

Improving Nutritious Food Systems by Establishing National Micronutrient Premix Supply Systems

Greg S Garrett

Director, Food Fortification, GAIN (Global Alliance for Improved Nutrition), Geneva, Switzerland

Corey L Luthringer

Senior Associate, Fortification, GAIN, Geneva, Switzerland

Penjani Mkambula

Senior Manager, Quality & Safety, GAIN, Geneva, Switzerland

components: a premix supplier, a revolving fund (or a revolving fund agent), a distributor, and fortified food producers.

- When introducing or strengthening premix procurement and distribution models, experience shows that it is important to:
 - select the most appropriate partner executing agency;
 - clearly communicate with all partners and stakeholders;
 - advocate for complementary policies and programs; and
 - support enforcement of fortification mandates.

Key messages

- If appropriately strengthened, food systems have the potential to deliver adequate availability, access, utilization, and supply stability of both macro- and micronutrients that contribute to food and nutrition security.
- Large-scale food fortification has emerged as one of the most feasible, cost-effective, and sustainable evidence-based interventions to address population-level vitamin and mineral deficiencies.
- The past decade has seen an expansion in food fortification programs in developing nations. However, timely and regular access to affordable and quality-assured vitamin and mineral premix is a barrier for a number of country programs.
- Several interventions have led to sustainable national premix supply systems. The model typically has four key

Making fortification programs truly sustainable

Food systems arise from the complex interactions of all the activities and actors involved in transforming environmental, agricultural, and manufacturing inputs into outcomes of food and nutrition security and health.^{1,2} By considering the interactions of all involved sectors, food systems have the potential and capacity to deliver adequate availability, access, utilization, and supply stability of both macro- and micronutrients that contribute to food and nutrition security.

Currently, in many low- and middle-income countries, food systems deliver narrow diets of staple foods that lack key micronutrients. Large-scale food fortification has emerged as one of the most feasible, cost-effective, and sustainable evidence-based interventions to address population-level vitamin and mineral deficiencies, estimated to affect hundreds of millions of the world's population.³ Food fortification also improves food and nutrition security by providing greater availability of, and access to, micronutrients necessary for health and well-being. However, in order for fortification programs to be truly sustainable, they need to be embedded within food systems along with the inputs and resources required to ensure the



Wheat flour fortification in action

quality and safety of fortified foods. This includes consistent access to quality-assured vitamin and mineral premix.

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Challenges in building national premix supply systems

The past decade has seen an expansion in knowledge and scale-up of food fortification programs in developing nations. Fortification of staples and condiments with essential vitamins and minerals has gained global traction, with over 140 countries implementing salt iodization programs, 85 countries mandating at least one kind of cereal grain fortification, and dozens more rolling out large-scale programs fortifying edible oils, sauces and condiments. These figures represent tremendous success in scaling up a proven, highly cost-effective, and sustainable nutrition intervention which is embedded within food systems.

However, timely and regular access to affordable and quality-assured vitamin and mineral premix remains a barrier for a number of country programs, and is an essential component towards sustainable, nutritious food systems. In order for national programs to reach long-term viability, programs which may have relied on donated or highly subsidized premix in the past – or which are looking to procure premix for the first time – need to move to a model where the program shoulders the costs

of premix procurement, storage and distribution. This shift is a challenge for a number of reasons, especially for programs with a fragmented food processing industry.

First, micronutrient premix is one of the most significant recurring input costs for fortification programs.⁴ The cost of premix was cited as one of the top three barriers to ensuring fortification quality and compliance by 75% of respondents (the highest percentage of all barriers reported) in a 17-country survey conducted in 2015.⁵ Second, especially for small and medium-sized producers, there is a limited ability to accurately forecast product demand and premix needs in cases where fortified foods have not yet been mainstreamed. Thus, these producers struggle with financing an upfront purchase of premix that balances the risk of stock-out with that of premix expiration. Third, for many countries, premix must be imported, and there can be high costs associated with this, such as customs taxes, VAT, and currency exchange fluctuations. These can make it cost-prohibitive and risky to purchase premix in the relatively small volumes that such producers require. Lastly, international procurement of premix can have lead times of three months or more, which is impractical for the highly fluctuating demand requirements as dictated by changing consumer acceptance and emergency assistance programs. Thus, having a national or localized procurement, storage and distribution capacity is instrumental to achieving sustainable and timely access to premix.

