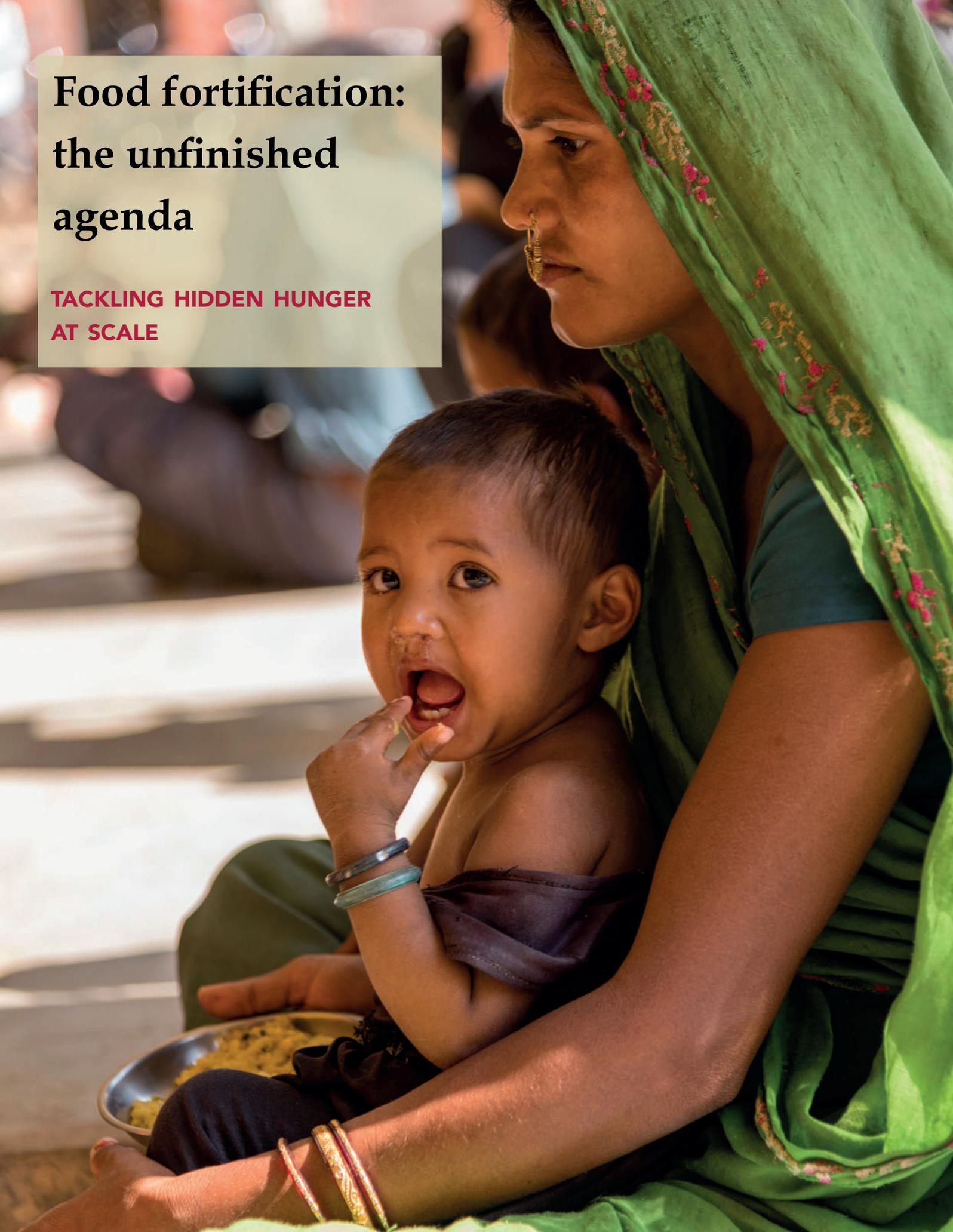


# Food fortification: the unfinished agenda

**TACKLING HIDDEN HUNGER  
AT SCALE**



## KEY MESSAGES

- Fortifying staple foods with key vitamins and minerals is a proven sustainable and effective approach to improving the health and wellbeing of large numbers of vulnerable people
- While fortification is mandatory for many foods, the availability of high-quality fortified foods is often low
- Countries need support to pass legislation, monitor quality and compliance, and measure the impact of fortification programmes
- Various actors have critical roles to play in tackling food fortification's unfinished agenda: **Donors** can increase commitment and funding; **national governments** can ensure that fortification programmes are monitored and regulations effectively incentivised and enforced; **industry** can produce high-quality fortified foods; and **civil society** can hold industry and governments accountable.

