



# 2019 Annual Report

PLAN, IMPLEMENT, MONITOR:  
food fortification for a healthier future



**Food Fortification Initiative**  
Enhancing Grains for Healthier Lives



Photo: CDC

## TABLE OF CONTENTS

---

**03**    **ABOUT US**  
Why fortify, How we work, A call to action

---

**11**    **FFI AROUND THE WORLD**  
Countries where we worked in 2019

---

**13**    **REGIONAL HIGHLIGHTS**

**Africa**  
Egypt  
Malawi and Uganda  
Mozambique

**Asia-Pacific**  
Solomon Islands

**Europe**  
**South Asia**

---

**25**    **GLOBAL GRAIN PROGRESS UPDATES**  
How we calculate global estimates  
Wheat  
Maize  
Rice

---

**33**    **FFI GIFT PROFILE**  
Gift profile, How to contribute, Executive management team

Cover: WorldFish

# About Us

**The Food Fortification Initiative (FFI) champions effective grain fortification so people have the nutrition they need to be smarter, stronger, and healthier.**

We help country leaders plan, implement, and monitor fortification of industrially milled wheat flour, maize flour, and rice. We are the only global group that focuses exclusively on these commonly consumed grains. Established in 2002, we are a public, private, and civic partnership that maximizes strengths and avoids duplication of efforts.

## What is fortification?

Food fortification—sometimes referred to as food enrichment—is when food producers add essential vitamins and minerals missing in a population’s diet to food that people eat every day.

Humans need vitamins and minerals, called micronutrients, in small amounts to function optimally. The consequences of micronutrient deficiencies can be extensive, including devastating birth defects for babies, impaired brain development in young children, and reduced work capacity among adults.

**Fortification is a large-scale, relatively inexpensive way to prevent micronutrient deficiencies, increase productivity, and save lives.**

**“We champion effective grain fortification so people have the nutrition they need to be smarter, stronger, and healthier.”**

# Why Fortify?

**Nutrition can be a matter of life and death. An estimated 2 billion people globally suffer from vitamin and mineral deficiencies.<sup>1</sup>**

Fortifying grains to improve nutrition has tremendous implications for individuals, entire populations, and a country's economy.

Anemia is often caused by deficiencies of micronutrients including iron and zinc. Pregnant women with severe anemia are twice as likely to die during or shortly after pregnancy than non-anemic women.<sup>2</sup>

Anemia affects an estimated:<sup>3</sup>

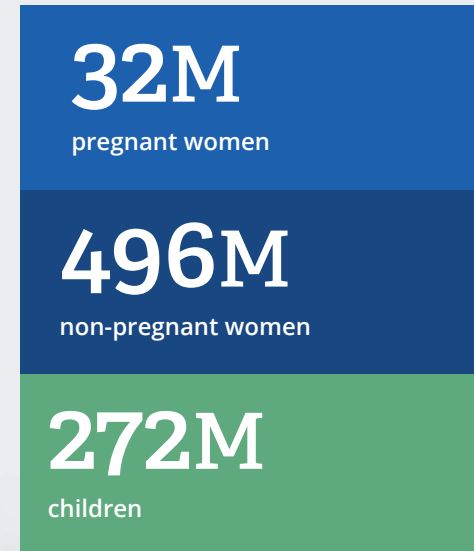


Photo: Xaume Olleros/RTI

Iron deficiency in childhood stunts cognitive development which hinders academic performance and future earnings potential as adults.<sup>4</sup>

Zinc deficiency adversely affects children and adults by weakening immune systems, increasing rates of childhood diarrhea and pneumonia, and contributing to increased rates of childhood stunting. **Globally, zinc deficiency contributes to 116,000 child deaths per year**—a number that would be much higher if researchers were able to count the number of deaths caused by preterm births in zinc-depleted mothers.<sup>5</sup>

Anencephaly and spina bifida are birth defects of the brain and spine that can be prevented by consuming enough folic acid, also known as vitamin B9.

**About 75% of children born with brain and spinal birth defects die before their fifth birthday.<sup>6</sup>** Though spina bifida has varying degrees of severity, it often leads to life-long disability and enormous costs for healthcare systems. Anencephaly is always fatal.

Vitamin B12 benefits children, adults, and the elderly by maintaining functions of the brain and nervous system.<sup>7</sup> Consuming adequate amounts of vitamin B12 can reduce the risk of developing chronic diseases including heart disease, stroke, dementia, Alzheimer's disease, and Parkinson's disease.<sup>7</sup>

Fortification with micronutrients including iron, zinc, folic acid, and other B vitamins benefit individuals at every point in life—from conception to aging.



Photo: Pudlowski/UNICEF

# How We Work

Before FFI begins working in a country, we use data to determine two essential requirements: demonstrated need for fortification and the potential to make a positive impact on health through fortified food. Our data comes from

several sources and through varied methods that include consumption and milling analyses, nutrition needs assessments, market analyses, political readiness assessments, current fortification reviews, and partner interviews.



Photo: Freshly threshed rice in India. Neil Palmer/CIAT



## Plan

Once a data-driven opportunity is determined and a national government seeks our support to design a fortification program, we form partnerships with leaders who represent public, private, and civic sectors. These partners help us plan the way forward and identify key challenges, opportunities, and champions for fortification.

At this stage, we help countries make their plan for fortification a reality. During design and development, we provide technical assistance to:

- Engage the legislative process
- Support millers as they source premix (pre-measured micronutrients that millers add to fortify flour or rice)
- Help draft fortification standards based on nutrient deficiencies and current consumption patterns that are in line with [World Health Organization \(WHO\) guidelines](#)
- Develop a communication and education strategy
- Identify miller, regulatory inspector, and laboratory training and equipment needs
- Design a realistic monitoring framework
- Design a surveillance system to capture coverage and impact

### TAKEAWAY

We help countries with demonstrated need and potential to create a plan for fortification when grains are industrially milled and commonly consumed, but they are not yet fortified.



## Implement

To ensure fortification programs are sustainable and effective, we help countries implement their plans. Specifically, we:

- Train millers on quality assurance and quality control practices
- Assist stakeholders in the passage of legislation
- Train regulatory monitoring inspectors and laboratory staff, and map agency responsibilities
- Improve national fortification guidelines
- Support collection, sharing, and acting upon monitoring data

### TAKEAWAY

We help countries implement their plan for fortification when there is clear public, private, and civic support for fortification.



## Monitor

Monitoring helps decision makers determine if a fortification program is working.

Effective monitoring ensures that millers adequately fortify foods, governments regulate and enforce standards, and problems are corrected.

### TAKEAWAY

We help countries improve fortification monitoring when grains are industrially fortified, but fortification standards are unregulated or health impact data is unavailable.

## A call to action

Research published using FFI data credited fortification with preventing 50,270 brain and spine birth defects globally in one year for an average of

137 healthier babies a day.<sup>8</sup> Yet according to estimates, an additional 82% of birth defects of the brain and spine<sup>8</sup> and 34% of anemia<sup>9</sup> could still be

prevented globally through adequate intake of iron and folic acid.

