



2025 Annual Report

RESILIENT BY DESIGN: ADVANCING FORTIFICATION,
ADAPTING TO CHANGE



Food Fortification Initiative
Enhancing Grains for Healthier Lives



TABLE OF CONTENTS

07

FFI AROUND THE WORLD
Countries where we worked in 2025

09

ACTIVITY HIGHLIGHTS
Global
Advancing Global Accountability on Fortification Commitments
2025 FFI publications
Africa - Eastern and Southern Africa
Americas - United States
Americas - Dominican Republic & Peru
Asia-Pacific - Philippines
Europe - Azerbaijan
Europe - Türkiye
India - Haryana, Maharashtra, & Rajasthan

25

GLOBAL GRAIN PROGRESS
How we calculate global estimates
Wheat flour
Maize flour
Rice
Legislation update

37

GIFT PROFILE & EMT
Gift profile
How to contribute
Executive Management Team (EMT)

41

ABOUT US
FFI's unique contributions
How we work
Why fortify
A call to action

Photo: Dominic Chavez/World Bank
Cover photo: A wheat flour mill in Türkiye. (Jessie Genoway/FFI)

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

FFI provides unique expertise to help country leaders plan, implement, and monitor the fortification of industrially milled cereal grains. Established in 2002, we are a public, private, and civic partnership based at Emory University.

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, maternal death, impaired brain development in young children, and reduced work capacity among adults.

Large-scale food fortification is a proven, cost-effective way to prevent micronutrient deficiencies, save lives, and build a better future.



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



Photo: Jessie Genoway/FFI

Message from the Director

Dear Partners and Colleagues,

In May 2026, the World Health Assembly (WHA) convened for its 79th session and received the Director-General's first formal report on implementation of WHA Resolution 76.19, the food fortification resolution the Assembly adopted in 2023. It was the first of three scheduled check-ins, with the next due in 2028 and the last in 2030. Three years ago, WHA76.19 was a promise on paper; this spring, in Geneva, it became a report card, and FFI has spent the past three years working to make sure that record reflected real, measurable progress in large-scale food fortification rather than good intentions.

FFI's commitment to advancing fortification globally was highlighted in 2025 with the Global Nutrition Report - Nutrition Accountability Framework Tracker's publication of government fortification commitments made as part of the 2025 Nutrition for Growth Summit. Of the 21 countries that made new or strengthened fortification commitments, FFI had recently or was currently providing technical assistance to 13.

That progress came despite real headwinds. The year opened with sudden reductions in several large funding envelopes, including USAID's AFFORD program. Because FFI is an intentionally lean organization, we were able to pivot and redirect technical assistance where it was needed most without losing our core momentum. By year's end, Angola and Namibia were ready to implement large-scale food fortification programs, Türkiye and Azerbaijan were moving toward national mandates, and strengthened relationships with India's Public Distribution System in Haryana, Rajasthan,

and Maharashtra positioned states closer to providing fortified whole wheat flour to tens of millions of people.

And yet, the amount of grains fortified globally remained largely static. Our global estimates show that 23.3% of industrially milled wheat flour, maize flour, and rice were fortified in 2025, slightly below 2024's 23.7%. While several factors likely contribute to this stagnation, India's 2026 decision to pause the distribution of fortified rice is a reminder that our work is never finished once a fortification policy is signed into law; for fortification programs to reach their lifesaving potential, they must be nationally owned, monitored, and defended year after year.

To our civic, public, and private sector partners who kept data flowing, legislation advancing, and mills fortifying through a year of tight budgets: thank you. The work we achieved in 2025 would not have been possible without you, and I am confident that our shared commitment will continue to build a smarter, stronger, and healthier future in 2026.