## WHAT'S THE ISSUE?

People need both macronutrients (carbohydrates, protein, and fats) and micronutrients (vitamins and minerals) to **grow and be healthy**. Macronutrients are required in large amounts to provide our bodies with energy for daily living, while micronutrients are required in smaller amounts for normal growth and functioning. Even if there is enough food to eat to meet energy needs, not everyone can always get the micronutrients they need from their food.

More than **two billion people** are thought to be deficient in at least one micronutrient. These include vitamins such as vitamin A, essential for vision and for proper functioning of the immune system, and minerals like iodine, which protects against irreversible brain damage.

Many people's **diets are not diverse enough**. Some vitamins and minerals are only found in low concentrations or in certain foods that are not regularly available. In some cases, physical, biological and health factors might prevent people reaching adequate levels of nutrition – for example, low exposure to sunlight reduces vitamin D synthesis, menstruation can deplete iron levels, and ill health such as diarrhoea can prevent digestion and absorption of multiple micronutrients.

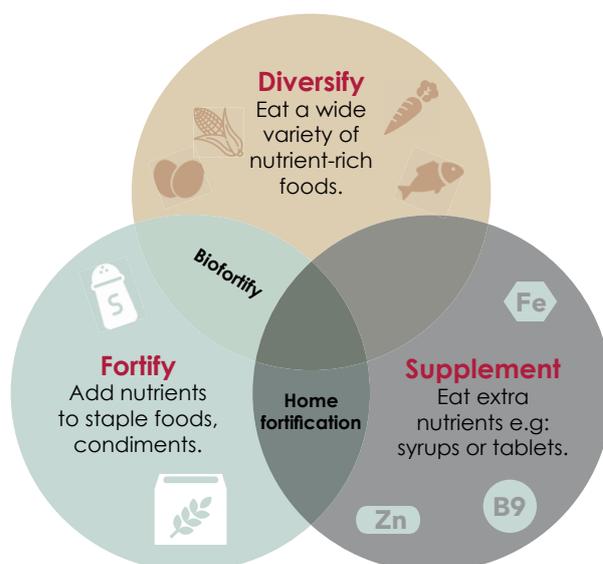


## WHAT'S THE SOLUTION?

Improving people's nutrient intake is an integral part of the solution. Better nutrition drives positive outcomes through **entire economies**; with better school attendance and performance, better jobs and earnings, and consequently better living standards. Nutrient intake can be optimised through three complementary approaches (Figure 1):

- Dietary **diversification**
- **Supplementation**
- **Fortification**

Figure 1: Three approaches to better diets



**Diverse diets rich in micronutrients** and increased consumption of nutrient-rich foods is the primary long-term ideal. However, owing to a combination of limited access (availability and affordability) of diverse foods and physiological constraints to meeting the requirements of vulnerable segments of the population, this remains an aspiration rather than a daily reality for many people, especially those on low incomes.

**Supplementation** may be essential for treatment where deficiencies exist, or prevention where segments of the population are particularly vulnerable (e.g. pregnant or lactating women or children under five). However, supplementation programmes can be expensive to roll out universally.

**Fortification** adds to or enriches the micronutrient content of foods that are commonly consumed in the population, which can help to prevent deficiencies from occurring in the first place. For certain micronutrients that are necessary for optimal development very early during pregnancy, such as folic acid, fortification can ensure a growing embryo or foetus gets essential nutrients even before a woman knows she is pregnant or before she is able to seek prenatal care and take supplements. Fortification can be done at the **point of cultivation** (biofortification), at the **point of food processing** (industrial fortification), or at the **point of consumption** (home fortification). Additionally, fortification can be targeted to specific groups at development stages with high nutrient requirements (such as children 6-24 months) by fortifying foods commonly consumed by these groups, such as infant porridge.