**More needs to be done.**



- 1 von Grebmer, K., et al. [2014. Global health index: the challenge of hidden hunger.](#) Welthungerhilfe, International Food Policy Research Institute, and Concern Worldwide. 2014.
- 2 Daru, J., et al. [Risk of maternal mortality in women with severe anemia during pregnancy and postpartum: a multilevel analysis.](#) The Lancet Global Health. 2018.
- 3 World Health Organization. [The global prevalence of anemia in 2011.](#) 2015.
- 4 Horton, S. and J. Ross. [The economics of iron deficiency.](#) Food Policy. 2003.
- 5 Black, R., et al. [Maternal and child undernutrition and overweight in low-income and middle-income countries.](#) The Lancet. 2013.
- 6 Blencowe, H., et al. [Estimates of global and regional prevalence of neural tube defects for 2015: a systematic analysis.](#) Annals of the New York Academy of Sciences. 2018.
- 7 Beckett, E., et al. [Reduced plasma homocysteine levels in elderly Australians following mandatory folic acid fortification: a comparison of two cross-sectional cohorts.](#) Journal of Nutrition and Intermediary Metabolism. 2017.
- 8 Kancherla, V., et al. [A 2017 global update on folic acid-preventable spina bifida and anencephaly.](#) Birth Defects Research Part A: Clinical and Molecular Teratology. 2018.
- 9 Keats, E., et al. [Improved micronutrient status and health outcomes in low- and middle-income countries following large-scale fortification: evidence from a systematic review and meta-analysis.](#) American Journal of Clinical Nutrition. 2019.

# FFI Around the World

In 2019, FFI worked in 21 countries across four regions: Africa, Asia-Pacific, Europe, and South Asia.

Though this report highlights certain countries, all of FFI's partner countries have made significant strides toward building a smarter, stronger, and healthier future through grain fortification.

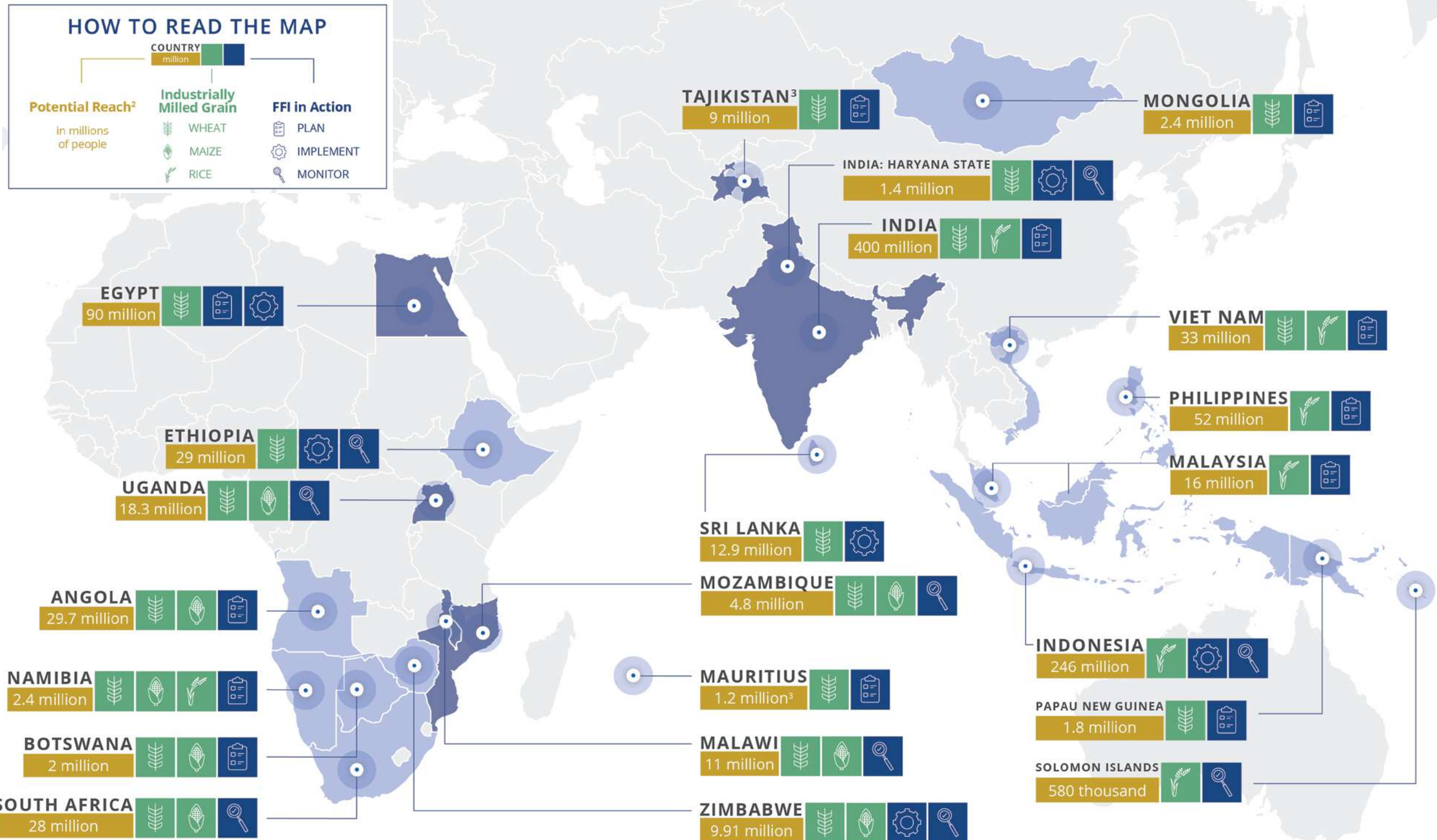
Working closely with our partners, we began work to reduce the risk of micronutrient deficiencies for 580,420,111 people—13% of the world's population.<sup>1</sup>

We are committed to helping country leaders plan, implement, and monitor their own grain fortification programs because **partnership saves lives.** The result is fewer maternal deaths, healthier babies, smarter children, and more robust national economies as a result of increased vitamin and mineral intake among the population.

1 Total estimate only includes countries that FFI supported in 2019. Estimate calculated by multiplying total population by the coverage rate of the industrially milled grain. Coverage rate is the percentage of population that consumes an industrially milled grain multiplied by the percentage of industrial mills able to fortify the grain.  
2 Potential reach calculated by multiplying total population by the coverage rate of the industrially milled grain.  
3 Estimate of potential in Tajikistan calculated by multiplying total population by the percentage of industrially processed wheat flour.

## Countries where we worked in 2019

■ countries highlighted in this annual report



# Regional Highlights

## AFRICA

### Feeding a smarter future

The majority of FFI's work in Africa is through Smarter Futures, a multi-sector partnership working to advance grain fortification in Africa. Under the Smarter Futures project, we strengthen grain fortification with hands-on technical assistance and trainings.

Since Smarter Futures began in 2009, it has expanded global resources for effective fortification implementation, monitoring, and advocacy training across the continent.

Funded by the Ministry of Foreign Affairs of the Netherlands, the Smarter Futures steering team includes FFI, Buhler, the Global Alliance for Improved Nutrition, Helen Keller

International, International Federation for Spina Bifida and Hydrocephalus, Mühlenchemie, Nouryon, Nutrition International, and the World Food Programme.

Current Smarter Futures funds are working to provide direct technical assistance to 11 countries on the continent with the potential to reach 218 million people by 2021.

EGYPT

90 million potential reach



In 2019, the Government of Egypt and FFI laid the foundation for restarting Egypt's national wheat flour fortification program, on hold since 2011.