With gratitude and determination,

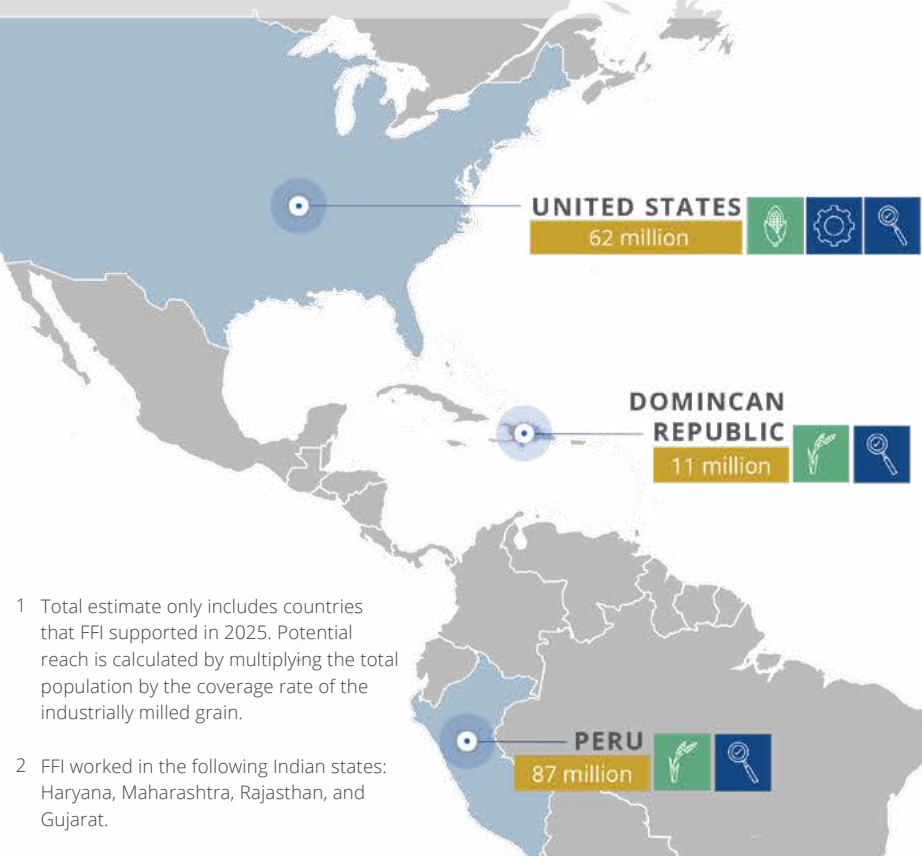
Scott Montgomery
Director, Food Fortification Initiative



FFI Around the World

In 2025, FFI provided technical assistance for grain fortification in 31 countries across five regions: Africa, the Americas, Asia-Pacific, Europe, and India.

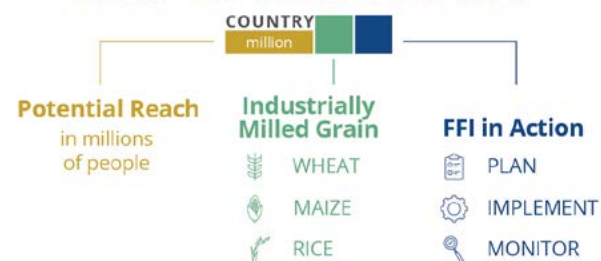
This report highlights a snapshot of FFI's work globally. Though they may not be included in the report, many of the other countries that FFI supported in 2025 made strides toward building a smarter, stronger, and healthier future through grain fortification. Working closely with our partners, we contributed to—or began contributing to—reducing the risk of micronutrient deficiencies for 1.3 billion people.¹



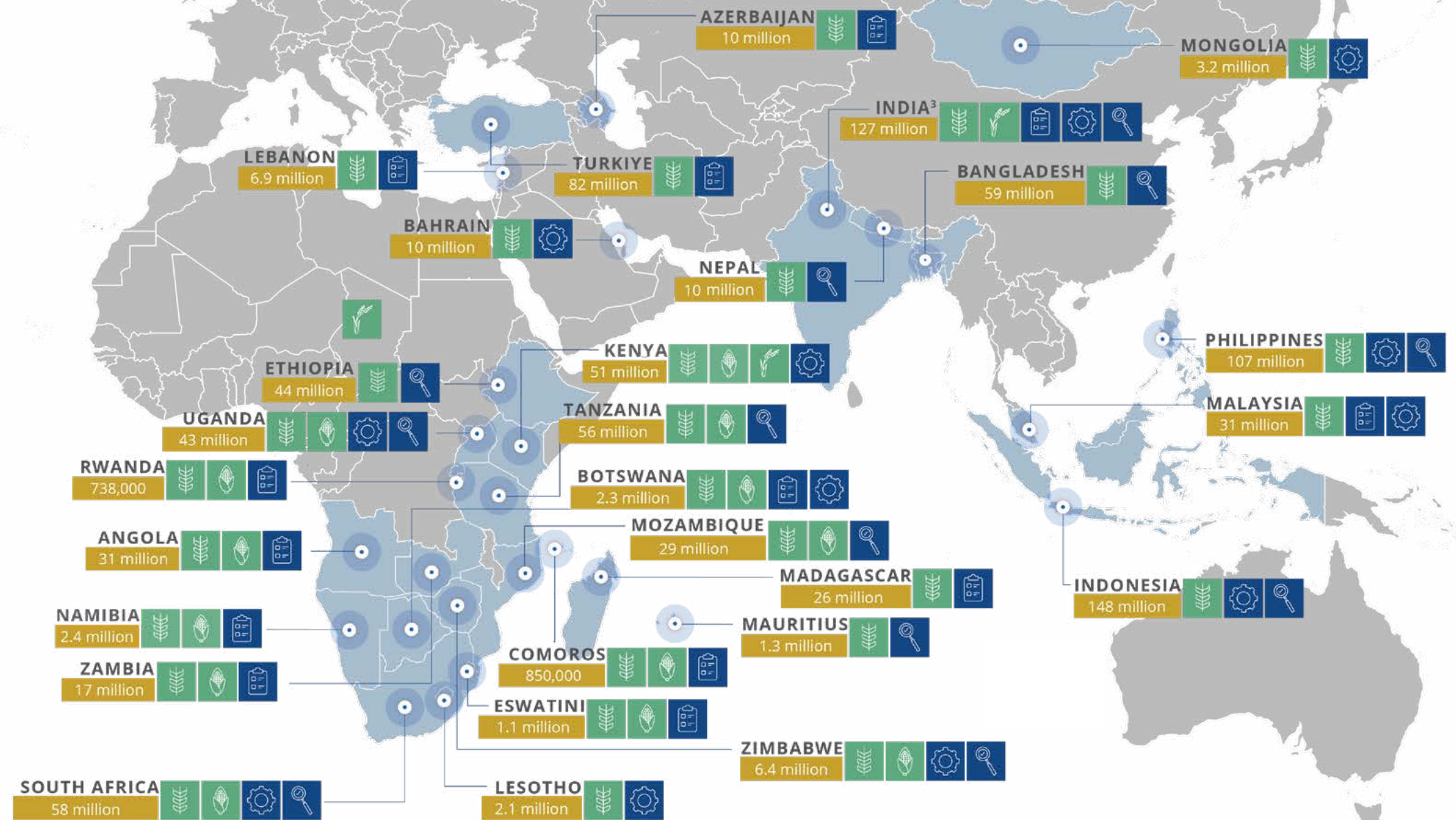
1 Total estimate only includes countries that FFI supported in 2025. Potential reach is calculated by multiplying the total population by the coverage rate of the industrially milled grain.