Here we focus primarily on the approach of the Global Alliance for Improved Nutrition (GAIN) to population-based fortification programmes, such as **large-scale industrial or mass fortification at the point of food processing**. For example, iron and folic acid are added to wheat flour by industrial millers to protect against iron-deficiency anaemia (a major cause of decreased productivity and maternal death) and neural tube defects (which can be fatal for newborns), respectively.

## HAVEN'T WE DONE IT ALREADY?

You'd be forgiven for thinking this.

In the 1920s – **almost 100 years ago** – industrial fortification began with the iodisation of salt in the United States and Switzerland. In the 1920s we had airships and telegrams – now we have 787 Dreamliners and smart phones. In 1920 there were 1.9 billion human beings in need of nourishing. Now there are four times as many – 7.6 billion.

Today, in addition to over **100 countries** which implement **national salt iodisation** programmes, **86 countries** mandate at least one kind of **cereal grain** fortification, and **over 30** mandate the fortification of **edible oils, margarine** and **ghee**.

Despite the impressive strides that have been taken in fortification, the journey is incomplete. Recent estimates suggest up to **75** additional low- or middle-income countries could benefit from new fortification programmes to improve public health<sup>1</sup>. Moreover, data on coverage, quality, and impact of existing fortification programmes is limited.

## WE KNOW FORTIFICATION WORKS

The evidence confirms that food fortification programmes in low and middle-income countries improve a range of micronutrient deficiency-related outcomes in different populations when there is high quality and consumption (Keats et al., forthcoming). Large-scale food fortification has **substantially increased availability of nutrients** including iron, folate, and vitamin A in several regions globally (Beal et al., 2017). The most striking success story is that of salt iodisation. Over six billion people consume iodised salt. It is credited with preventing 750 million cases of goitre over the past 25 years. With redoubled efforts by donors, governments, private sector and all stakeholders, we could **end iodine deficiency disorders** across the globe within the next four years (Garrett and Haddad, 2017).



<sup>1</sup> Preliminary count based on prevalence of micronutrient deficiency. Further consideration should be made in country to explore food consumption and food vehicle coverage, industry makeup and other criteria.

# BIG GAPS REMAIN

## MANDATES

Despite this, there is no question that a very large unfinished agenda remains around legislating the fortification of grains with iron and folic acid, and the fortification of edible oils with vitamin A. Of the around 75 additional countries identified that could benefit from fortification of staples with micronutrients including iodine, folic acid, iron, and vitamin A, further research is needed to confirm the prevalence of micronutrient deficiencies in the population, and the amount of the fortifiable foods that are being produced and consumed. On top of this, many countries with existing fortification programmes have set standards on the amount and type of micronutrients to add that require updates to align them with World Health Organisation (WHO) recommendations (e.g. WHO & FAO, 2006; WHO 2009) to make meaningful and safe contributions to people's nutrient intakes.

## QUALITY AND COVERAGE

A government mandate for food fortification is a huge and often hard-won step to improve the nutritional status of a population, but it is a just that – a step. After legislation on paper comes legislation in practice: quality assurance and quality control, monitoring, incentives and deterrents to achieve compliance, and assessment of impact. For fortification to yield its intended impacts, high coverage of foods that are fortified in compliance with standards must be ensured and sustained.

While data on the quality of fortified foods is limited, what exists delivers a cold splash of reality. It has been estimated that on average, only half of samples tested adhere to national standards (Luthringer et al., 2015). This is driven by lack of capacity and willingness among industry and government.

When industry labels and markets under-fortified or unfortified foods as fortified, trust in food systems can erode. When governments fail to objectively and consistently monitor and enforce food producers or to create an enabling environment for industry, industry is not motivated to comply. Either way, consumers lose.