Identifying solutions to improve nutritious food systems

To date, significant resource allocations have been focused on developing innovative models for premix procurement and distribution. For example, this has been a key component of over a dozen country fortification programs which GAIN has supported since 2002. These efforts have reviewed annual demand for fortified foods; industry makeup, organization, and capacity to fortify; and existing procurement and distribution arrangements. This has led to targeted technical assistance to fill quality control and monitoring gaps, and contributed to better forecasting for premix requirements within the sector.

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“Having a national or localized procurement, storage and distribution capacity is instrumental to achieving sustainable and timely access to premix”

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At the level of individual countries where food industry has struggled to procure quality-assured premix on its own, several

interventions have led to more sustainable national premix supply systems (Figure 1). The model, likened to a “revolving fund,” with full or partial cost recovery requires up to four key components but this may vary depending on context: a premix supplier, a revolving fund agent, a local distributor, and fortified food producers. The revolving fund agent manages the funds throughout the procurement process and runs competitive tenders to regularly supply a distributor’s centralized warehouse with bulk quantities of premix from certified premix suppliers. The distributor informs the revolving fund agent of the forecast demand for all fortified food producers within a country or region party to this model. Food producers can then procure premix in required quantities from the local distributor directly, reducing lead times. The distributor then delivers ordered premix amounts to food producers and concurrently works with producers to make arrangements to procure new orders. It is worth noting that depending on context, the revolving fund agent can also play the dual role of a distributor. The revolving fund agent continues to hold the risk, in particular if it offers extended credit terms or sells the premix on a consignment basis to the distributor for premix payment.

The benefits of such a premix supply system are myriad and especially pronounced for countries with small and medium-sized fortified food producers which struggle to access quality-assured premix directly. The model has been shown to work through various approaches rolled out in Ghana, Tanzania,



Sustainable premix supply systems can make a major contribution to improving the nutritional status of the population

Kenya, Ethiopia, and Kyrgyzstan. Boxes 1 and 2 are case studies showcasing iterations of this model in action in selected countries and highlight how the model should be customized to the operating context existing in a partner country. By consolidating the premix requirements for a large number of producers within a country, the revolving fund agent is able