Malnutrition from micronutrient deficiencies is a pressing public health issue in Egypt. The need for fortification in Egypt is great: 20-30% of women are anemic,<sup>1</sup> birth defects are three times what they could be if women had adequate intake of folic acid,<sup>2</sup> and losses in gross domestic product due to vitamin and mineral deficiencies are over US \$800 million annually.<sup>3</sup>

But the potential for fortification to dramatically improve Egyptians' nutritional status is even greater: 90% of the population is reached by industrially processed wheat flour that can be easily fortified. Fortification would provide a tremendous opportunity for Egypt to address persistent health and economic challenges.

### Bread builds bridges

Egypt's former national fortification program provided fortified baladi bread, a staple food consumed by a majority of Egypt's low-income population, at a subsidized cost. Through this program, life-saving amounts of folic acid and iron reached approximately 50 million Egyptians. In 2018, the Government of Egypt launched *100 Million Healthy Lives*, an initiative that emphasized the critical role of nutrition in health and economic development.

To help Egypt's 100 million citizens access essential micronutrients, the government decided to restart the national wheat

flour fortification program. In April 2019, the government requested our technical support. Once a partner agreement was drafted, we quickly got to work on a comprehensive situation assessment. We mapped the opportunities and challenges for flour fortification that lay ahead and helped the government take its next step in planning a successful program.

### A stronger future

Building on the assessment and subsequent discussions with stakeholders including government, wheat millers, and consumers, we will help the government develop a realistic plan for restarting—and strengthening—fortification. Egypt does not require wheat flour produced for the open market to be fortified. One of our first recommendations is that the government enact mandatory fortification for wheat flour sold on

the open market, an improvement that will ensure fortified wheat flour reaches at least 90% of the population.

The partner agreement, approved by all government channels involved in fortification, is expected to be signed in early 2020. Once the program enters the next phase, implementation, we will engage with key in-country partners and provide technical assistance.

From planning to implementation and monitoring, we remain committed to the work of rebuilding a smarter, stronger, and healthier future for Egypt—one baladi bread at a time.

1 World Health Organization. [The global prevalence of anemia in 2011](#). 2015.

2 Blencowe, H., et al. [Estimates of global and regional prevalence of neural tube defects for 2015: a systematic analysis](#). Annals of the New York Academy of Sciences. 2018.

3 Egypt World Bank. [Nutrition at a Glance](#). Accessed 12 February 2020.



Photo: A small baladi bread bakery produces 18,000 loaves per day. Nada Elhusseiny/FFI

**The need for fortification is great, but its potential to dramatically improve nutrition is even greater.**



Photo: Baladi bread. Bernadette/Flickr



**MALAWI AND UGANDA**

29.3 million potential reach



**One of FFI’s innovative approaches to ensure high-quality fortified foods are available in Africa is a grassroots Pull Strategy.**

The strategy, funded by the Global Alliance for Improved Nutrition (GAIN), engages consumer and civic society groups in advocacy and monitoring. Consumer and civic society groups assess the availability and quality of fortified foods available on the market. To date, numerous countries that have fortification programs struggle to determine if the correct amounts of vitamins and minerals are being added to foods. A major reason for this is government food safety inspectors’ limited bandwidth and resources.

To test out this alternative approach to ensuring quality products are on the market, FFI started pilot projects in Malawi and Uganda in 2018 and completed the second phase of the strategy, Pull 2, in 2019.

**The push for pull**

During the first phase of the Pull Strategy, we provided local advocates—consumer associations and groups for parents of children with disabilities—with technical assistance to determine if foods marketed as fortified met the

country’s fortification standards. During the second phase in Uganda, advocacy groups conducted a second analysis of fortified foods and followed up with food producers that proved to be non-compliant. In Malawi, advocacy groups leveraged national media to give those impacted by nutrition-related birth defects a chance to share their stories and reiterate the importance of fortification with food producers and the government.

**New approach, proven results**

The Pull Strategy empowers local advocates to build evidence-based recommendations that governments and food producers can use to improve adherence to national fortification standards. In Uganda, we saw a marked improvement in compliance to national standards for vegetable oil and wheat flour following implementation of the Pull Strategy as a result of sharing market analysis results and engaging with food producers and parent groups of children with birth defects of the spine.

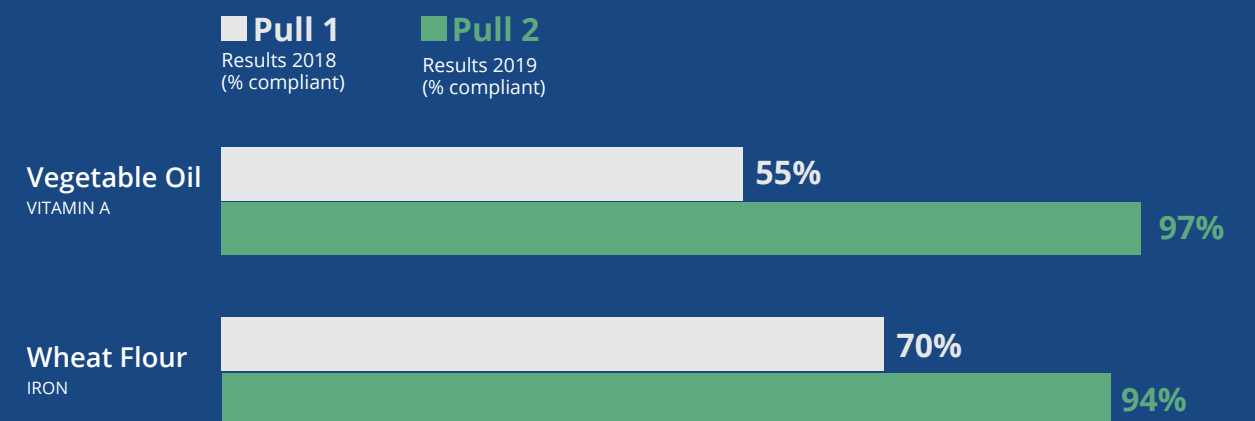


Photo: A general store in Uganda. Brian Wolfe/Flickr

Using lessons learned from Malawi and Uganda, we published a Pull Strategy report and toolkit. The toolkit will serve as a resource for other countries—particularly those where

national efforts to obtain quality information through government regulatory inspectors are constrained—to strengthen food fortification monitoring and advocacy.

**The Pull strategy boosts the percentage of food producers compliant with mandatory food fortification standards, Uganda 2018-2019**



## MOZAMBIQUE

4.8 million  
potential reach

In 2019, FFI assisted Mozambique in testing an online data collection and aggregation tool for fortification monitoring called [FortifyMIS](#).

The Government of Mozambique requires millers to fortify all wheat and maize flour according to set standards. Yet the program lacks consistent regulatory monitoring, opening the possibility for millers to fortify incorrectly, inadequately, or not at all.

### Why Fortify: Mozambique

66%

children are anemic

44%

woman are anemic

1,500

children born with birth  
defects of the brain or spine

birth defects of the brain or spine.<sup>2</sup>

Despite mandatory fortification, Mozambique's high rates of anemia and birth defects indicate a pressing need for better monitoring and enforcement: 66% of children and 44% of women are anemic,<sup>1</sup> and at least 1,500 children are born each year with

## Technology stops hunger in its tracks

FortifyMIS provides decision makers with timely information to improve a national fortification program and, consequently, a country's health and economy.