New global and national accountability measures are needed to enhance quality and compliance of fortification programmes, and to stamp out fortification fraud. Civil society has a role to play here in helping programme performance.

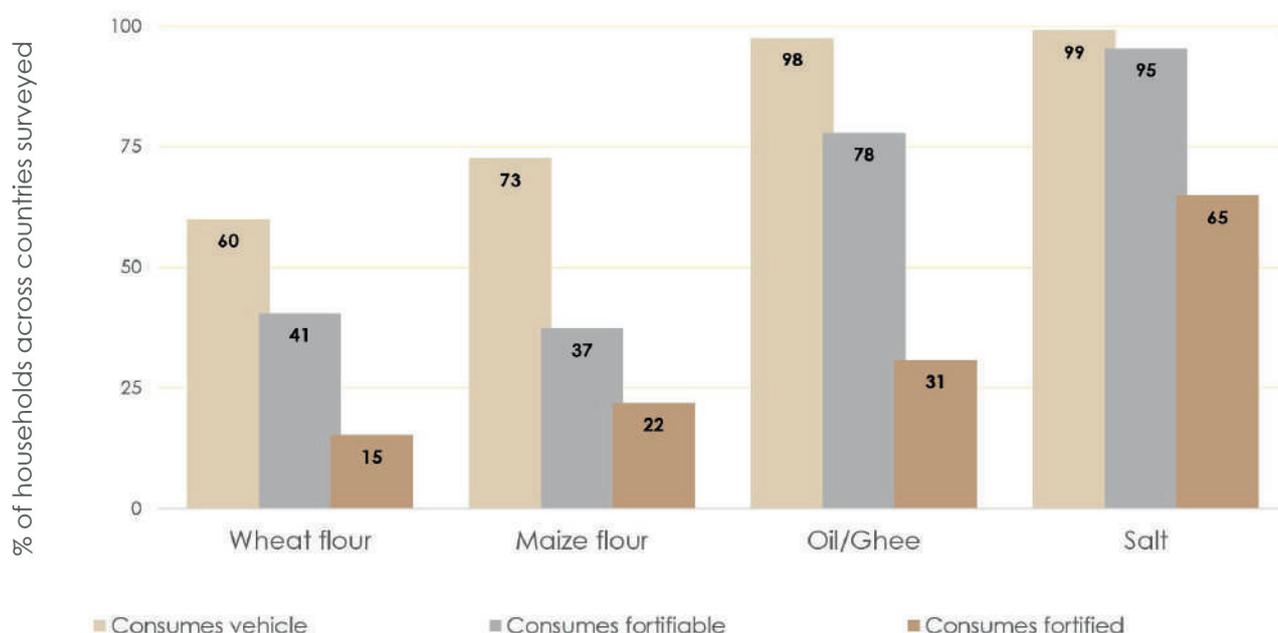
**After legislation  
on paper comes  
legislation in  
practice.**

In 2013, GAIN developed the Fortification Assessment Coverage Toolkit (FACT) for assessing coverage of population-based and targeted fortification programmes (Friesen et al, 2017). Between 2013-2017, FACT surveys were conducted in 16 low- and middle-income countries. The results emerging from analysis of FACT surveys together with other comparable survey data show disappointing household coverage and quality of fortified foods (Figure 2).

## MEASURING IMPACT

There is strong evidence on the impact of food fortification on functional outcomes for goitre (iodine) and neural tube defects (folic acid). Data from low- and middle-income countries for other nutrients is limited; however this is not surprising given the challenges around evaluating impact of population-based programmes such as fortification (Neufeld & Friesen, 2018). Evidence is building in some low- and middle-income countries, but there is still a way to go to improve the quality of the evidence. Impact assessments that are prioritised in programmes with proper design and implementation are needed.

**Figure 2: Global gaps in coverage in countries with large-scale food fortification programmes**



Source: Aggregated survey data, GAIN analysis. Note: Wheat flour data taken from 16 surveys, maize flour 8 surveys, oil/ghee 14 surveys, and salt 13 surveys for fortifiable salt, 21 surveys for fortified salt. For detailed results by country refer to Aaron et al 2017, Knowles et al 2017 and the PLOS ONE Fortification Assessment Collection (<https://collections.plos.org/fortification-assessment>).

