systems
4. Demand: cost-effectiveness of social marketing and behavior change communication to low-income consumers

**Strategic area 4: Implementing, monitoring, and process evaluation of large-scale fortification programs**

In order for food fortification programs to achieve their desired impact, fortified products must be appropriately fortified, available and accessible to consumers over time. The Regulatory Working Group identified that there are few global data on the quality and compliance of fortification programs. From the limited data, it appears that less than half of products are adequately fortified as per standards.

For implementation, guidelines for salt iodization and food fortification are available; however more tailored guidance and dissemination of specific examples of good practices are needed to inform countries on how they can improve their national fortification programs. These include, but are not limited to, topics such as the production, importation and distribution of fortification vehicles and fortificants, quality assurance and control systems, validation studies on test kits, or cost-effectiveness studies. This would help to improve quality and compliance with fortification legislation, coverage, and monitoring. Evaluations designed based on the impact pathway also provide insight into what strategies facilitated implementation, and may be applicable in other countries or contexts. For example, a paper on the legislative frameworks in corn flour and maize meal fortification proposes how in-country legislation can be framed to address identified problems in meeting fortification standards.[11] A review on regulation and monitoring highlights the need for improved regulatory monitoring capacity.[12] In addition to published literature, there is a wealth of unpublished information from agencies involved in fortification.
Research needs under this area focus on improving the generation and utilization of information to improve implementation and efficiency of programs, including monitoring, process evaluation, and implementation research.

Specifically, research questions focus on:

1. Case examples of how monitoring can be streamlined and integrated into existing monitoring efforts, and what are good practices for monitoring and ensuring timely corrective action
2. Process evaluation and/or implementation research to provide guidance on gaining essential government and industry buy-in to ensure high coverage and compliance

**Strategic area 5: Evaluation of large-scale fortification programs**

Impact evaluations should be used to determine whether programs have achieved their goals and ultimately to make any needed changes to program or policy based on those results.

Impact evaluations should ideally be conceived and designed before programs begin, in order to maximize the potential to measure changes in status and function and attribute them to the program. When such designs are not feasible, then impact evaluation should be accompanied by strong process evaluation (see Strategic area 4) to measure key indicators across the pathway to impact and build evidence as to whether any changes could feasibly be due to the program. Whatever the design, impact of programs should be measured only when programs are "evaluation ready," meaning that they are applying WHO-recommended standards, are well-monitored, compliance is adequate, and a high proportion of the population is consuming fortified foods on a regular basis over time such that biochemical or functional outcomes could feasibly be influenced. If any of these components are not fulfilled, then the lack of impact of a program may be due to its ineffective implementation and not to its lack of potential.

Questions identified under this area were related to:

1. Methods for impact evaluation: criteria, criteria to establish the best methodology under different situations, key outcomes to be measured
2. Evidence for effectiveness, particularly for new fortification vehicle/nutrient combinations, specifically addressing the impact on nutrient intake, nutrient status, and functional outcomes, and whether there are any potential negative impacts of fortification

The Regulatory Monitoring Working Group section provides suggestions with examples in practice of how to improve program monitoring and compliance (related to Question 1), and


Women with fortified oil

the Advocacy Working Group have proposed suggestions and case examples of how to gain buy-in for fortification (related to Question 2).

## Conclusion

This exercise to formulate questions at each stage in the program cycle highlighted the fact that there are still knowledge gaps in how to implement and measure impact of effective fortification programs. Some of the questions posed require synthesis and interpretation of existing information, others the generation of tools and methodologies, and others require research studies and evaluations. All fortification programs should be developed and improved based on evidence (of inadequate intakes, of consumption of potential food vehicles) implying that studies are required in each context. These questions highlight the importance of documentation and dissemination of experiences and lessons learned to inform the sector, fill knowledge gaps, and facilitate the development of better practice guidelines. The full list of questions in **Annex 3** may be a useful reference for agencies to prioritize their research and dissemination plans to respond to the needs from the field.

**References**

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# Summit recommendation 5: Advocacy

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**Arusha Statement recommendation:**

**Continuing advocacy is a high priority,** and we will work together with stakeholders such as the SUN Movement and African Union to advocate for greater attention by governments.

**Objective:** Identify opportunities to advocate for national policy-makers and government officials to improve their mandatory fortification programs. Depending on the stage of the program, examples of improvements sought through advocacy may include initiating fortification, revising standards, or monitoring compliance.

**Background:** Achievement of public health impact in fortification ultimately depends on industry compliance with fortification standards, following WHO guidelines. This is most achievable when fortification is mandatory, as this enables regulatory authorities to monitor compliance and creates a business environment where all large-scale producers are incentivized to comply and incur similar costs. Advocacy is therefore needed for passing legislation as a first step, but then also for investing in full implementation and monitoring of programs in order to ensure effectiveness.

Consequently the primary audience of fortification advocacy efforts is policy-makers and government officials, including parliamentarians. This includes people making policies, allocating budgets, and overseeing food regulations (such as food safety inspectors). However because direct access to policy-makers is often limited, fortification advocacy needs to also focus on individuals or groups who are influential with policy-makers. This may include, but is not limited to, national fortification alliances, industries, NGOs, consumer protection groups, consumers, academia, institutional bodies, and donors.

**Recommended message**

Effective advocacy will maximize the perceived benefits, and minimize the perceived barriers, of mandatory fortification. However, an advocacy message that attempts to address *all* the benefits and barriers will be too complicated to be effective. Instead, the advocacy message must focus on **one point** that will get policy-makers' attention. Other issues can be addressed after policy-makers are engaged in the topic.

Each fortification stakeholder has an economic interest in fortification. For example, governments need human and financial resources for monitoring, industry members pay for premix, and consumers buy the fortified foods. Consequently **an economic message is likely to resonate with multiple audiences.** Therefore the TAG's recommendation is to **focus on cost:benefit messaging.** This acknowledges that some costs are involved, but emphasizes that the benefits far outweigh the costs.