FIGURE 1: Indicative national premix supply system model

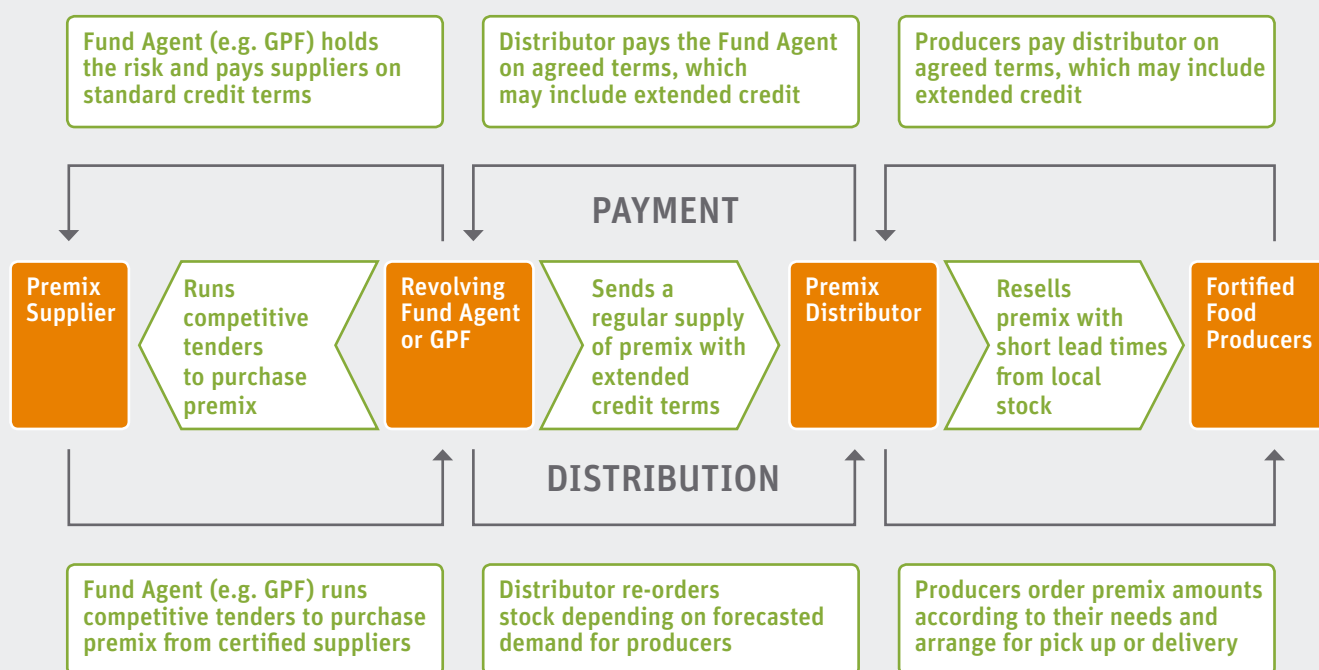
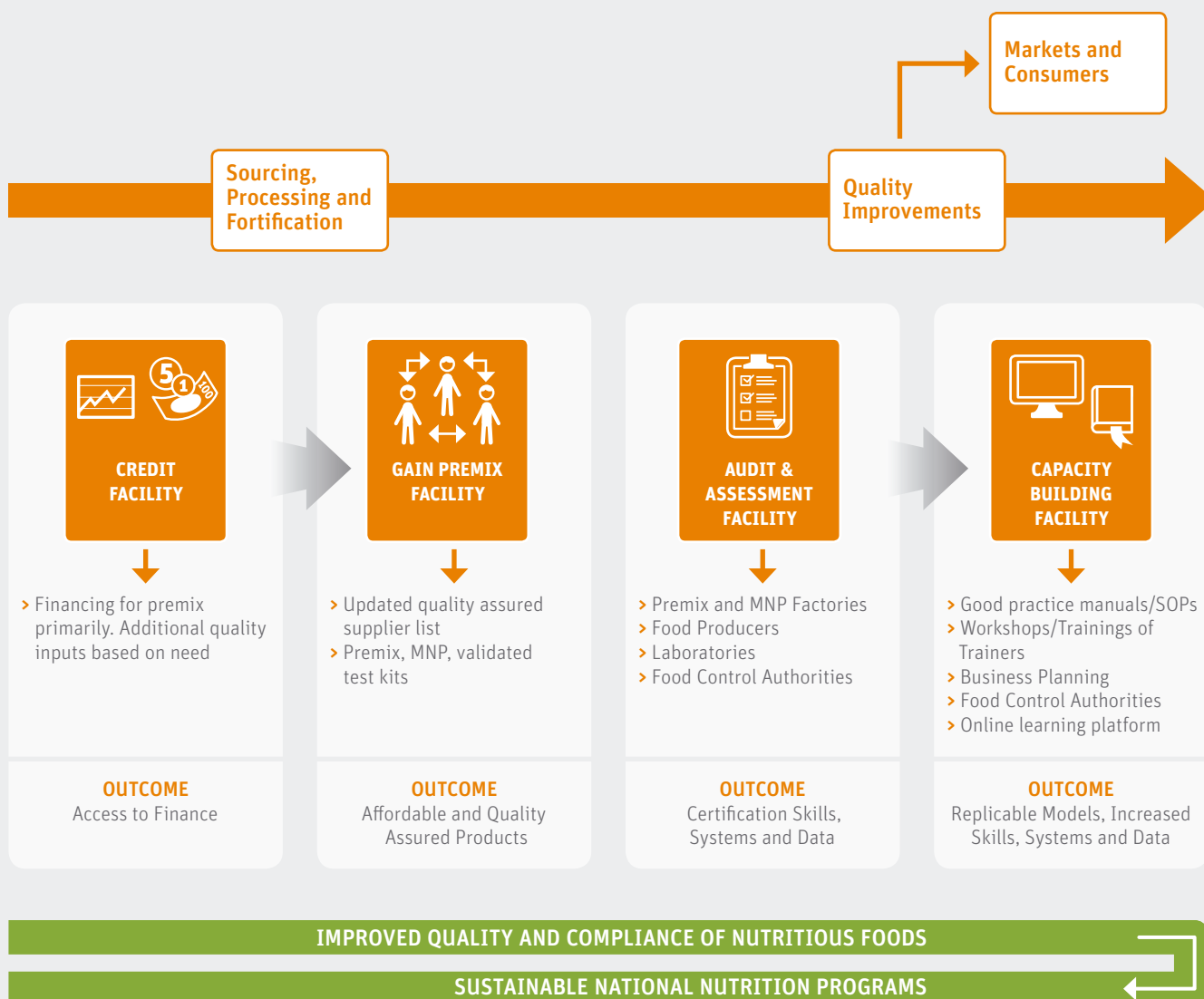