## SO WHAT IS GAIN'S STRATEGY?

Key elements of GAIN's multi-tier national fortification delivery model are set out in Figure 3. These build on the 2015 Arusha Statement on Food Fortification (Government of Tanzania, GAIN, 2015) and target new legislation, compliance with existing legislation, innovation to encourage solutions, and monitoring of progress through five key strategy streams:

1

**Advocacy**, support to political processes, and capacity building to mandate new laws and expand national programmes.

Establishing an evidence-based need and potential to benefit is crucial. It is also necessary to build strong partnerships among stakeholders – government, business, and civil society. The process of programme implementation must ultimately be country-owned and led.

3

Actions to improve **monitoring, research** and **evaluation** of programmes.

More surveys to identify where coverage and compliance need work, disaggregated by region and demographic can help stakeholders understand how to design appropriate solutions, as well as where to best target their efforts. GAIN aims to conduct FACT household surveys in two new countries each year over the next five years. Additionally, GAIN aims to support technical, methodological, and information systems capacity needed by countries to assess fortification quality at the industry and market levels.

5

Better **alignment** of fortification and food safety programmes.

Food safety and quality are both essential for good health. Better alignment of food quality programmes generally and food fortification in particular, with food safety programmes is necessary to improve the demand and availability of nutritious and safe foods. Scope also exists to explore efficiency savings in, for example, combining efforts on monitoring. We will also support the strengthening of the enabling environment, for instance, policies, in national public and private sector systems in order to improve consumption of fortified, nutritious and safe foods.

2

**Support** to ensure adequate standards are set, and **technical assistance** to enable **compliance** with **standards**.

Building political will, as well as government and industry capacity to ensure compliance is one of the most pressing areas of need. GAIN aims to target four countries each year over the next five years with comprehensive support on compliance.

4

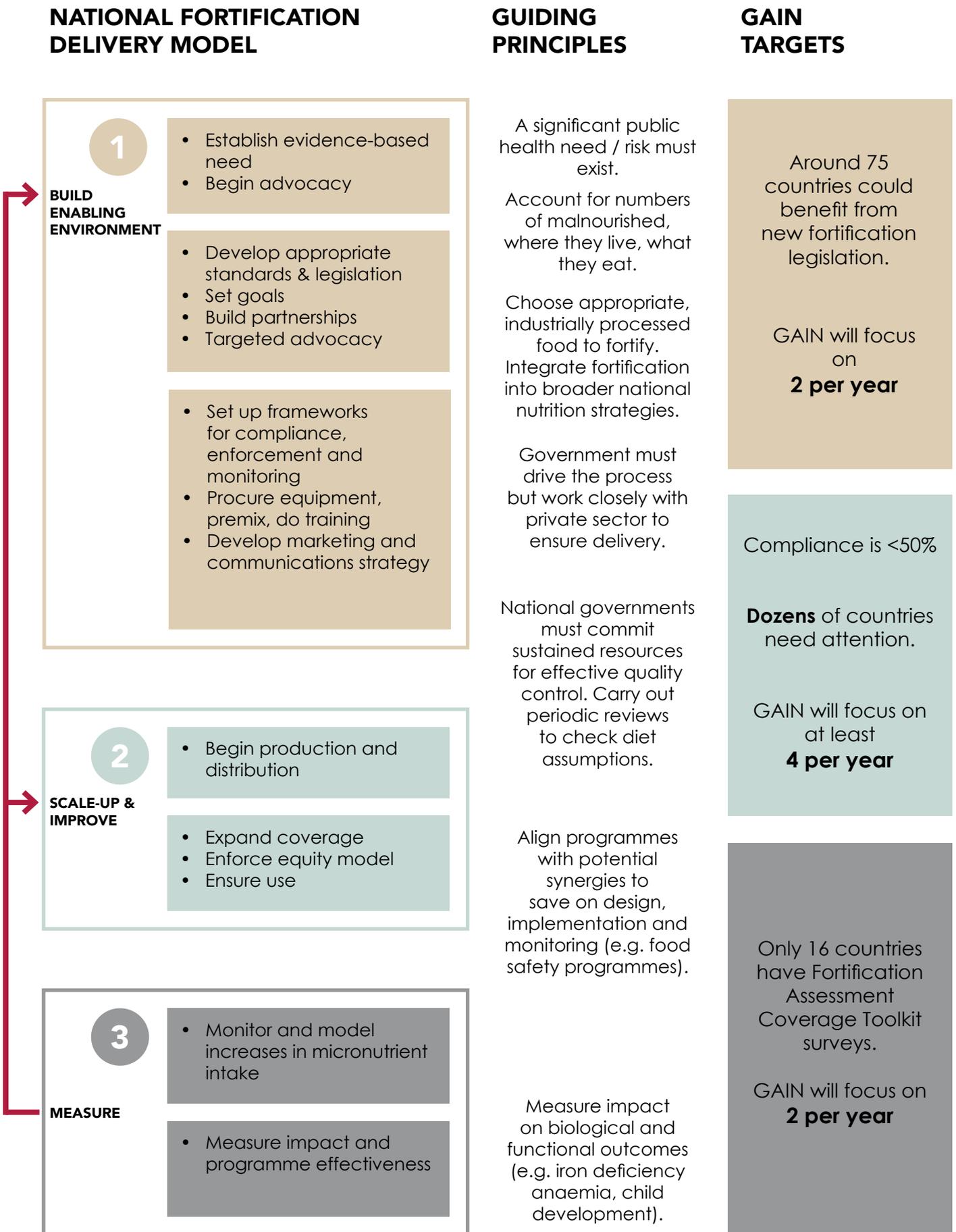
Hard and soft **innovations** to support solutions.