The Copenhagen Consensus Center, a think tank of international economists, has repeatedly endorsed the economic value of improving nutrition. Harvard University has led a forum on good health as good economics.[1] Also, the World Bank, in partnership with Research for Development and 1,000 Days, is working on determining the potential costs to achieve the World Health Assembly's Global Nutrition Targets. Data from these groups

can be used as **global evidence** for the recommended message.

This working group proposes several ways that the nutrition sector can come together to advocate for fortification with one clear voice:

- **Form a high-level champions group** to share messages about the economic benefits of well-implemented and monitored mandatory fortification programs
- **Highlight cost:benefit messages** through TAG entities' communications channels as evidence that the global community is unanimous in this effort
- **Support country leaders** in the suggested actions for the four channels described in this report. Countries will want data specific to their setting
- **Appeal to policy-makers' deeper values** whenever possible, such as a sense of self-respect and accomplishment. As the cost of fortification is immediate but the benefits are long-term, appeal to the policy-makers' desire to leave a legacy for future generations
- **Increase involvement** in the International Coalition on Advocating Nutrition (ICAN) to mainstream fortification as a nutrition intervention and to uniformly share the message about economic benefits

### Channels

Four channels are commonly used for communicating fortification messages: **meetings, materials, media, and individual and small-group communications.** The following is a description of each channel as well as suggested actions. The channels are meant to be used in combination. A consistent message needs to be communicated through multiple channels in order to have the desired effect. A key resource for this material is *Making Health Communications Programs Work*, published by the US Department of Health and Human Services, Public Health Service, National Institutes of Health, and National Cancer Institute.

**1. Meetings.** These include training workshops, meetings to share updated scientific evidence, and advocacy events. The effectiveness of meetings as advocacy tools varies greatly based on the meeting's subject, participation, and follow-up.

| Pros | Cons |
|---|---|
| May be familiar, trusted, and influential | May only reach those who are already committed to fortification |
| Can offer shared experiences | May not provide personalized attention |
| Can reach larger intended audience in one place | May lose control of message if adapted to fit sponsoring organisations' needs |

**Global meetings on fortification:** Stand-alone global meetings on fortification should not take place more often than once every 2–3 years. Instead, advocates should **work to ensure that fortification is on the agenda for other meetings that draw the target audience of policy-makers and government officials.** These may include the periodic meetings of the World Health Assembly, the Micronutrient Forum, World Bank, International Monetary Fund, World Economic Forum, regional economic and development bodies (European Union, Southeast Asia, etc.), and other related health, nutrition and food fora.

The group suggests that a meeting's success be measured by tangible actions and outcomes on the ground. One strategy which has proven effective in triggering action is individual **country-level engagement.** At larger events, one-on-one side meetings between country implementers and technical partners can be useful opportunities to identify challenges and provide tailored technical support, bringing in experts as necessary, and with follow-up to confirm that questions have been answered and takeaways are being integrated to improve programs.

**2. Materials.** These include case studies, lessons learned, research results, reports, brochures, and online tools. As highlighted in the evidence section, national stakeholders need updated guidance documents, as well as dissemination of best practices and lessons learned.

| Pros | Cons |
|---|---|
| Can reach large numbers of people | Can be difficult to access and utilize |
| Can provide scientific basis for advocacy | Can present conflicting results |

Several types of materials can be produced to further the objectives of fortification advocacy. For relevant newly published scientific studies, **an accompanying piece** should be created that summarizes the findings in practical terms for program implementers. This could be via a press release, a blog, or a video.[2] Another way to make tedious research or statistics come to life in an approachable way is to translate it into **exciting advocacy tools,** such as the interactive statistics and graphics work of Hans Rosling, or through TED Talks. Data projects could show progress or illustrate what could happen if fortification is not maintained.

Tools should be simplified and made available to practitioners in order to calculate their own cost:benefit estimates. Available tools include the WHO One Health Tool (fortification is intervention number 122)[3] and FFI's cost-modeling tool (which requires a trained facilitator).[4] A user-friendly "cost of doing nothing" toolkit may be useful.

Finally, there are opportunities to **integrate fortification into existing reports,** such as the Global Nutrition Report,

Women making bread in Tajikistan

UNICEF's State of the World's Children, and the Food and Nutrition Technical Assistance III Project (FANTA) PROFILES[5] for country-level nutrition advocacy. The SUN Movement provides a ready-made platform to publish and disseminate these advocacy materials to country programs through its website and various networks at the country level.

**3. Media.** Media can reach decision-makers who can improve policy. This includes blogs, websites, social media and newspapers, radio and television spots. Media should be sensitized to appropriate and effective fortification messaging. This could be supported by partners such as a health promotion team in the Ministry of Health, local NGOs, or an entity represented on the Technical Advisory Group.

| Pros | Cons |
|---|---|
| Can reach broad audience rapidly | Can have limited time access |
| May be best for visual and emotional appeals | May not be trusted |
| May be effective way to build public support for policy change | May lose control of content |

During the Global Summit, Bjørn Lomborg of the Copenhagen Consensus observed that people base decisions more on emotion than logic. An emotional appeal illustrating the human cost of micronutrient deficiencies is missing in fortification advocacy. Therefore, more emotion should be incorporated into fortification advocacy. If a compelling story can be identified about micronutrient deficiency, this should be shared widely in the media.