Developed by Project Healthy Children (PHC) and the Global Alliance for Improved Nutrition (GAIN), FortifyMIS is used on computers, tablets, and handheld mobile devices. It allows users to automatically track fortified food quality and safety data through customizable digital forms, real-time dashboards, and tailored data-reporting methods.

The management information system for FortifyMIS provides an improved, simplified means for food producers and government inspectors to monitor the quality of fortified products. As a result, the platform reduces the time



Photo: Dominic Chavez/The Global Financing Facility

and cost of monitoring and improves overall program performance by quickly tracking the quality of foods and identifying where improvements are needed. By using FortifyMIS, Mozambique can better capture critical data needed to improve data-driven program outcomes.

### Training for progress

Between August and October 2019, we trained food producers, consumer advocacy groups, lab staff, and

regulatory inspectors on FortifyMIS. The group of 20 received classroom lessons and hands-on experience with the MIS at markets, large-scale milling operations, and border points. We also led trainings for a team of government staff and individuals from GAIN-Mozambique to ensure consistent on-the-ground support will be available for users of the MIS.

In the coming year, we will assist Mozambique by teaching a core team of industry inspectors, food producers, and consumer advocates to train others

on use of FortifyMIS, first in the Maputo Province and then scaled to all provinces in the country. By strengthening the overall fortification monitoring framework, Mozambique will ensure millions get the right quantity and quality of nutrients they need.

1 World Health Organization. [The global prevalence of anemia in 2011](#). 2015.  
2 Blencowe, H., et al. [Estimates of global and regional prevalence of neural tube defects for 2015: a systematic analysis](#). Annals of the New York Academy of Sciences. 2018.

# Regional Highlights

## ASIA-PACIFIC

**SOLOMON ISLANDS** 500,000 potential reach

Since 2015, FFI has worked closely with the Government of Solomon Islands and industry to plan, implement, and monitor the country's first wheat flour and rice fortification programs.

One of only seven countries to mandate rice fortification, Solomon Islands is making strides toward a stronger, smarter, and healthier future.

In Solomon Islands, 4 of 10 women and children have anemia,<sup>1</sup> more than half of pregnant women have anemia, and about 12 severe birth defects of the

brain and spine occur for every 10,000 births.<sup>2</sup>

To implement the country's existing regulations for wheat flour fortification, we began training wheat flour millers in 2015. However, early FFI evaluations found that rice fortification might reach more people. Though fortified

wheat flour can be as effective as fortified rice, the average Solomon Islander consumes more rice than wheat. With the Australian Department of Foreign Affairs and Trade's (DFAT) continued support and in-country guidance, we helped the Solomon Islands Ministry of Health and Medical Services advocate to the central government for mandatory rice fortification.

As a result of our support, Solomon Islands now requires most rice available in markets to be fortified with essential micronutrients—a move that improves the nutrition of more than 500,000 people.

To ensure investments in Solomon Islands remain sustainable, we will continue supporting the government through June 2020 with technical advice to monitor and enforce fortification programs, deliver compliance information to rice importers and other affected businesses, and implement a communication program for health professionals and consumers.

**Micronutrient deficiencies won't wait—and neither will we.**

**Rice fortification in Solomon Islands benefits 99% of the population—and it costs rice millers less than 1% of the production cost.**

1 World Health Organization. [The global prevalence of anemia in 2011](#). 2015.  
2 Blencowe, H., et al. [Estimates of global and regional prevalence of neural tube defects for 2015: a systematic analysis](#). Annals of the New York Academy of Sciences. 2018.

**2014** Australia's Department of Foreign Affairs and Trade (DFAT) asks FFI to guide Solomon Islands' leaders to address the country's significant nutritional needs through food fortification and provides a grant to support activities.

**2015** FFI develops a comprehensive plan for Solomon Islands to implement the existing mandatory wheat flour fortification standard.

An analysis of cereal grain availability in the country suggests that rice fortification would also be key to reach the majority rice-eating population; amending national standards to require rice fortification also becomes a project objective.

FFI facilitates the development of a memorandum of understanding between partners to establish a multi-sector Food Fortification National Committee to provide national coordination over the food fortification program.

FFI experts train wheat flour millers in quality assurance and quality control and food safety inspectors in wheat flour monitoring.

**2016-2018** FFI assists the government in developing a proposed fortification standard for rice.

**2018** FEBRUARY: FFI runs a rice fortification compliance and enforcement training workshop for regulators.

DECEMBER: Government enacts a mandatory standard for rice that requires fortification of rice with iron, zinc, folic acid, thiamin, and niacin. As nearly all industrially-produced rice in the country is imported, the standard applies to imported rice.

**May 2019** Mandatory rice fortification standard becomes effective. A two-month grace period is provided to rice importers to implement.

**June 2019** First shipment of fortified, imported rice arrives in Solomon Islands.

FFI assists in developing the import monitoring procedures to validate compliance of rice imports. FFI develops, tests, and trains regulators to use a rapid, qualitative test to monitor rice imports.

**July 2019** FFI runs a follow-up compliance and enforcement training workshop for regulators.

**August 2019** Solomon Islands rice fortification is in full effect, and government regulators begin to enforce requirements for rice imports.

# Regional Highlights

## EUROPE

EUROPE 56 million potential reach



Europe is often viewed as a part of the world where vitamin and mineral deficiencies are not prevalent, yet certain countries in the region carry a burden at levels that deserve attention.



Photo: Annamurat Nazarov, left, explains the Turkmenistan approach to fortification to Ilgar Khidirov, a miller from Azerbaijan. Sarah Zimmerman/FFI

The World Health Organization (WHO) reports that “the burden of disease associated with poor nutrition continues to grow” in its European region, which includes Central Asia and the Caucasus. WHO found that micronutrient deficiencies in Europe are often caused by a diet low in fruit and vegetables.<sup>1</sup> Changing a dietary

pattern takes time and is often influenced by a number of different factors. Flour fortification is a large-scale, relatively low-cost way to get people needed micronutrients in the short-term while dietary patterns are improved.

Eight Central Asian and Caucasus countries—Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan—are taking note. In coordination with the Food Safety Agency of the Republic of Azerbaijan, United Nations Children’s Fund (UNICEF), and United States Agency for International Development (USAID), FFI led a five-day training of trainers workshop where country representatives developed skills in planning, implementing, and monitoring wheat flour fortification.

Five of the eight countries have wheat flour fortification mandates, but only Turkmenistan and Uzbekistan have been able to reach the majority of

## Wheat flour fortification legislation in Europe, 2019

■ Countries with mandates  
■ Countries without mandates



their population. The remaining three countries (Azerbaijan, Georgia, and Ukraine) are at different stages of developing national food fortification programs. Several times during the workshop, countries with established programs were paired with those without established programs. This

allowed experienced fortification stakeholders the opportunity to share knowledge and gain experience as fortification trainers.