2 FFI worked in the following Indian states: Haryana, Maharashtra, Rajasthan, and Gujarat.

HOW TO READ THE MAP



Where We Work: 2025



GLOBAL HIGHLIGHTS

Advancing Global Accountability on Food Fortification Commitments

In 2025, the Food Fortification Initiative (FFI) continued to play a central role in supporting countries and partners to translate global commitments on large-scale food fortification (LSFF) into action. Through moments like the [76th World Health Assembly \(WHA\) resolution on food fortification](#) and the [Nutrition for Growth \(N4G\) Summit](#), FFI worked with governments, UN agencies, civil society, and the private sector to assess progress, highlight successes, identify gaps, and strengthen accountability for delivering on fortification commitments.

In 2023, the World Health Assembly adopted Resolution WHA 76.19, calling on Member States to finance, implement, monitor, and report on large-scale food fortification programs as a proven strategy to prevent micronutrient deficiencies. At the 2025 Nutrition for Growth Summit, 21 countries across Africa and Asia made new or strengthened commitments to food fortification, signaling growing political will to advance LSFF as part of food systems transformation. FFI has provided technical assistance to 13 of these countries.

Several countries made ambitious pledges. Bangladesh committed to adding fortified wheat flour to its national school-feeding program and is working toward mandatory fortification of all wheat flour. Botswana pledged to fortify 90% of staple foods—flour, oil, and salt—by 2025. Ethiopia committed to fortification targets of 79% of edible oil producers, 60% of

wheat flour producers, and 97% of edible salt producers by 2030. Nigeria reaffirmed its strong commitment to LSFF, pledging to integrate food fortification into national policy frameworks by 2026 to address undernutrition, micronutrient deficiencies, and diet-related noncommunicable diseases.

Other countries—Benin, Burkina Faso, Cambodia, Côte d'Ivoire, Egypt, Gambia, Haiti, Indonesia, Kenya, Kyrgyz Republic, Mauritania, Mongolia, Morocco, Nepal, Pakistan, Philippines, Rwanda, Sao Tome and Principe, Sierra Leone, Somalia, Sudan, Tajikistan, Tanzania, Togo, and Zimbabwe—also committed to strengthening fortification policies, coverage, and compliance. If fully implemented, these commitments have the potential to reach hundreds of millions of people with essential nutrients such as iron, folic acid, vitamin A, zinc, and iodine. At the same time, gaps remain in financing, regulatory capacity, data systems, and reporting—underscoring the need for sustained coordination and accountability as progress reports are due in 2026, 2028, and 2030.