Another important aspect of effective media communications is the question of who is actually communicating the message: both their popularity and their reputation are important factors. Fortification advocates should identify the most influential media in a country's population so as to **communicate the fortification message through the most used media channels.** If a television cooking show is popular, have the cook to prepare a meal with fortified ingredients. If radio shows are popular, suggest that individuals who have been personally affected by vitamin and mineral deficiencies should share their stories on the show. Trusted authorities on health and lifestyle should also be sensitized to reinforce messages at country level through traditional and social media. This may include physicians, religious leaders, consumer groups, and local NGO staff. UNICEF Ambassadors may also be contacted and requested to include fortification in their messages.

A **media resource kit** outlining cost:benefit, including draft news releases, blogs, letters to the editor, infographics, and social media messages that can be adapted for use in the national or regional context, would be helpful.

**4. Individual and small-group communications.** Individual

conversations with policy-makers and leaders of all stakeholders and key partners can be effective in mobilizing champions. This area also covers discussions within NFAs as well as regional bodies such as health and monetary communities.

| Pros | Cons |
|---|---|
| Can be credible | Can be detrimental if person advocating is not trusted |
| Permits two-way discussion | Can have limited intended audience reach |
| Can be motivational, influential, supportive | Can be difficult to access interpersonal channels |

**Individuals** with personal experience of micronutrient deficiencies can be compelling advocates for fortification. Examples include people with spina bifida, or doctors who treat people with nutrition-related health problems. **These individuals should be identified and invited to speak** to NFAs, media, and at fortification training workshops for industry or government.

Regional bodies can also be powerful advocates for policy change, especially in facilitating trade in fortified foods. The West African Economic and Monetary Union has initiated a successful process of harmonizing standards and creating uniform recommendations for fortification throughout the trade region. The uniform support of health and economic communities, non-governmental groups, development organizations and donors is instrumental in the success of fortification. Successful experiences in fortification at national level should also be leveraged and disseminated within the country and with other countries. For instance, if a country has successfully fortified salt with iodine, leaders of that program could be recruited to speak to policy-makers involved in the current fortification discussions.

Programs have also shown that it is critical to **involve all potential partners** at the beginning of fortification discussions. This helps prevent overlooking key information from one sector, and it also builds commitment from each group to work toward success. One common way to do this is to create a national advocacy working group or NFA subcommittee. FFI's Fortification Communications Toolkit can help guide the group's work.[6] For existing SUN business, civil society, and donor networks at country level, fortification should be considered as a component of their costed action plans.

Finally, **gender roles** can be relevant in conducting fortification advocacy. Women are more likely than men to experience iron deficiency, women become pregnant, and women are frequently children's caretakers. Consequently, women may be the most passionate individuals on the subject of micronutrient deficiencies. Women's organizations and existing women's networks should be engaged to become champions of fortification.

### Summary of advocacy working group's findings

Of the many reasons to fortify staple foods with vitamins and minerals, the economic benefits are likely to be the most compelling advocacy message for policy-makers and government officials. Economic messages will also resonate with stakeholders who can influence policy-makers and government officials. The Advocacy Working Group recommends that entities represented on the Technical Advisory Group should highlight fortification's cost:benefit ratio in all their communications, and should support country leaders in developing country-specific advocacy strategies. Using a consistent message in multiple channels will help establish the global economic benefits of well-implemented and monitored mandatory fortification programs.

A woman rolling flour dough

**References and notes**

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# Summit recommendation 1: Funding for Fortification

**Arusha Statement recommendation:**

**Modest but new investment is essential.** Fortification is cost-effective and largely self-sustainable, costs are built into markets and typically do not require further or continuous public subsidy. Governments need to invest in technical support, oversight and compliance.

New investments are needed to build, improve and sustain fortification programs. They are small in relation to leveraged costs, cost per beneficiary and overall returns, and tiny as a proportion of health spending.

Over the past decade there have been major external investments from donors in food fortification in Africa and Asia, notably by the Bill & Melinda Gates Foundation through GAIN, as well as funding made available to Helen Keller International, the Smarter Futures partnership with the Ministry of Foreign Affairs of the Netherlands, and the Micronutrient Initiative and UNICEF, among others. While these resources have helped

**TABLE 1:** Country and vehicle selection

| Country | Wheat flour | Maize meal | Vegetable oil | Salt | Sugar | Fish \| soy sauce |
|---|---|---|---|---|---|---|
| Afghanistan | X | | X | X | | |
| Bangladesh | | | X | X | | |
| Cambodia | | | X | | | X |
| Egypt | X | | X | X | | |
| Ethiopia | X | | X | X | | |
| Ghana | X | | X | X | | |
| India* | X | | X | X | | |
| Indonesia | | | X | X | | |
| Kazakhstan | X | | | | | |
| Kenya | X | X | X | | | |
| Mali | | | X | | | |
| Morocco | X | | X | X | | |
| Vietnam | | | X | X | | X |
| Mozambique | X | | X | X | | |
| Niger | | | | X | | |
| Nigeria | X | X | X | X | X | |
| Pakistan** | | | | X | | |
| Philippines | | | | X | | |
| Senegal | X | | X | X | | |
| South Africa | X | X | | | | |
| Tajikistan | X | | | X | | |
| Tanzania | X | X | X | | | |
| Uganda | X | X | | | | |
| Zambia | | X | | | | |
| Zimbabwe | X | X | | | | |

*India is calculated on a national basis for vegetable oil and salt, and a state basis for wheat flour including Himachal Pradesh, Jammu and Kashmir, Assam, Rajasthan, and Haryana Estimated fortifiable coverage (target) for fortified wheat flour in these states used in this model was 20% of the population.
**Model excludes programs that are already sufficiently funded by external donors, so excludes Pakistan oil and wheat flour.