At the end of the training, each country developed a flour fortification action plan for the next six to 12 months



Photo: Touring a flour mill provides insight into the flour fortification process. Sarah Zimmerman/FFI

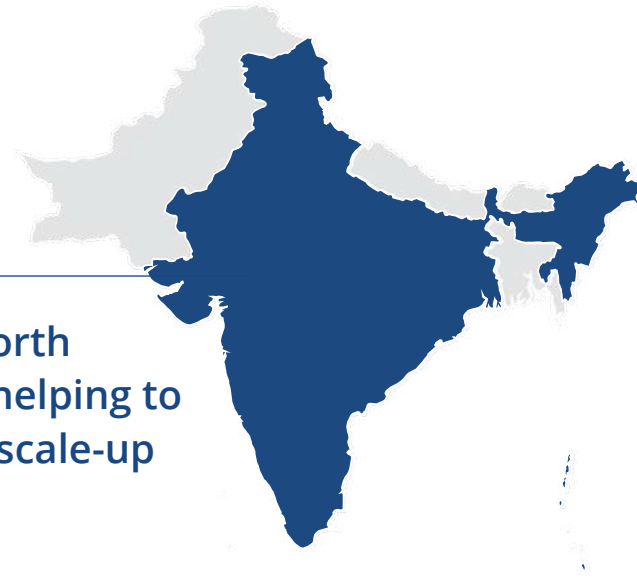
with commitments to advance effective flour fortification in their countries. Strengthened by a common purpose and equipped with tools from the training, the countries aim to drastically reduce iron-deficiency anemia and neural tube defects. With FFI’s assistance, Europe is on the fast-track to a healthier future.

<sup>1</sup> World Health Organization Regional Office for Europe. Health Topics. Nutrition. <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition>. Accessed 30 Sept 2019.

# Regional Highlights

## South Asia

INDIA 400 million potential reach



**FFI has been a key partner for the north Indian state of Haryana since 2015, helping to plan, implement, monitor, and now scale-up fortification efforts across the state.**

Out of all Indian states, Haryana has one of the highest percentages of children and women with anemia—72% and 63%, respectively.<sup>1</sup> At least 2,400 children are born each year in Haryana with birth defects of the brain and spine.<sup>2</sup> Wheat flour fortification provides Haryana with an opportunity to address these serious health challenges.



Photo: Adam Cohn/  
Flickr

Through our support in 2019, the Government of Haryana significantly strengthened its wheat flour fortification program, expanding the distribution of fortified flour through the state's public distribution system (PDS), India's largest social safety net program, from two blocks of one district to five entire districts. We also provided millers with technical assistance to increase their production capacity and meet the state's demand for fortified flour.

As a result, the program is poised to continue expanding across the state and reach 1.4 million more people. Haryana is in the midst of increasing the

distribution of fortified wheat flour in five more districts—50% of the state—with plans to scale to 100% by the end of 2020.

## The Haryana model

We started our work in Haryana by identifying where people bought their food. By mapping Haryana's supply chain for wheat flour, FFI found that the government could provide essential vitamins and minerals to those who need it most in the most effective way through PDS. Using these findings, we supported



Photo: Atta, stone-ground wheat flour, is used to make flatbread called chapati. Bartosz Hadynia

the government to complete a pilot project that provided fortified, stone-ground wheat flour called atta through the PDS in two large towns, or blocks. The pilot garnered enthusiastic support from public, private, and civic stakeholders. After it proved successful among beneficiaries, the government decided to scale-up the program.

As the Haryana project expanded to more blocks and districts, it also started providing fortified atta to children through the state's

Mid-Day Meal program (MDM) and Integrated Child Development Scheme (ICDS) in six districts of Haryana, currently reaching around 382,000 school children through MDM and 290,000 ICDS beneficiaries.

## Scale-up to save lives

A senior government official and key partner in Haryana's wheat flour fortification program commented, "As a public health professional, it is humbling to know that this intervention will let children live up to their potential because they are not anemic, women will be more productive because they are not exhausted from iron deficiency, and over the years, perhaps babies will be born without devastating birth defects." With plans for implementation across all of Haryana's 22 districts in 2020, FFI and the government's efforts will improve nutritional status—and the future—for 12.6 million people.

Using lessons learned from the Haryana model, we plan to assist 17 other states in India who have potential and demonstrated need for fortification of wheat flour and rice in multiple market channels. We are currently conducting supply chain analyses in Maharashtra, West Bengal, and Himachal Pradesh to determine the next steps needed to implement a fortification program in each state.

If wheat flour or rice fortification is implemented through PDS and the open market in all 17 prospective states, we estimate potential reach greater than 400 million people otherwise vulnerable to vitamin and mineral deficiencies. With its monumental potential for fortification, India's efforts to enhance grains will enhance lives.

<sup>1</sup> International Institute for Population Sciences and ICF. India National Family Health Survey (NFHS-4), 2015-16. 2017.

<sup>2</sup> Verma, I.C. and S. Bijarnia. The burden of genetic disorders in India as a framework for community control. *Community Genetics*. 2002.

# Global Grain Progress



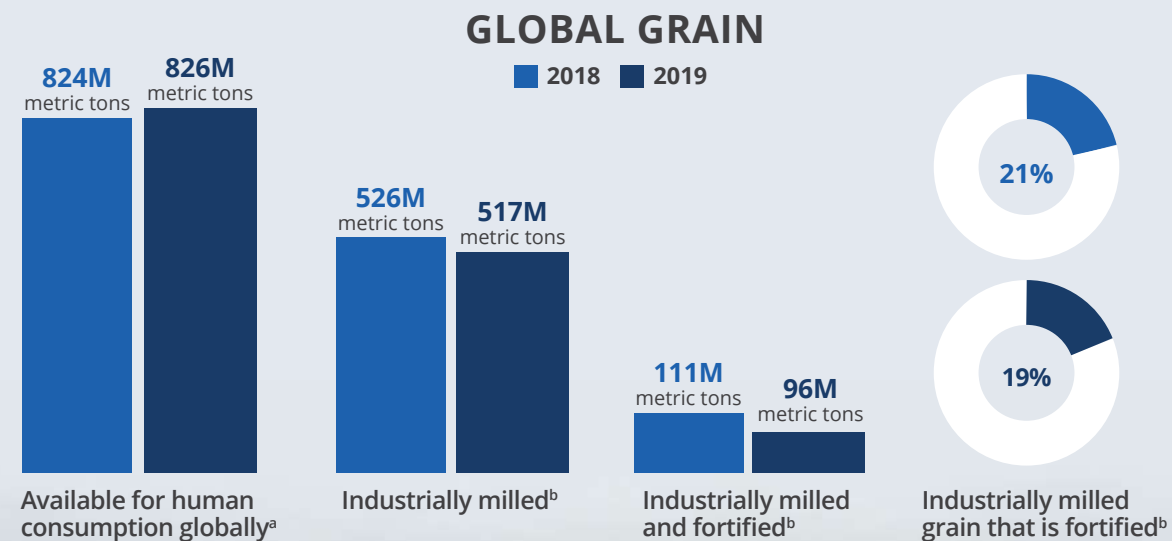
The 2019 increase in grain available for human consumption globally presents a tremendous opportunity for fortification.

As more grain is industrially milled, grain can be fortified with essential micronutrients to save more lives.

More than ever, countries need support from FFI to better plan, implement, and monitor the fortification of industrially milled grain.

Much of the global decrease in industrially milled and fortified grain 2018-2019 can be explained by two factors:

- 1) increasingly precise and accurate estimates of the percentage of industrially milled grain and grain fortified and 2) a global increase in the amount of industrially milled wheat.