Convening Global Action at N4G and WHA78

FFI co-led two major global events in 2025 to spotlight progress on LSFF commitments and catalyze further action. On March 24, 2025, FFI and partners co-sponsored the hybrid side

event “Accelerating Action on Large-Scale Food Fortification as an Essential Component of Sustainable, Healthy Food Systems” ahead of the Nutrition for Growth Summit in Paris. Held at the N4G Civil Society Pavilion, the event brought together governments, donors, global nutrition leaders, and private sector representatives to celebrate commitments, share country success stories, and explore innovative approaches to financing, compliance, and data-driven accountability.

FFI also co-led the WHA78 fortification side event in Geneva, “Accelerating Action on Micronutrient Deficiencies and Their Consequences, Including Spina Bifida: Delivering on WHA 76.19 through Large-Scale Food Fortification.” Co-hosted by the governments of Bangladesh, Chile, Egypt, Pakistan, and the Philippines, the event highlighted how Member States are advancing LSFF to deliver on WHA 76.19 through policy reform, multisectoral coordination, and program implementation.

Strengthening Advocacy and Communications

To amplify global momentum, FFI led the development of [social media toolkits](#) for the N4G fortification side event, producing sample posts, partner handle lists, hashtags, and newsletter content to support coordinated advocacy. FFI also contributed to drafting the [LSFF commitment guide](#) with its own [social media toolkit](#) and [a recap video highlighting N4G fortification commitments](#), helping partners and countries clearly articulate commitments and encourage further action.



Photos: Representatives from the Governments of the Philippines, Nigeria, Ethiopia, and Bangladesh speak on fortification commitments at the Nutrition for Growth Summit. (FFI)



Photo: A Government of the Philippines representative speaks on the government's commitment to fortification at the 78th World Health Assembly. (FFI)

As countries move from pledges to implementation, FFI remains committed to supporting governments and partners to finance, execute, monitor, and report on fortification programs—ensuring global commitments translate into measurable nutrition impact.

2025 FFI Publications

Resources published in 2025 by FFI staff that build the evidence base for food fortification

Research Publications

Chadha, M., Lopez de Romaña, D., **Pachón, H.**, & Arabi, M. (2025). Overview: Existing context and the need to generate evidence of the impact of large-scale food fortification on the prevalence of anemia. *Maternal & Child Nutrition*, 22(1), Article e70093. <https://doi.org/10.1111/mcn.70093>

Dorbu, A. D., Waddel, H. B., Chadha, M. K., López de Romaña, D., Arabi, M., Moore, R. H., Mehta, C., & **Pachón, H.** (2025). Nutritional anemia reductions due to food fortification among women of childbearing age: A literature review and Bayesian meta-analysis. *Maternal & Child Nutrition*, Article e13801. Advance online publication. <https://doi.org/10.1111/mcn.13801>

Faye, M. H., Diémé, M. M. A., Nkhoma, P. M., Diouf, A., Panagides, D., Badiane, A., **Tsang, B. L.**, Mama, O. M., De Souza, M. A., & Dossou, N. I. (2025). Assessing the fortification quality of refined vegetable oil with vitamin A, wheat flour with iron, and salt with iodine: Findings from a market assessment in Senegal, West Africa. *Current Developments in Nutrition*, 9(5), Article 107440. <https://doi.org/10.1016/j.cdnut.2025.107440>

Kancherla, V., **Bhalla, P.**, Dutta, S. K., Mehta, R., Vora, R. M., & Karmarkar, S. (2025). Food fortification ineffective in preventing neural tube defects in India due to regulation promoting inadequate levels of folic acid and vitamin B12. *Birth Defects Research*, 117(7), Article e2498. <https://doi.org/10.1002/bdr2.2498>

Parker, J., Kisho, A., Hou, S., Goodman, M., **Cravens, L., Grap, M. E., & Pachón, H.** (2026). Impact of mandatory grain fortification with folic

acid on population folate concentrations and the risk of folate deficiency and insufficiency: A systematic review and meta-analysis. *The Journal of Nutrition*, 156(3), Article 101291. <https://doi.org/10.1016/j.tjnut.2025.101291>

Technical Country-Level Reports

- Bhalla, P. “[Presentation for IAOM South Asia.](#)” FFI: New Delhi, India, 2025.
- Enzama, Wilson. “[Comoros LSFF Feasibility Assessment.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[2024 Annual Report.](#)” FFI: Atlanta, USA, 2024.
- Food Fortification Initiative. “[Fortification at a Vertically Integrated Masa Facility – Best Practices.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Georgia Country Profile.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Mozambique Cost-Benefit Analysis Report.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Mozambique FortifyMIS Training Report.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Mozambique Pull Landscape Assessment Report.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Mozambique Pull Report.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Mozambique Pull Strategy Presentation.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Quantitative Testing of Folic Acid in Fortified Corn Masa.](#)” FFI: Atlanta, USA, 2025.