**TABLE 2:** Country program categorization

| Vehicle | Fortificant | Build \| Expand | Improve | Sustain |
|---|---|---|---|---|
| Wheat flour | Iron and folic acid | Afghanistan, Egypt, Ethiopia, India (Assam, Haryana, Himachal Pradesh, Jammu & Kashmir, and Rajasthan), Kazakhstan, Kenya, Tajikistan, Tanzania, Zimbabwe (12) | Ghana, South Africa, Uganda, Morocco, Mozambique (5) | Nigeria, Senegal, Tanzania(3) |
| Maize flour | Iron and folic acid | Kenya, Nigeria, Tanzania, Zambia, Zimbabwe (5) | 0 | South Africa, Uganda (2) |
| Vegetable oil | Vitamin A | Afghanistan, Bangladesh, Cambodia, Ethiopia, Indonesia, Nigeria, Vietnam, India (8) | Mali, Mozambique, Tanzania (3) | Egypt, Ghana, Kenya, Morocco, Senegal (6) |
| Salt | Iodine | Ghana, Morocco, Niger, Philippines, Senegal, Tajikistan, Vietnam (7) | Afghanistan, Bangladesh, Ethiopia, Indonesia, Mozambique, Pakistan (6) | Egypt, India, Nigeria (5) |
| Fish \| soy sauce | Iron | Cambodia, Vietnam (2) | 0 | |
| Sugar | Vitamin A | 0 | 0 | Nigeria (1) |
| Total vehicle programs | | 34 | 14 | 14 |

drive significant progress in increasing fortification program coverage, the Summit established that more investment is needed – particularly in the areas of regulatory monitoring and generation of evidence – in order to expand, improve and sustain fortification programming to achieve further impact on public health.

Calculating the appropriate level of external funding needed to support fortification is not straightforward. It is often based on a combination of assumptions on inputs required, country-specific needs and global funding experience, along with assumptions informed by varying philosophies of delivery (e.g., subsidizing premix vs. not subsidizing), political realities, and donor priorities.[1]

Women at work in a Vietnamese fish sauce factory

Recognizing this, there have been recent attempts to quantify funding needs moving forward. Leading up to the Summit from March to September 2015 a costing model was developed to provide the Summit organizers with a high-level estimate on how much investment is needed by donors, government, and the private sector to scale up fortification programs from 2016–2030 in 25 low and middle-income countries.[2] It presented a range of values from $150 million (US) to $250 million depending on the decision to provide subsidy for equipment and premix, and at what level. One of the more conservative calculations from this model was used in the final panel of the Summit and quoted by the African Union in the Arusha Statement and in various media outlets following the Summit: "... it was estimated that the additional donor costs over 15 years to build, improve and sustain fortification in 25 low- and middle-income countries for multiple food vehicles would be $150 million. This could effectively cover an additional billion people. Further investment in fortification would trigger significant co-investment by the private sector and motivate national governments to allocate resources." The methodology and assumptions used for the costing model are described in the rest of this chapter.

## Costing model

Countries and vehicles included in the model were selected based on where data was available and where there is a need for fortification.

**TABLE 3:** Cost drivers per category

| Category | Criteria | Production | Technical Standards & Quality | Advocacy & Communication | Monitoring, Learning & Research | Program Examples |
|---|---|---|---|---|---|---|
| **Build \| expand** | Less than 50% of the fortifiable food vehicle is fortified | 30% premix subsidy for 3 years covering 50% of the target 10% equipment subsidy. No subsidy for countries which rely on imports, mandatory, or public distribution | Developing standards, training industries and regulatory bodies, laboratory upgradation, QC testing | Policy & advocacy, influencing decision-makers, developing communication strategy, implementing campaign | Developing and implementing government monitoring system, program monitoring, independent FACT* survey, independent monitoring mission | Afghanistan vegetable oil, Zimbabwe wheat flour, Tajikistan wheat flour, Tanzania maize flour |
| **Improve** | 50–79% of the food vehicle is fortified | No premix or equipment subsidy | Refresher training industries and regulatory bodies, QC testing | Same as above but discounted | Compliance studies, FACT survey | Indonesia USI, Tanzania vegetable oil, Uganda wheat flour |
| **Sustain** | ≥80% of the food vehicle fortified | No premix or equipment subsidy | Light refresher training | Light policy & advocacy. No communications program | Compliance studies, FACT survey, impact analysis | India USI, Ghana vegetable oil, Senegal wheat flour |

*FACT Survey refers to the "Fortification Assessment Coverage Tool," which is a survey module that measures coverage and compliance of fortified foods (and/or consumption of potentially fortifiable foods) among target population groups (e.g. women of reproductive age in poor households).

Using available information (both anecdotal and from surveys and reports), each country program was categorized into either the "Build/Expand," "Improve," or "Sustain" category. While food fortification programs are low cost in the long run, they often require investments in early stages for industry equipment and installation, laboratory equipment, training, premix, and supporting advocacy for sustainability.

The other two main drivers of cost included whether or not the country already had mandatory fortification in place and the size of the country's total consumption of the food vehicle which drives the cost of premix (total population x consumption per capita).

A major gap identified through this Summit in public sector and donor investment in fortification today are in ongoing regulatory monitoring and quality assurance and control of fortified foods, public health monitoring, and generation of evidence to guide programs. Because most LMIC lack infrastructure to integrate monitoring and corrective action, regulatory monitoring has to be established in order to ensure programs are effective. In addition, due to a lack of existing monitoring data, there is little data-supported evidence to indicate that fortification is having its intended public-health impact.

The costing model estimates that to address these gaps and scale up fortification to reach its full effective coverage potential in the 25 countries included which fortify multiple vehicles, the additional, minimal donor costs from 2016–2030 to build, improve and sustain fortification would be around $150 million. This assumes minimal subsidy for premix and equipment but would be leveraged along with $2.5 billion invested by the private sector (and costs passed onto the consumer), and approximately $150 million invested by governments. As noted, these costs – especially to donors – are variable based on the level of subsidy to be provided. Based on existing and potential coverage estimates, this investment could effectively cover an additional billion people consuming adequately fortified foods.[3]

**Suggested Actions:**

More accurate costing for specific countries from this initial group of 25 would require a deeper look at each country's needs, i.e., a bottom-up approach as opposed to a top-down approach. It would also be useful to link external resources required for fortification with the broader nutrition resource needs in a country.