FIGURE 2: GAIN's Platform for Quality and Safety (GPQS)

Notes: The GPQS offers services to government and food industry which aim to build more robust quality systems for fortification. For premix, it provides access to high-quality premix at competitive prices through procurement, credit, and audit facilities.⁶ The audit facility prequalifies suppliers based on stringent quality criteria, monitors ongoing quality of supply as well as testing premix and fortificants. The procurement facility offers a centralized service to run competitive tenders from the certified suppliers, ensuring fair and transparent competition. The credit facility pools risk and offers extended credit terms or the option to finance on a consignment basis to pay for premix shipments. As of March 2016, the GPQS has certified 18 premix blenders and 23 micronutrient manufacturers and has sourced approximately \$56 million (US) worth of fortificants and premix across over 43 countries.⁷ These services are available to help establish national premix supply systems.

to take advantage of the volume effect, running tenders for bulk premix orders to achieve a more competitive price than producers could each obtain individually. Through the distributor's centralized warehousing, maintenance and overhead costs are minimized, and the premix can be resold in quantities more conducive to the needs and storage capacity of individual producers. Financial risk is minimized for local distributors through access to affordable pricing by a centralized international procurement mechanism, and for local producers

as their working capital is not tied in excessive premix stock as they have access to local supply. In this way, only the revolving fund agent and/or distributor has to manage customs, import requirements, and currency exchange, which allows food producers to buy in the local currency, with minimum lead time. This procurement model is similar to the "just-in-time" supply chain management philosophy, eliminating waste by procuring only what is needed, when it is needed.^{8,9} This allows both the distributor and food producers to optimize the amount of

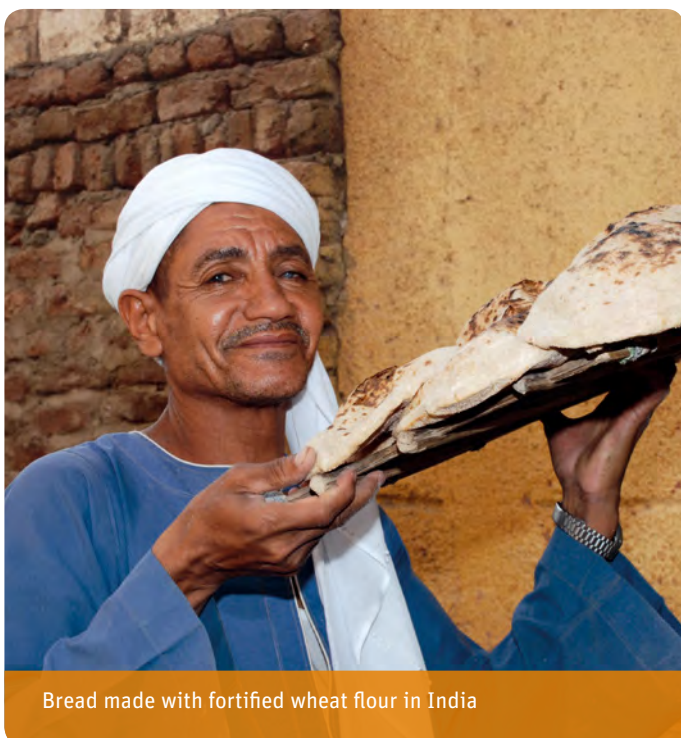
Box 1: Ethiopia's KIO₃ Revolving Fund: Working with a government agency and producer cooperatives