Examples of hard innovations include technology to make monitoring simpler, or to expand frontiers of industrial fortification or biofortification. Soft innovations include new ways to build demand for fortified food among consumers, and developing/ launching a compliance index<sup>2</sup>. While much of the science and technology driving large-scale food fortification is well-established, it is still a surprising hotbed of innovation. New food vehicles and fortification processes expand the frontiers of what is fortifiable – edible oil, rice, stock cubes, double-fortified salt (salt fortified with iron and iodine), and tea are among the more promising recent innovations.

Biofortification – the process whereby micronutrient density of foods is improved through agronomics, plant breeding or biotechnology – is another weapon in the arsenal against micronutrient malnutrition. In partnership with HarvestPlus, GAIN aims to scale up commercialisation of biofortified foods in several countries over the next five years.

<sup>2</sup> Over the next three years, GAIN is developing an index of market and compliance assessments in three countries. Hopefully more countries can be profiled with time.

Figure 3: National fortification delivery model, with GAIN principles and goals



## CONCLUDING REMARKS

Adequate nutrition should not be a privilege in the 21st century.

Food fortification is a dependable, low cost, sustainable approach to improving the nutrition of large numbers of people – it is not a luxury.

Nearly a century after the advent of salt iodisation as a public health programme, we are about to see iodine deficiency disorders virtually controlled. While there has been plenty of progress to celebrate in staple food fortification, particularly in recent decades, the work is far from finished.

Life-saving vitamins and minerals should be made available through fortified foods to the billions more around the globe who suffer from basic micronutrient deficiencies. This should be a rallying call to governments, donors, and other stakeholders. We must continue to enact and enforce fortification legislation and work together to boost quality and coverage of existing programmes. We must measure and understand what works where and why.

The unfinished agenda needs donors to increase commitment and funding. One estimate indicates we need at least an additional \$150-250M from donors before 2030 to complete the job (Laviolette, 2018). We also need industry to comply with legislation and ensure the quality of their products in line with standards. We need national governments to effectively monitor and enforce programmes. Lastly, we need consumers and civil society to demand better diets and hold industry and government accountable.

It doesn't need to take another hundred years. Let's get on with it.

### Recommended citation:

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#FutureFortified

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