- Food Fortification Initiative. “[Recommendations for Azerbaijan Wheat Flour Fortification.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Standard Operating Procedures: Fortification at a Wheat Flour Mill.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Vitamin D Fortification: FFI Overview.](#)” FFI: Atlanta, USA, 2025. Food Fortification Initiative. “[Vitamin D Fortification: Literature Review.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Afghanistan Country Profile.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Angola LSFF Strategy.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Ethiopia Internal and External Quality Monitoring of Fortified Foods: A Training of Trainers.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Mozambique Training in the Use of the FortifyMIS Platform.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Philippines External Monitoring Manual.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Philippines Internal Monitoring Protocols.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Philippines Micronutrient Premix Preparation.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Philippines Training Materials.](#)” FFI: Atlanta, USA, 2025.
- Food Fortification Initiative. “[Tanzania Internal and External Quality Monitoring of Fortified Foods: A Training of Trainers.](#)” FFI: Kampala, Uganda. 2025.
- Food Fortification Initiative. “[Fortification Monitoring Course.](#)” FFI: Atlanta, USA, 2025.
- Future Fortified. “[Commitment Guide for the Paris Nutrition for Growth Summit.](#)” 2025.
- Genoway, J. & Sundell, K. “[Resources to Support Food Fortification Advocacy and LSFF Commitments.](#)” N4G Regional Webinars

for Africa and Asia. 2025.

- Montgomery, S. “[2025 World Folic Acid Awareness Week Webinar.](#)” FFI: Atlanta, USA, 2025.
- Montgomery, S. & Bustrak, S. “[FFI TIA Presentation 2025.](#)” FFI: Atlanta, USA, 2025.
- Tsang, B. “[Data & M&E of Fortification Programs.](#)” International Virtual Exhibition Fair on Large-Scale Food Fortification in West Africa. FFI: Atlanta, USA, 2025.

Communication Materials

- Food Fortification Initiative. “[Corn Masa Fortification.](#)” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “[FAQ: Health Impact of Fortification.](#)” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “[Folic Acid Fortification Is Safe: A Summary.](#)” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “[Health Benefits of Folic Acid Fortification.](#)” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “[No Evidence to Link Folate Status or Folate Intake to Prostate Cancer Risk.](#)” FFI: Atlanta, USA. 2025.
- Future Fortified. “[Nutrition for Growth Commitment Summary Video.](#)” 2025.

Podcasts

- “[Hidden Hunger Explained.](#)” The Good Sight Podcast, Nutrition Every Day series, in partnership with Rise Against Hunger India. September 19, 2025.
- “[Transforming Nutrition with Fortification.](#)” On the Map with Global Health. April 29, 2025.

News

- Associated Press. “[Corn tortillas in California now must contain folic acid. More states are looking at it.](#)” *CNN*. 2025.

- Darke, Robert. “Fighting Birth Defects with Food Fortification in West Africa.” *Borgen Magazine*: Rome, Italy. 2025.
- Food Fortification Initiative. “In Memoriam: Godfrey Oakley.” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “In Memoriam: Philip Randall.” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “New Publication Raises Concerns that India’s Food Fortification Standards Are Insufficient.” FFI: Atlanta, USA. 2025.
- Food Fortification Initiative. “Study Confirms Food Fortification is Highly Cost-Effective in Fighting Hidden Hunger Across 63 Countries.” FFI: Atlanta, USA. 2025.



Photo: Dylan Campbell

REGIONAL & COUNTRY HIGHLIGHTS

EASTERN AND SOUTHERN AFRICA

850,000
potential reach



In 2025, FFI advanced LSFF efforts across Eastern and Southern Africa through expanded technical assistance, strengthened partnerships, and targeted country support under a collaboration with UNICEF. Launched in October 2024 and running through May 2026, the partnership supported ten countries at different stages of fortification program development, with the dual goal of improving program design where mandatory fortification is not yet established and strengthening monitoring and enforcement systems where programs already exist.

Across the region, FFI tailored its assistance to country-specific needs, recognizing that fortification systems evolve through distinct phases—from feasibility assessment and strategy development to regulatory implementation and compliance monitoring. Working closely with UNICEF country offices, governments, and partners, including the World Food Programme and Global Alliance for Improved Nutrition, FFI helped countries address persistent micronutrient deficiencies through sustainable, nationally owned fortification systems.

Equipping Angola, Comoros, Namibia, and Zimbabwe to Implement Large-Scale Food Fortification Programs

Several countries made meaningful progress

toward establishing or strengthening national fortification frameworks. Most notably, Angola and Namibia are ready to implement large-scale food fortification programs in 2026, thanks to assistance from FFI and UNICEF. And Comoros and Zimbabwe are closer to implementation as a result of similar tailored technical assistance.