**References and notes**

[1] For example, a donor in 2016 agreed a grant of £46 million (UK) to one national fortification program over a five year period while in other cases some countries have been able to move forward with fortification with minimal external fortification support.

[2] This costing model was developed by GAIN in collaboration with Kalim Ghauri (independent economist). This model incorporated multiple rounds of technical inputs and expert advice from Sue Horton (Copenhagen Consensus economist), and staff from the Food Fortification Initiative, Helen Keller International, and the Bill & Melinda Gates Foundation.

[3] This figure was quoted in the Arusha Statement, the Scaling Up Nutrition Annual Report, the New York Times and various other media outlets.

# Summit recommendation 4: Global Reporting

**Arusha Statement recommendation:**

**Progress requires more transparent accountability and global reporting.** We support the call for a global observatory or annual report of the state of fortification.

Increasing accountability and global reporting of mass-food fortification activities is one of five recommendations made in the Summit Statement. Each working group was asked to discuss the need for increased accountability and global reporting. All working groups agreed that the sector is in need of a central repository to track fortification legislation, policy, compliance and coverage data. It was recommended that several already existing databases should be reviewed and evaluated as a starting point and sources towards the development of a global tracking system.

FFI's global tracking platform, country-level information, and the pending Global Fortification Report (led by the Micronutrient Forum) may provide an important starting place for the inclusion of other indicators, specifically compliance indicators, for global tracking. In addition, GAIN has an internal database which attempts to track fortification compliance as well as legislation, policy, compliance and coverage of edible oils and condiments.

Lastly, indicators from UNICEF (iodized salt coverage), IGN (urinary iodine concentrations) and PHC's country-specific regulatory monitoring tool could be extracted and pulled into later versions of one platform for a more comprehensive approach to tracking.

The Advocacy Working Group recommended that a single repository of information related to mass food fortification would need to be managed by a network of partners and give attribution to all partners for their work in managing it.

A pedestrian passes a hoarding promoting fortified food


**Suggested Actions:**

1. Create a working group to define key indicators including method of collection.
2. Determine what financial and human resources are needed to start up and sustain a global repository.
3. Recommend a host location for the system.
4. Determine the final use of the global reporting system as that will largely determine which technology platform can be used. A database that is only used by TAG members to pull data and create reports, for example, is very different from a system for country fortification partners to enter monitoring data.
5. Identify what is already being collected, including the World Health Organization's Vitamin and Mineral Nutrition Information System (VMNIS), UNICEF's Multiple Indicator Cluster Surveys (MICS), and NutriDash system, Demographics and Health Surveys (DHS), and IGN, GAIN and FFI data on fortification of specific food vehicles.
6. Determine if information identified in step 5 above will be incorporated into the global reporting system or if it will be linked as an external resource.
7. Ensure consistency in the technical side of the database including coding countries and defining geographic regions.
8. Build a global reporting system, or amend an existing system, to accommodate the above findings.

9. Train individuals from TAG entities and partners in how to use the global reporting system to add data and retrieve reports.
10. Maintain global reporting system with accurate information.
11. Use data from the global reporting system for advocacy with key stakeholders and donor appeals.

# Conclusion

This report elaborated on the five recommendations from the Arusha Statement on Food Fortification in order to set the programmatic, research, advocacy, and investment agenda for food fortification programs moving forward. The priority for strengthening existing food fortification programs is in improving quality systems to ensure compliance, and this report has laid out concrete actions countries can take to accomplish this. Further investments are required, not only by donors, but by governments and the private sector, to make staple food and condiment fortification – in regions where micronutrient deficiencies persist – an industry standard. Continued prioritization of research would also help to advance programs, especially in improving our understanding of consumption patterns and measuring impact attributable to food fortification. Fortification has been proven to be effective, with over a century of experience in contributing to the control of micronutrient deficiencies in Western countries, and new evidence of effectiveness of vitamin A, iron, and iodine fortification in low- and middle-income countries. In terms of cost per person per year, large-scale food fortification is one of the best investments in nutrition and health available.

It is anticipated that this report will be used widely by nutrition program practitioners – e.g., implementing agencies, policy-makers, donors – to foster coherence and support collaboration and alignment in the nutrition and food sector in order to strengthen, scale up and ensure sustainability and optimal impact of national fortification programs.

# Annex 1:
## Key Barriers | Obstacles to Regulatory Monitoring

Members of the Regulatory Monitoring working group compiled this information over a period of several weeks sourced from peer-reviewed and gray literature and individual field experiences.

**Collecting the data**

- Fragmented system for collecting the data, agency | inspector overlap
- Unclear roles and responsibilities
- Lack of mandates to collect | unclear mandates
- Lack of technical capacity and lack of budget to sample and | or audit:
  - Lack of technically trained staff (72%)
  - Lack of knowledge on how to sample and how to store the samples resulting in poor quality collection
  - Limited knowledge on how to harmonize fortification with already-existing collection forms in order to streamline collection
  - No funds for additional inspectors, need for more inspectors and more trained inspectors at the government level, need for greater monitoring frequency (88%)[1]
  - No funds for transport for sample collection
  - Limited knowledge and | or trust and interest in auditing processes, relying only on product sampling | testing (see section on "Systems Approach" in Luthringer et al)
- Low priority for enforcement:
  - No line item in the inspectorate budget for fortification
  - Fortification not included with regular food safety inspections