## How we calculate global estimates

We measure global progress in grain fortification through an annual survey.

We begin with data from the Food and Agriculture Organization (FAO) of the UN about how much grain is available in the food supply for each country.

### Flour and rice available

To calculate the amount of wheat flour available, we multiply the metric tons of wheat available in each country by the country's average flour extraction rate. We use 75% as the default extraction rate unless we have country-specific data.

For maize flour, we use regional extraction rates of 67.5% for Africa and 72.5% for South/Central America and the Caribbean. We use an extraction rate of 70% elsewhere for maize.

No extraction rate adjustment is needed for rice as FAO data represents the "milled rice equivalent."

### Industrially milled

We then adjust the numbers to reflect industrial production. We assume that 100% of wheat flour is

industrially milled, with the exception of countries with a large number of small mills, such as Afghanistan, India, Nepal, and Pakistan. In contrast, we assume that 0% of maize flour and rice are industrially milled unless we have country-specific data to indicate otherwise. The exception is that in countries in FFI's Europe region, we assume that 100% of the maize flour and rice is industrially milled.

### Percent fortified

We ask national partners in governments, milling associations, nongovernmental organizations, and UN agencies to estimate how much of each grain is fortified in their country. We then compile the country figures into global estimates.

Photo: A rice field in Senegal. Xaume Olleros/RTI

a FAO data from 2013 for both 2018 and 2019 as 2013 is the most recent year with data from most countries.

b FFI calculations.



Photo: RTI

## Wheat

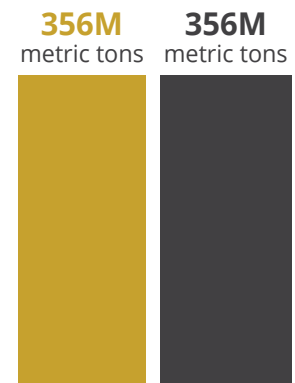
In 2019, the amount of industrially milled wheat increased by 700,000 metric tons. This means that more wheat flour has the potential to be fortified on an industrial scale.

The biggest change in wheat flour fortification results from improved data in Pakistan. In 2019,

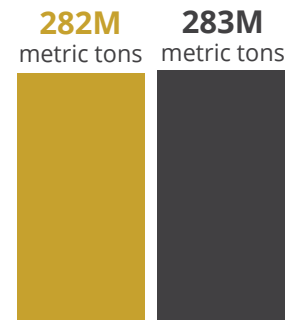
Nutrition International found that 25% of wheat is industrially milled and 8% of industrially milled wheat is fortified—a significant decrease from the historical estimates we used in 2018. Additionally, as a result of FFI’s in depth work across Africa, we found that fortification compliance is lower than many of our 2018 estimates.

### WHEAT FLOUR

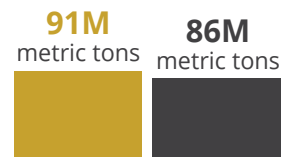
2018 2019



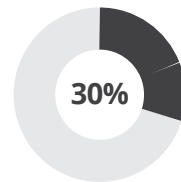
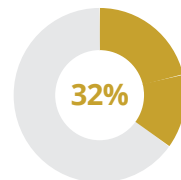
Available for human consumption globally<sup>a</sup>



Industrially milled<sup>b</sup>

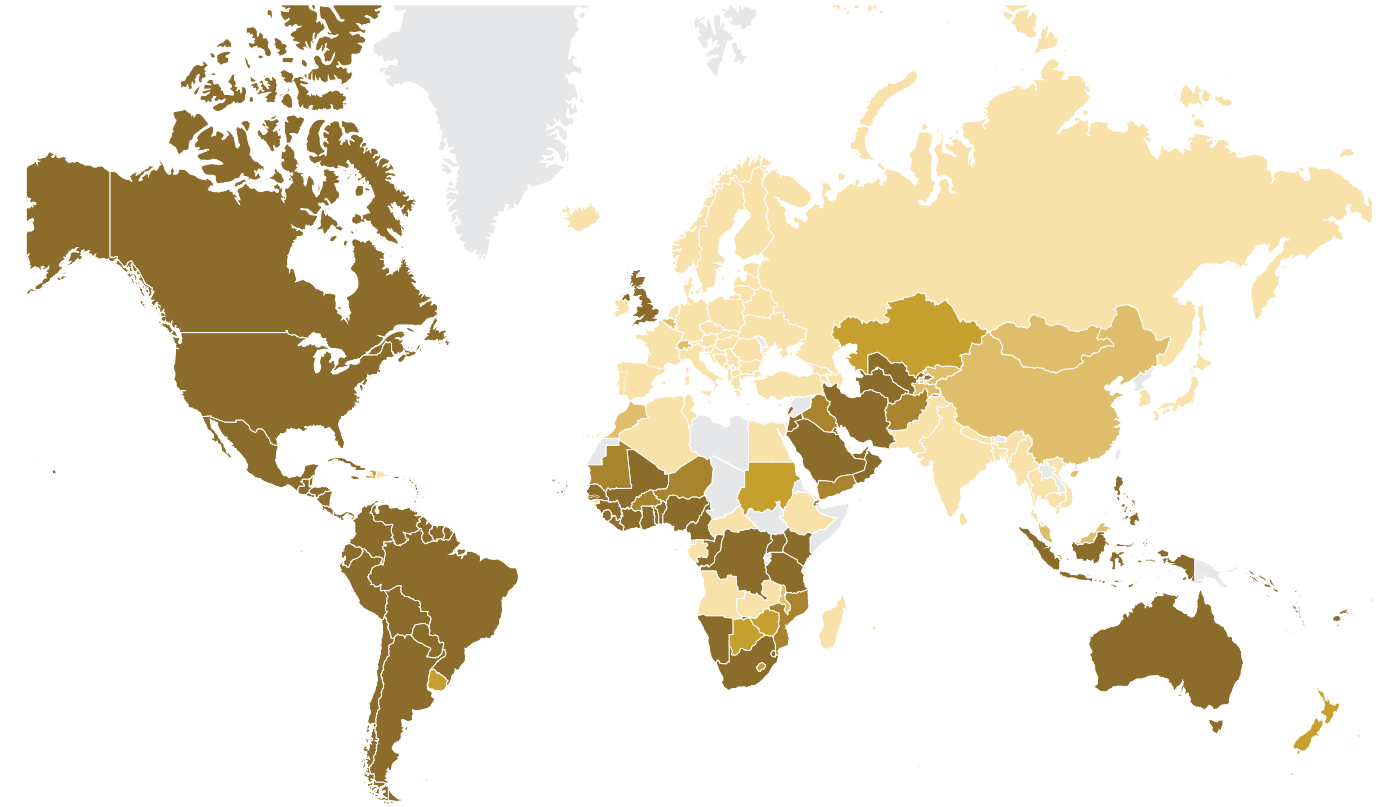


Industrially milled and fortified<sup>b</sup>

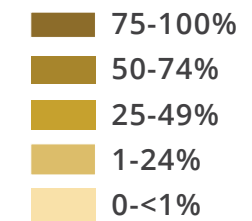


Industrially milled grain that is fortified<sup>b</sup>

## Percentage of industrially milled wheat flour that is fortified, 2019



### LEGEND



### Countries have one of the following:

- Less than 75 grams per capita per day available for human consumption
- Less than 30% of industrial milling capacity
- No data

a FAO data from 2013 for both 2018 and 2019 as 2013 is the most recent year with data from most countries.  
b FFI calculations.