In Angola, FFI facilitated the development of a national LSFF 5-year strategy (in [Portuguese](#) and [English](#)) through a participatory process involving government and partners. The strategy—covering wheat flour, maize flour, and edible oil—has been validated and is moving through national approval processes, marking a significant step toward mandatory fortification.

Namibia also made significant advances toward mandatory fortification. Building on earlier strategy development, FFI supported discussions to develop regulations and adopt regional standards, including expanding existing salt fortification regulations to include the fortification of commonly consumed foods such as wheat flour, maize flour, and millet flour.

In Zimbabwe, FFI supported the finalization of wheat and maize flour fortification standards, which are now being applied by industry. FFI also supported the provision of technical resources and training for millers to strengthen implementation and improve industry troubleshooting capacity.

Meanwhile, feasibility assessments helped countries evaluate new fortification opportunities. In Comoros, [FFI conducted an assessment that identified rice fortification as a promising intervention](#) due to high consumption levels and reliance on imported rice, while highlighting the need for strengthened inspection capacity at ports of entry and a regional fortification mandate to generate enough demand for food producers.

Building Capacity for Monitoring and Compliance

In countries with established fortification mandates, FFI focused on improving regulatory monitoring and enforcement systems. Training-of-trainers workshops in [Ethiopia](#) and [Tanzania](#) strengthened national capacity by equipping regulators, industry representatives, and civil society actors with practical monitoring tools and validated inspection approaches. These training programs created pools of national experts capable of supporting ongoing compliance and responding to emerging implementation challenges.

Mozambique demonstrated both progress and ongoing challenges. FFI completed [refresher training on FortifyMIS](#), a digital platform used to collect and analyze fortification data, and implemented FFI’s “Pull Strategy,” a social accountability approach that engages civil society to assess private sector compliance with fortification standards. Findings showed that while fortification activities were occurring, compliance gaps remained—underscoring the continued need for stronger regulatory oversight and industry quality assurance systems.

In South Africa, where fortified foods influence regional markets, preliminary assessments revealed delays in the approval of revised regulations and uncertainty about current

implementation levels. If given the opportunity, FFI plans to conduct a comprehensive landscape analysis to guide future efforts to strengthen the program.

Advancing Fortification Across Development Stages

Beyond country-level support, FFI strengthened regional coordination mechanisms across Eastern and Southern Africa. Through engagement with the Regional Coordination Mechanism and a regional data dialogue held in Ethiopia in October 2025, countries shared experiences and identified joint solutions to common challenges, including data management and program monitoring. Participants emphasized that many effective tools and data resources already exist but require greater national capacity and support to be used effectively.

FFI’s work across the region reflects a strategic progression of fortification systems—from early feasibility studies to fully operational programs that require strengthened compliance monitoring. Countries such as Angola, Namibia, and Zimbabwe advanced into more mature implementation phases, demonstrating tangible progress achieved through sustained technical assistance and partnership with UNICEF and national stakeholders.

While challenges remain—including coordination barriers, data gaps, and regulatory delays—FFI and UNICEF’s support in Eastern and Southern Africa highlights the value of adaptive, country-driven support. By strengthening policies, building technical capacity, and fostering regional collaboration, FFI continues to help countries move toward effective, sustainable food fortification programs that improve nutrition and health outcomes for millions across the region.

UNITED STATES

62 million potential reach

In 2025, FFI expanded its technical assistance efforts in the United States to support the development of [state-level corn masa flour fortification mandates and strengthen advocacy for folic acid fortification](#). Working in collaboration with the CDC Foundation and the Global Alliance for Prevention of Spina Bifida (GAPSBiF), FFI focused on increasing the availability of fortified corn masa products and advancing policy solutions to help prevent neural tube defects for Americans.

Building on earlier national efforts, FFI completed a project aimed at understanding and improving the landscape of corn masa fortification. A central component of this work was codifying technical best practices for fortification, culminating in a suite of [technical briefs](#) finalized in summer 2025 and shared with members of the Tortilla Industry Association. These resources provide practical guidance to industry stakeholders and policymakers seeking to implement effective fortification standards.

FFI also provided direct technical assistance to support advocacy and legislative development in multiple states. FFI contributed technical expertise in partnership with GAPSBiF to inform bills that require corn masa producers to fortify with folic acid. In a tremendous bipartisan win for nutrition, corn masa bills were passed in California and Alabama in 2025. FFI also supported proposed corn masa fortification bills in states including Georgia, Florida, and Texas.

Engagement with industry partners was another critical component of the initiative. FFI presented technical best practices and updates on state mandates at the Tortilla Industry Association Convention in May 2025 and provided one-on-one support to corn masa producers preparing to comply with emerging

regulations. Outreach to major retailers and manufacturers—including Walmart, Kroger, Olé Mexican Foods, and Gruma—helped build private-sector awareness and encourage alignment across the supply chain.