**Testing and compiling the data**

- Poor lab capacity | budget constraints:
  - Lack of equipment, reagents, staff
  - No sustained government funding for inspectorates, some have just enough to keep the lights on, not to mention food safety or fortification
  - Public-private partnerships needed
- Limited training within the lab on how to test
- Limited understanding of how testing methodology and equipment can affect results, leading to false positives and false negatives
- No central database to house the data once collected and tested
- Fragmented system for receiving the data
- Unclear roles and responsibilities

**Acting upon the data**

- Limited personnel for legal action | time lag between testing and communicating test results:
  - Infrequent monitoring capacity
- Corruption among inspection personnel | collusion between inspectors and industry
- Results never reported out | results lost
- Perceived political risk of enforcement by government inspectors
  - 60% perceived a political risk around strong and consistent enforcement, resulting in inconsistent follow-through and underwhelming usage of enforcement strategies[1]
  - Fear of strike threats or resistance from interest groups
- Unclear legislation and regulations, especially unclear or lack of objective enforcement mechanisms stated in regulations
- Unclear roles and responsibilities (i.e., who has authority to enforce)
- Non-compliance measures that are unrealistic and therefore are not used by inspectors. (Even Canada has recently completed a study regarding their compliance standards and ability to actually test for these. They came to the conclusion that their lab methods are just not precise enough for the very small ranges allowed in the standards.)

**Non-compliance**

- Competition with non-fortifying producers (which reinforces the issue of acting upon non-compliance)
- Corruption among inspectors
- Compliance | non-compliance measures which are ineffective (i.e., incentives | penalties not effective)
  - Over 60% did not consider incentives | penalties to be effective[1]
- Lack of duty-free equipment and | or premix
- Lack of consumer demand | advocacy
- Cost of premix, equipment, internal monitoring
- Lack of know-how
- Poor quality or unsafe inputs
- Poor processing procedures and expertise
- Improper packing and handling
- Lack of awareness of standards
- Purposeful under-fortification
- Lack of SOPs and documentation

**Reference**

[1] Luthringer CL, Rowe LA, Vossenaar M et al. Regulatory monitoring of fortified foods: Identifying barriers and good practices. Glob Health Sci Pract 2015;3(3):446–461

# Annex 2:
## List of Relevant Documents and References

**Published estimates of prevalence of micronutrient deficiencies:**

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# Annex 3:
## List of Key Questions Identified by the Guideline and Evidence Working Group

**Strategic area 1: Measuring the magnitude and distribution of micronutrient malnutrition**

**Research priorities identified in WHO guidelines**

1. Relationship between iodine excretion and urinary iodine in different ages, pregnancy and lactation, and under different climactic conditions and physical activity level to allow adjustments of population criteria.
2. Identification of optimal indicators for iodine nutrition during pregnancy, lactation and infancy.
3. Validation of neonatal serum TSH concentration as an indicator of iodine status in pregnancy.
4. Investigation of the usefulness of thyroglobulin as a functional indicator of iodine status, to complement the use of UIC as an indicator of iodine intake.
5. Prevalence of iodine deficiency among pregnant and lactating women and the potential negative impact in their health and the development of their offspring.
6. Prevalence of iodine deficiency status of infants.
7. Prevalence of iodine-induced thyroiditis and iodine-induced hyperthyroidism.
8. Relative contribution of iodine from table salt and salt-containing processed foods (including bouillon cubes, condiments, powder soup).
9. Alignment of salt reduction and salt iodization.
10. Identification of different vehicles for iodine fortification.
11. Field-friendly, affordable, automated microbiological assays for the assessment of red blood cell folate.
12. Less invasive methods for the assessment of folate status.
13. Interaction between red blood cell folate and TB, HIV and antimalarial drugs.
14. Effect of living at high altitude on red blood cell folate concentrations.
15. Surveillance systems for the prevalence of NTDs.
16. Assessment of the distribution of red blood cell folate status in women of reproductive age.
17. The distribution of red blood cell folate concentrations in women of reproductive age, and their association with NTDs, in different settings.

18. The lowest concentrations of red blood cell folate at which potential negative health outcomes appear, if any.
19. Optimal blood folate thresholds for reduced risk of NTD-affected pregnancy among women with overweight and obesity.
20. Population thresholds for serum folate for the prevention of NTDs.
21. The lowest total folate intake level (dietary and/or synthetic form of this vitamin) required to reach the target optimal red blood cell or serum folate concentration at the population level that is considered to be protective against NTDs.
22. What is the prevalence and distribution of micronutrients deficiencies and/or excess at national level across age groups, socio economic groups and ethnic groups?
23. Which are the most high risk groups at sub-national level?
24. What methodology can be put in place to improve the identification of high risk groups at sub-national level?
25. How can national surveillance systems be improved to provide information at sub-national level?
26. Are current cut-off points valid for different populations (age, pregnancy & lactation, ethnic groups)?
27. What is the relationship between currently used biomarkers, cut-off points and functional outcomes?
28. What are the cut-off points for biomarkers of vitamin D deficiency and excess? What are the prevalence and cut-off points of vitamin D deficiency? How can we obtain greater resources for analyzing the micronutrient level problems and impact – both nationally and globally?
29. Which proxy indicators can be used to indicate the need for food fortification and to make fortification policy decisions?
30. How far have methodology and tools been developed to provide adequate instruments to improve information provision in food fortified surveillance system?
31. How can existing data sets and data-collection systems (e.g., DHS, MICS, national nutrition surveys) be used to answer questions that will inform the nutritional situation of the population?
32. What effort has been taken to link the gap between evidence and policy in overcoming micronutrient deficiencies at national and global levels and across age groups?