Photo: RTI



Photo: Maize is ready to harvest in Niassene, Kaolack region, Senegal. Xaume Olleros/RTI

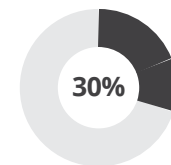
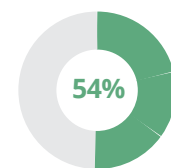
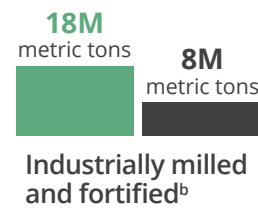
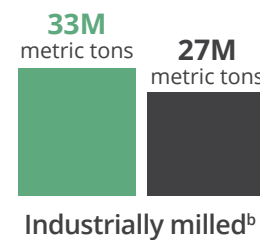
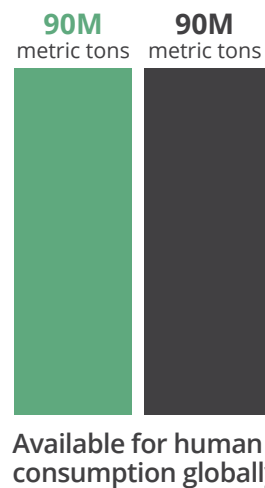
# Maize

The most significant impact on 2019 global maize progress results from incorrect estimates of industrially milled and fortified maize in Mexico, the single largest consumer of maize flour in the world. In 2019, 60% of the maize in

Mexico was distributed as whole grain, leaving only 40% of maize industrially milled. In 2018, the data source suggested 100% of maize was industrially milled and 100% fortified.

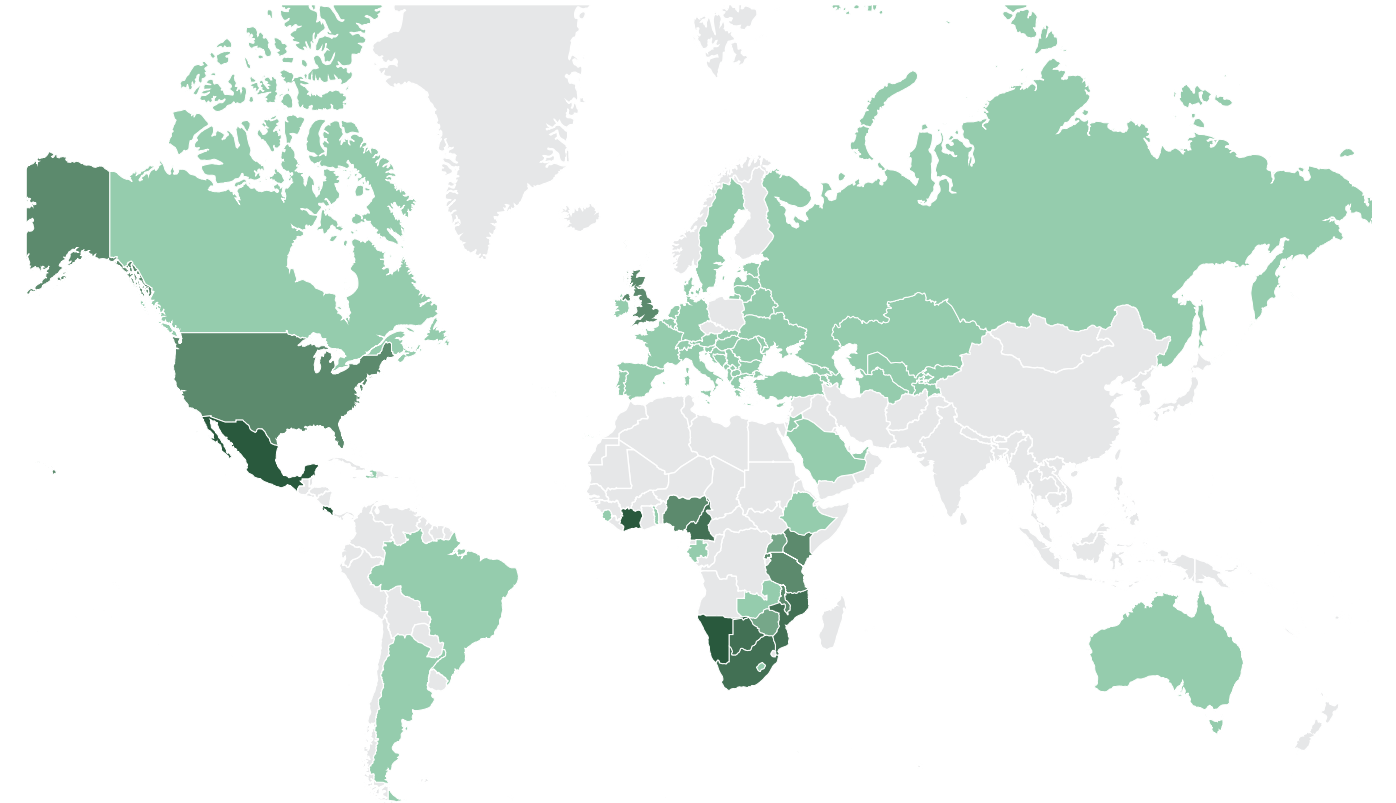
## MAIZE FLOUR

■ 2018 ■ 2019



Industrially milled grain that is fortified<sup>b</sup>

## Percentage of industrially milled maize flour that is fortified, 2019



### LEGEND

- 75-100%
- 50-74%
- 25-49%
- 1-24%
- 0-<1%

### Countries have one of the following:

- Less than 75 grams per capita per day available for human consumption
- Less than 30% of industrial milling capacity
- No data

a FAO data from 2013 for both 2018 and 2019 as 2013 is the most recent year with data from most countries.  
b FFI calculations.