Among others, Gruma has emerged as an industry leader for improving nutrition in the US by adding folic acid to a majority of its corn masa products and advocating that all food producers do the same.

Together, these efforts strengthened the technical and advocacy foundation needed to advance corn masa fortification in the United States. By supporting policymakers, advocates, and industry partners simultaneously, FFI is helping create sustainable pathways for fortification policies that can improve nutrition outcomes and reduce preventable birth defects nationwide.



Photo: Sharon Bustrak, FFI Technical Advisor, testifies before the Georgia State Senate on the opportunity to save lives by mandating folic acid fortification of corn masa products. (FFI)



DOMINICAN REPUBLIC & PERU

98 million
potential reach



In 2025, FFI strengthened its collaboration with the World Food Programme (WFP) across Latin America to build practical capacity for fortification monitoring and implementation, with a particular focus on rice fortification systems. Through targeted trainings and technical exchanges, FFI supported country partners in translating fortification standards into workable monitoring approaches that reflect on-the-ground realities.

In Peru, FFI engaged directly with WFP’s country office and the national fortification regulatory agency through a series of technical meetings focused on external monitoring of rice fortification. Discussions centered on proposed monitoring guidelines that initially required government laboratories to test for 10 nutrients in fortified rice. Given current laboratory capacity constraints, FFI and partners worked through practical alternatives, recommending a revised approach that prioritizes testing for

three to four key nutrients while additional lab capacity is developed. Government representatives expressed optimism that updated guidelines could be finalized by year’s end, helping move monitoring efforts forward despite broader implementation challenges, including many small rice producers and a shifting policy environment.

To reinforce these country-level efforts, FFI and WFP refreshed and expanded access to online fortification training courses that FFI developed jointly with the Global Alliance for Improved Nutrition and the IGP Institute at Kansas State University.

FFI and WFP created a new, easy-to-access platform for the self-paced trainings and translated the modules into Spanish, significantly increasing their reach across Latin America and enabling more stakeholders to participate.

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The online courses cover core concepts in internal, external, import, and commercial monitoring for both flour and rice fortification, guiding participants through system planning, inspection activities, and data use. Designed for government officials, inspectors, millers, and laboratory staff, the modules support consistent baseline knowledge ahead of in-person workshops and national trainings that will take place in Peru and the Dominican Republic in 2026.

As a result of FFI and WFP’s partnership in Latin America, in-country collaboration and expanded Spanish-language learning tools are helping partners strengthen monitoring systems and sustain fortification program quality across the region.



Photo: FFI Research Director, Dr. Helena Pachón, engaged with WFP Peru and the national fortification regulatory agency through technical meetings. (FFI)

Rice Fortification Monitoring



Module 1 – Introduction



Module 1 (English)



Modulo 1 (español)

This module introduces the topics of rice production, rice fortification, and monitoring rice fortification programs. It also highlights some logistical matters related to the course.

There is no quiz associated with this module.



Photo: Attendees at a January 2025 Miller's Consultation meeting hosted by FFI, Nutrition International, and the Philippines National Nutrition Council and Department of Health. (FFI)

PHILIPPINES

107 million
potential reach



FFI continued supporting the Government of the Philippines in 2025 through a Nutrition International-funded project aimed at strengthening national wheat flour fortification standards. The project focuses on adding folic acid to the wheat flour standard and ensuring that only bioavailable forms of iron are permitted—key steps toward improving micronutrient intake and preventing nutrition-related birth defects.

While progress has been slower than anticipated due to delays in convening the National Nutrition Council Governing Board, FFI maintained momentum by preparing the technical and policy foundations needed for implementation once approvals are finalized. A Department of Health (DOH) consultancy conducted in 2025 clarified the pathway to implementation, identifying the need for an additional Administrative Order to operationalize and enforce the revised standards. Encouragingly, relevant government teams expressed readiness to move forward once the resolution is approved.

In 2025, FFI drafted key deliverables to strengthen both internal and regulatory

monitoring systems. Outputs included guidelines for [micronutrient premix preparation](#), [internal monitoring protocols](#), an [external monitoring manual](#), updated inspection checklists, and [training materials](#) designed to support industry compliance and government oversight. These resources position national stakeholders to rapidly transition into implementation.

FFI also supported advocacy and stakeholder engagement efforts, including collaboration with the Spina Bifida Support Group Foundation of the Philippines and leading a consultation meeting with millers. Engagement with Department of Health leadership reinforced commitments to advance birth defect surveillance and convene decision-making bodies to move the policy process forward.