### Strategic area 2: Understanding the diverse causes of micronutrient malnutrition

**Research priorities**

1. What is the effect of vitamin B12 on NTD recurrence?
2. For multi-factorial health problems such as anemia and child mortality, what proportion is attributable to poor nutrition and to what extent are other types of interventions needed?
3. What is the nutrient content of the existing diet? Is this consistent with the prevalence of deficiency (or excess) indicated by biomarkers? Or might deficiency be due to something other than total dietary nutrient content (absorption, infections, etc.)?
4. Have methodology and tools been developed to provide adequate instruments to improve fortified food surveillance?
5. Are the women responding to folic acid genetically predisposed to folate deficiency and can they be detected and targeted in another way?
6. How do host factors such as other nutrient deficiencies, infection, inflammation, gut health and microflora influence the efficacy of fortified foods and how are these accounted for in efficacy studies?
7. Should we automatically combine fortification programs with infection control, improved sanitation and clean water provision programs?
8. How do we best target anemia control in areas of widespread infection, especially malaria?

### Strategic area 3: Developing large-scale fortification programs to reduce micronutrient malnutrition

1. Knowledge and awareness of the general population about the use of iodized salt is important to address barriers such as religious concerns and existing demand for non-iodized salt.
2. What is the capacity in terms of trained staff, equipment, and budgetary resources to monitor compliance of food fortification?
3. What are the best institutional practices related to the implementation of food fortification programs at national level?
4. What are the population's values and preferences regarding fortified foods?
5. What are the food consumption patterns of staple foods suitable for fortification at national level across geographical location, age groups, socio-economic and ethnic groups?

6. What tools are available to estimate national or sub-national food consumption patterns?
7. What is the linkage between investing in communications and social marketing, and increased coverage of fortified foods?
8. How should NFAs function and what is the role of the NFA in implementing a food fortification program?
9. What cost:benefit tools can be standardized and used to advocate at the national policy-maker level for the need to implement a national, mandatory program?
10. How do we harmonize the needs of compliance and regulations with industry perceptions?
11. How can the private and public sectors and NGOs collectively address public health issues on micronutrient deficiencies among the marginalized groups of society?
12. What is the best way to engage the food companies that produce staple foods such as oils, flours, and salt to implement effective fortification practices?
13. What are the attitudes of governments and communities in LMIC to fortification?
14. What new, more streamlined indicators may need to be standardized and disseminated to move from an ideal regulatory compliance system to a realistic system?
15. How to establish in any given country where private sector communications and social marketing are sufficient and where government investment is needed e.g., best use of foods, non-market forces for information and safety issues.
16. What are the decision-makers‘ values and perception of fortified foods, especially staples being used strategically/politically, as rice?
17. Does the industry have capacity to fortify in terms of capital investments in fortification equipment, existing ability to monitor production (i.e., labs)?
18. Is the industry fragmented (e.g., tens of thousands of small mills) or modern and consolidated?
19. How can food fortification be better mainstreamed linked with ongoing initiatives aimed at improving production quality and quantity?
20. Have all food science questions (organoleptics, acceptability, etc.) about fortification of the selected food vehicle been answered?
21. What is the industry structure of that specific food vehicle?
22. Are other foods already fortified?
23. Are we convinced that fortification compounds recommended by WHO (2006 and 2009) are still the best available or is there some new evidence from human studies to warrant revision?
24. What are the best and most effective forms of micronutrients that can be used without changing the inherent characteristics of the fortified foods?
25. What is the most effective vehicle for vitamin A fortification in terms of stability, cost and subsequent health impact?
26. How to set nutrient levels when two or more foods are fortified and there are other programs that provide micronutrients (e.g. supplementation, micronutrient powders)?
27. How do we best overcome the inhibitory effect of phytic acid in cereals fortified with zinc or iron so as to ensure adequate absorption?
28. Can we find an iron fortification compound to add to bouillon cubes and show impact of bouillon cube fortification?
29. Are we sure that rice fortification technology is good enough to ensure efficacy given there is little evidence yet for extruded and coated rice?
30. What are the predicted effects of different combinations of fortification vehicles and levels of fortification on dietary adequacy and excess? How do these vary by sub-national region and by target group?
31. Does effectiveness of food fortification programs at the country level need to be determined at sub-national levels with different characteristic sociocultural groups?
32. Can we improve the efficacy testing of zinc fortified foods so as to get more consistent results?
33. What are the accepted ways of measuring the efficacy of foods fortified with Fe, Zn, vitamin A, vitamin D, folate, and iodine?
34. Can the efficacy studies be improved, simplified and made less expensive?
35. Can we agree on the time frame for feeding studies?
36. Do we need to test in each population group?
37. What interventions will effectively address persistent high levels of anemia among women of reproductive age and children under five in rural areas?
38. What type of evidence is required at national level and what can be used from elsewhere (e.g., do findings on bioavailability of specific iron compounds from one country likely apply in another; is WHO interim guidance on which type of fortificant to select for flour fortification universally applicable, or should it be confirmed in-country?)
39. What impact do mycotoxins have on the effectiveness of fortification in maize?
40. Can we better link nutritional status to functional outcomes?

**41.** Which function outcomes should we focus on?

**42.** How can we best analyze the food system to identify fortifiable vehicles and opportunities to reach specific groups who have the highest need for an increased intake of micronutrients (e.g., do the poorest consume processed foods, and if limited, how could they be provided better access?)

**43.** How can existing data sets and data-collection systems (e.g., living standard measurement studies, HIES, food basket surveys, food frequency questionnaires) and available market data be used to answer questions that will inform the selection of food vehicle(s) and nutrient(s)?

**44.** How are local producers from resource-scarce countries able to compete with imported duty-free fortified products in the region?

**45.** How can we ensure that the primary focus of food fortification initiatives is on increasing intake of micronutrients (as opposed to improving micronutrient status or reducing anemia, which are also affected by multiple other factors), and focus the efforts on ensuring access to adequately fortified foods (including selection of appropriate fortificants and vehicles, good QA&QC, good shelf-life, good distribution and/or market penetration, ensure that people receive or purchase it etc.)?