Since 2011, Ethiopia has achieved tremendous progress in improving iodine nutrition through salt iodization, increasing national iodized salt coverage from 4.2% in 2005 to over 90% in 2014, in part through improved supply chains for potassium iodate (KIO₃). The KIO₃ supply system had been fully donor-based leading to low viability of the program especially as donors were unable to carry the increasing costs of KIO₃ as production volumes of iodized salt increased.

To address this, the Ethiopian government worked with GAIN to establish a revolving fund with distribution that would allow salt producers to purchase and procure KIO₃ directly from the government in the quantities needed. GAIN, UNICEF, and the Micronutrient Initiative capitalized this fund in 2012 with initial donations of KIO₃, and GAIN worked with the Ethiopian Government to select the Pharmaceutical Fund and Supply Agency (PFSA) as a suitable candidate to host the fund. PFSA is a government agency whose mandate is to ensure the availability and affordability of quality pharmaceuticals and health equipment to all public health facilities in Ethiopia by using a revolving drug fund. Thus, PFSA was chosen because it already has experience in procurement and has the capacity to import goods on international markets for resale. PFSA also has experience in demand forecasting and revolving fund financial models, and would only need to add KIO₃ to its repertoire of products available.

PFSA has been able to forecast demand for KIO₃; appropriately recover proceeds from sales to replenish stocks from approved KIO₃ suppliers; and effectively distribute stock. In some salt-producing areas of Ethiopia, producers organized themselves into associations that could better manage procurement of stock from PFSA and distribute this to small and medium-sized producers. One such producers' organization, the Afar Salt Producers Mutual Support Association (ASPMSA), even worked with the government and the individual producers to coordinate production, fix quotas, and set prices of iodized salt higher than non-iodized salt. ASPMSA also coordinated procurement and distribution of KIO₃ to its member producers, automatically deducting the cost of KIO₃ from the producers' pay, based on each producer's production quota. This method effectively removed the incentive to increase profits by not iodizing.¹⁰ KIO₃ could then be purchased in amounts ranging from 5 to 25 kg, suitable for all sizes of salt producers, allowing for consistent recovery of the KIO₃ costs for the revolving fund.

The revolving fund has continued to successfully operate with minimal donor support. A total of 54 MT of KIO₃ has been successfully procured by PFSA, and in late 2015 a request for a fourth procurement of 40 MT was received by the Ministry of Health and will be tendered via international competitive bidding.



Bread made with fortified wheat flour in India

stock each keeps, preventing both stock-outs and expiration that would be detrimental to achieving the intended health impact of the fortification program.

“The ‘revolving fund’ model has been shown to work and to be highly replicable and customizable”

Lessons learned and path forward

Several lessons can be drawn from the experiences described in the boxed case studies and should be considered when introducing or strengthening premix procurement and distribution models in support of better food systems:

1. Select the most appropriate partner executing agency.

The choice of revolving fund agent can determine the success or failure of the revolving fund itself. The partner agency must have the technical capacity and a strong

relationship with fortified food producers to ensure their revolving fund services will be utilized and viable. Having exclusive or preferential access to both premix suppliers and fortified food producers can help encourage the revolving fund agent to take on the risk of procuring large volumes of premix.

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2. Clearly communicate with all partners and stakeholders. Communication message misalignment has been a pitfall that prevents successful procurement models. Whether it is with industry, government, and private companies directly involved in the revolving fund, or external organizations and donor agencies operating parallel programs, ensuring that communications are clear and consistent on national fortification efforts and premix volumes required will encourage stakeholders to complement each other in their efforts.

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3. Advocate for complementary policies and programs.

Advocacy is necessary to ensure that national stakeholders understand that using a premix supply system is an effective and advantageous proposition. Advocacy with governments is necessary to facilitate premix imports and minimize taxation and import costs. Within industry, advocacy is useful to encourage larger producers, who will often procure their premix directly, to also utilize aggregate procurement mechanisms to leverage higher purchase volumes for more competitive prices for smaller producers.