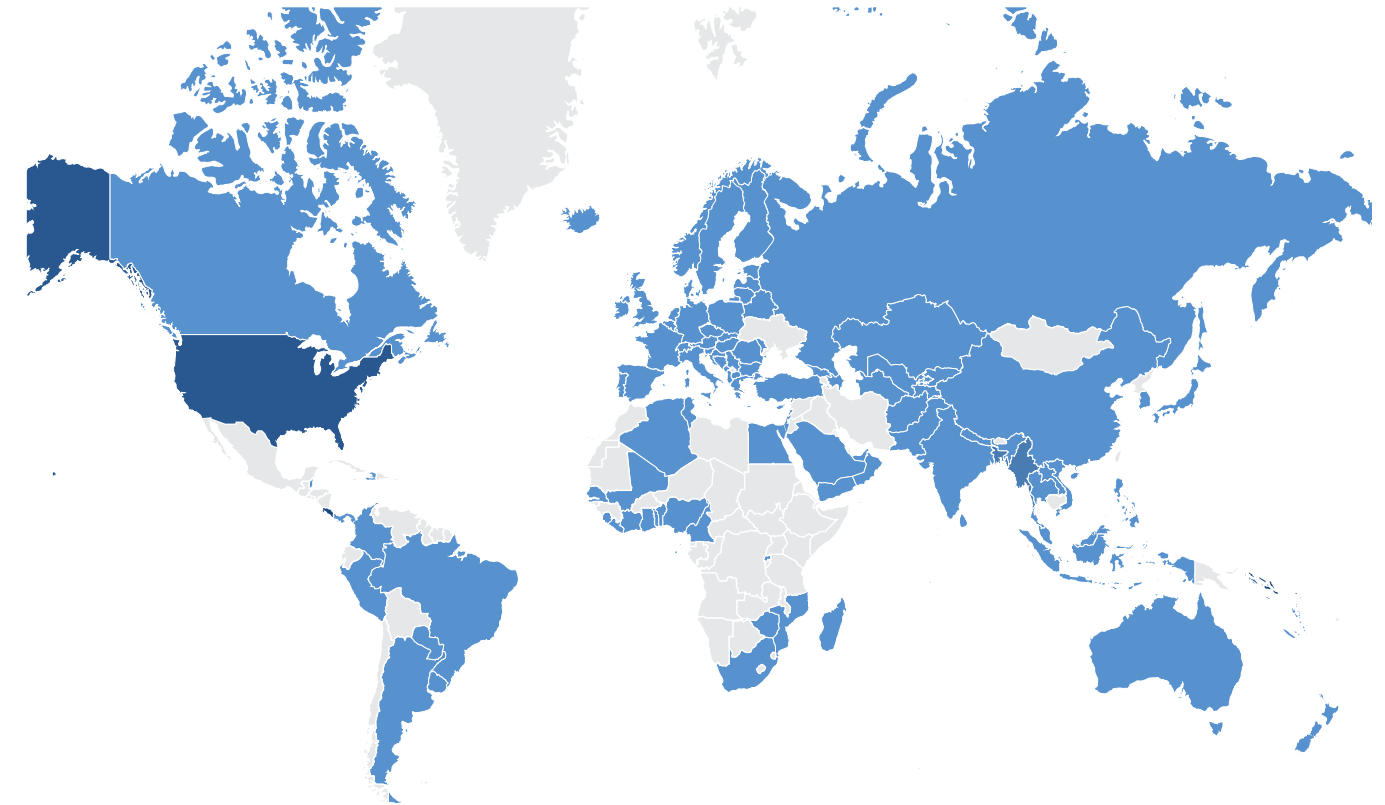
Photo: Xaume Olleros/RTI





Photo: Jim Homes/AusAid

### Percentage of industrially milled rice that is fortified, 2019



In 2019, the total percentage of industrially milled rice that is fortified remained constant, though the overall amount of rice that is available for consumption decreased.

#### RICE

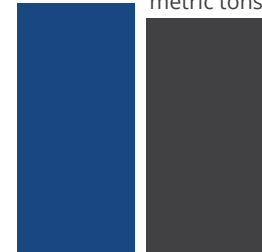
■ 2018 ■ 2019

378M metric tons (2018)  
379M metric tons (2019)



Available for human consumption globally<sup>a</sup>

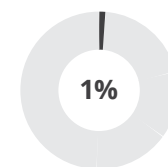
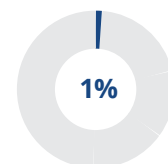
211M metric tons (2018)  
203M metric tons (2019)



Industrially milled<sup>b</sup>

2M metric tons (2018)  
2M metric tons (2019)

Industrially milled and fortified<sup>b</sup>



Industrially milled grain that is fortified<sup>b</sup>

#### LEGEND

- 75-100%
- 50-74%
- 25-49%
- 1-24%
- 0-<1%

Countries have one of the following:

- Less than 75 grams per capita per day available for human consumption
- Less than 30% of industrial milling capacity
- No data

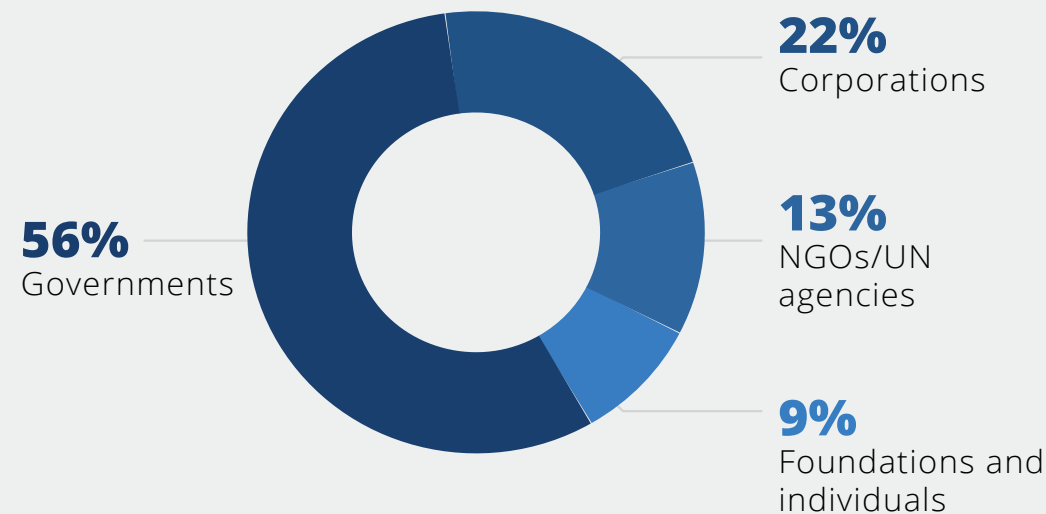
<sup>a</sup> FAO data with additional sources for Papua New Guinea and Bhutan. FAO data from 2013 were used for both the 2018 and 2019 estimates as that is the most recent year with data from most countries.  
<sup>b</sup> FFI calculations.



Photo: Freshly threshed rice in India. Neil Palmer/CIAT

# FFI Gift Profile

We are grateful to the individuals and donors who contributed to our work in 2019. Contributions for 2019 were US \$1.7 million.



## How to contribute

Your gift will make a difference by reducing the debilitating effects of anemia, preventing thousands of serious birth defects a year, and strengthening immune systems to prevent premature death in children and adults alike. Join us and donate online through [GiveWell](#) or the [CDC Foundation](#).



Photo: Working a rice field. Xaume Olleros/RTI

## Executive Management Team

An Executive Management Team (EMT) representing global leaders in the public, private, and civic sectors provides our strategic direction. In addition to the nine members listed below, leaders from the US Centers for Disease Control and Prevention and World Health Organization are EMT observers.

**Jane E. Friedrich**

Leader, Global Core Research and Development  
Cargill, Inc.

**Judith Monroe**

President and CEO  
CDC Foundation

**Reynaldo Martorell**

Woodruff Professor of International Nutrition; Senior Advisor, Global Health Institute  
Emory University

**Walter Von Reding**

Head, Milling Solutions Flour Service  
Bühler AG

**Melinda Farris**

Executive Vice President  
International Association of Operative Millers

**Manpreet Chadha**

Senior Technical Adviser, Fortification  
Nutrition International

**Lieven Bauwens**

Board Chair  
International Federation for Spina Bifida and Hydrocephalus

**Roland Kupka**

Senior Adviser, Micronutrients, Nutrition Section  
United Nations Children’s Fund

“THE NEED FOR  
FORTIFICATION IS  
GREAT, BUT ITS  
POTENTIAL TO  
DRAMATICALLY  
IMPROVE  
NUTRITION IS  
EVEN GREATER.”