**46.** What is the best methodology for developing standards in a setting with multiple fortified foods with the same micronutrients?

**47.** How can we better assess and use all possible delivery channels for food fortification (e.g., school feeding, food distribution for the poor, etc.)?

**48.** How far can implementing a food fortification program in countries contribute significantly in terms of Scaling Up Nutrition Movement to reduce stunting?

**49.** When is the best time to engage the private sector ompanies that produce fortifiable foods?

**50.** We need to develop easily measured metrics that distinguish the effects (beneficial/harmful) of fortification from those due to other concurrent nutritional interventions and test such metrics for accuracy, reliability and ease of use.

**51.** There is a need to estimated the potential for delivery of inadequate and excessive amounts of the micronutrient for different scenarios of fortification and combinations of fortified foods consumed.

**52.** How can the information generated in the initial steps of the program cycle (steps 1–3) best be introduced into the program-planning process?

**53.** How should decision-makers prioritize among nutrients and population groups, recognizing that there may be tradeoffs in terms of which food-fortification level combinations are likely to be more effective than others for different regions or age groups (and may have different costs)?

**54.** How can expected impacts in fortification be set up, going from efficacy to effectiveness?

**55.** What is the willingness of the private institutions (food manufacturers) to invest in communications and social marketing of fortified food products?

**56.** What design characteristics in fortification programs are most likely to influence the success of a program (e.g., selection of target groups, selection of foods, selection of nutrients, selection of fortification compounds, planning for training, planning of monitoring activities, planning for impact evaluation)?

**57.** What does a government have to do to ensure sustainability of programs?

**58.** How much time and length of investment is needed for an effective program to be self-sustaining?

**59.** How can NGO efforts be sustained after successfully influencing the government to mandate iron fortification?

**60.** What are the minimum requirements in the planning for scale-up of fortification programs?

**61.** What design characteristics in fortification programs are most likely to influence the success of a program (e.g., selection of target groups, selection of foods, selection of nutrients, selection of fortification compounds, planning for training, planning of monitoring activities, planning for impact evaluation)?

**62.** How much do models differ according to culture, resources and traditions, and existing inequities?

**63.** Should monitoring plans be taken into consideration when planning the implementation, and if so how?

**64.** How do you strengthen National Fortification Alliances?

**65.** How should NFAs function and what is the role of the NFA in implementing a food fortification program?

**66.** Who are the main parties and participants that need to be engaged in the planning processes?

**67.** Do all parties in the fortification implementation have equal representation and weight?

**68.** How is responsibility for actions determined and correspondingly how is accountability ensured given that fortification programs require multi-sectoral participation and coordination?

**69.** What is the best premix procurement mechanism for a very stratified industry such as maize flour?

**70.** How should programs work with suppliers to improve the quality of raw vehicle provided to millers for fortifying?

71. Does social marketing and behavior change communication among low-income consumers increase the demand for fortified foods or are resources better spent on engaging consumer protection groups so as to ensure consumers have access to fortified foods?

**Strategic area 4: Implementing, monitoring, and process evaluation of large-scale fortification programs**

1. What incentives measures can be put in place at government level to increase manufacturer's compliance with national fortification regulations?
2. How can accurate and field-friendly methods be improved and rolled out to monitor the level of fortification in food vehicles, at different stages of production and distribution?
3. How do you get sufficient government and industry investment in lab networks and in training and employing inspectors?
4. What incentives can be put in place to increase government's willingness/efforts to obtain compliance information on a regular basis?
5. How can fortified products quality be regulated within the framework of free trade agreements in Asia?
6. How can monitoring efforts for fortification be integrated with existing monitoring efforts (e.g., food safety monitoring) to improve efficiency and sustainability?
7. What sustainable tools and instruments are needed to monitor compliance level of producers of the food vehicle?
8. What is the most effective way of monitoring food manufacturing to ensure compliance with all regulations governing foods?
9. What are best practices for establishing a monitoring system and ensuring that the information is acted on in a timely manner?
10. What are the minimum compliance and impact indicators to determine progress and impact of fortification programs?
11. When to use individual food samples vs composite samples to assess fortification levels?
12. What fortified foods are contributing to intake, and how much do supplements contribute?
13. What are consumption patterns of foods in the population after implementation of fortification?
14. How should a fortification program be modified as consumption patterns change in the country considering both under- and overconsumption?
15. What national, regional, or international health report cards can include fortification and be used as a mechanism to increase government push for effective coverage and compliance?
16. What is the coverage of the fortified food?
17. Will a new staple food specifically target subgroup populations that are still at risk?

**Strategic area 5: Evaluation of large-scale fortification programs**

1. What are the long-term impacts of folic acid fortification on the population other than that of reducing the incidence of neural tube defects?
2. What are the best practices for implementing program evaluations (since logistics often limit these to pre-post, or just post, surveys, which are limited in terms of causality claims)?
3. Are we sure we can monitor impact by measuring intake?
4. When do we need to demonstrate improved nutritional status and improved functional outcomes?
5. How do we capture the contribution of fortified staples and condiments used as ingredients in processed foods?
6. What is the public health impact (effectiveness) of the program on nutrient intake, nutrient status, and functional outcomes?
7. To what extent does effectiveness vary by region, age, or other target groups?
8. Does effectiveness match that predicted by dietary simulations conducted in Step 3 of the program cycle?
9. What are the cost:benefits of the impact of the fortification program?
10. What are the potential long-term negative impacts of fortification with any micronutrients (e.g., contribution to obesity, cancer, less dietary diversity)?
11. If programs are not achieving the expected/desired effectiveness, what steps along the impact pathway need to be strengthened? Are these consistent across settings?

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