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4. Enforcement of fortification mandates is complementary to sustainably supplying premix.

Ensuring that enforcement and inspection agencies have the capacity and political will to detect and work with non-compliant food producers is critical to successfully sustaining fortification with high-quality premix after donor support has ended. Without such enforcement and

Box 2: Premix Hubs in Tanzania and Ghana: Building new markets through private-sector partners

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The premix hubs in Ghana and Tanzania were designed to ensure that food producers embarking on fortification for the first time had access to high-quality premix while building their own procurement capacity.

In Tanzania, the premix hub was designed to carry multiple micronutrient premix for flour fortification and vitamin A for fortification of vegetable oil. GAIN and its partners selected Phillips Pharmaceuticals as distribution agent. (Phillips is a private company and leading importer of healthcare products with local offices in Tanzania.) This assistance ensured the proper storage conditions were available for retention of stability and quality, especially that of vitamin A, which requires appropriate storage conditions.

Premix was available to producers on a sliding subsidy basis, managed by Helen Keller International (HKI). Subsidies were agreed to start at 40% of the vitamin and premix cost to industry, tapering to 20% over six months, and finally end within one year. Throughout the lifespan of the Hub, producers were exposed to several alternative sources of premix and educated on strategic sourcing of quality premix. Internationally certified suppliers were given access to the new market by supplying the Hub and had already approached industry to market their products prior to the Hub's close in 2014. In this way, market forces were able to take over after subsidies ended and industry continues to source their own vitamins and premix as needed for fortification efforts. Smaller producers have even continued the practice of pooling their volumes to take advantage of bulk pricing.

In Ghana, GAIN and its partners invested in the procurement capacity of Environmental Processing and Associates Ltd. (EPA), a small private company that was closely involved with the President's Special Initiative on Salt. The GAIN Premix Facility acted as the revolving fund agent and agreed to supply high-quality KIO_3 to EPA on consignment in small packages of 1 kg and 5 kg, suitable to the needs of small and medium-sized salt producers. Salt producers order KIO_3 from EPA, who regularly distributes it upon order. The purchase price included a markup to absorb fluctuating exchange rates and port clearing expenses while covering the supply services of delivery, warehousing, and management.

This model has proven viable. In 2012, EPA supplied the equivalent of 27% of the theoretical market for KIO_3 , based on annual salt consumption and industry capacity for iodization. In February 2015, EPA took on their sixth KIO_3 consignment and due to its market-driven design the model has remained viable even without successfully achieving an exemption from the 27.5% customs duty and VAT imposed on KIO_3 . A key success factor identified by EPA is the flexibility of supply that they offer. Salt producers can be supplied high-quality KIO_3 within 24 hours of ordering, and producers can buy in small volumes as often as necessary which is particularly important in Ghana where the salt industry remains highly fragmented with numerous small producers.

engagement, some industries may seek out less expensive and lower-quality premix sources or cease fortification with premix altogether.

Sustainably delivering micronutrients through improved food systems

Ensuring a sustainable supply of high-quality fortification premix is a necessary factor to improve the nutritious quality of food systems and achieve the intended health impact through national food fortification programs. High cost and the challenges of identifying quality premix sources and procuring via international markets present barriers to many food producers. Through the establishment of national premix supply systems which are designed for the local context, such as the procurement and distribution models described here, industries can better pool their volumes and take advantage of more competitive pricing, allowing them to access a timely supply of premix from certified suppliers. Moving forward, GAIN, through its Platform for Quality and Safety (GPQS) which includes the GAIN Premix Facility (Figure 2), is committed to providing premix services to all partners where needed to ensure sustainable national micronutrient premix systems are established or strengthened. This in turn will ensure more sustainable access to affordable and high-quality premix for fortified food producers which helps build higher quality and more nutritious food systems for all.

Correspondence: Greg S Garrett,

Director at Global Alliance for Improved Nutrition (GAIN),
The Global Alliance for Improved Nutrition, Rue de Vermont 37,
1202 Genève, Switzerland **Email:** ggarrett@gainhealth.org

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