Although final approval of the standards remains pending, the project has strengthened technical readiness, stakeholder alignment, and implementation planning—ensuring the Philippines is well positioned to advance effective wheat flour fortification once regulatory approval is secured.

AZERBAIJAN

10 million
potential reach



In 2025, FFI supported Azerbaijan in designing a national wheat flour fortification program, working closely with the Azerbaijan Food Safety Agency (AFSA) and UNICEF Azerbaijan to translate the country's strong government commitment to nutrition into actionable policy.

In addition to providing general technical assistance, FFI and partners supported the development of tailored [fortification policy recommendations](#), a draft fortification standard, and [standard operating procedures](#), laying the technical foundation for a future wheat flour fortification mandate.

A key milestone in the collaboration was a February 2025 study visit to FFI headquarters in Atlanta, Georgia, United States. The study visit covered key topics such as policy and monitoring best practices and fortification communications. During the visit, the team also visited Ardent Mills' Chattanooga facility, where representatives from government, UNICEF, and industry observed flour fortification in practice. The visit provided practical insights into premix integration, dosing technology, and quality assurance systems—bringing the operational realities of fortification to life. These lessons have directly informed Azerbaijan's planning discussions and strengthened confidence in implementing a sustainable program.

Since the project ended in May 2025, the Government of Azerbaijan has taken concrete steps toward mandating fortification with essential nutrients such as iron, folic acid, and

vitamin B12, and is convening a multisectoral working group to guide implementation. FFI remains engaged as a trusted technical partner, providing ongoing input as the country advances toward legislation and national rollout. Azerbaijan's strong government leadership, technical partnership with FFI and UNICEF, and private-sector engagement positions the country to deliver meaningful reductions in micronutrient deficiencies and transform nutrition.



Photo: A staff member from Ardent Mills examines wheat grains with the Azerbaijan team. (Sharon Bustrak/FFI)

TÜRKİYE

82 million
potential reach



In 2025, FFI advanced advocacy for mandatory wheat flour fortification in Türkiye by strengthening partnerships across government, civil society, and industry. Through these efforts, FFI elevated both the technical and public health case for fortification—highlighting its potential to reduce micronutrient deficiencies and prevent serious health outcomes such as neural tube defects and anemia.

FFI brought value to Türkiye’s fortification program planning process in two key ways: convening multisectoral stakeholders and translating evidence into action. In February 2025, FFI presented the tremendous opportunity to transform health through a national wheat flour fortification mandate to more than 40 representatives from the public, private, and civic sectors in Ankara. The event, hosted by the Turkish Nutrition Institute, highlighted that, at an estimated cost of [just TRY 8 per person annually](#), fortification could reach more than 80 million people, prevent more than 3,500 birth defects per year, and significantly reduce anemia among women of reproductive age—while also improving economic productivity and food security.

A central component of this work was empowering civil society voices. Advocates like Dr. Selma Calik, president of the Ankara branch of the Turkish Spina Bifida Association, played a critical role in communicating the lived impact of micronutrient deficiencies through meetings with government, development partners, and [the media](#). Her perspective underscored the importance of fortification as a cost-effective, population-wide intervention and emphasized

the essential role of patient-led organizations in driving sustainable policy change.

These advocacy efforts contributed to meaningful policy progress. In April, the Ministry of Agriculture and Ministry of Health established a joint working group under the National Food Council, signaling strengthened government coordination. By November 2025, the government had begun designing a national fortification standard and mandate, with FFI providing ongoing technical assistance to support effective and sustainable implementation.

As Türkiye moves from advocacy to policy development, growing alignment across sectors reflects increasing momentum toward a national program capable of delivering large-scale nutrition and economic benefits for generations to come.



Photo: Jessie Genoway/FFI



Photo: Jessie Genoway/FFI

INDIA

127 million
potential reach

FFI continued to advance whole-wheat flour—known as atta—fortification across India in 2025 by strengthening state-level partnerships, generating evidence, and expanding opportunities to integrate fortified atta into large-scale social safety net programs. Across Haryana, Rajasthan, and Maharashtra, FFI engaged government stakeholders, convened millers, and supported technical discussions to move from pilot efforts toward sustainable, scalable models.

A key milestone in 2025 was the development of a policy brief outlining the opportunity to provide fortified atta through the Public Distribution System (PDS), one of the world’s largest food safety net programs. The brief highlights the significant burden of micronutrient deficiencies in India, including persistently high rates of anemia and neural tube defects, and presents fortified atta as a cost-effective, high-impact solution to address these challenges at scale. The brief was shared at meetings with high-level stakeholders to advocate for improved nutrition through fortified atta.

Evidence from Haryana demonstrates both the feasibility and impact of FFI’s strategy. Between 2018 and 2023, fortified atta distribution

reached more than 3 million beneficiaries and was associated with meaningful reductions in iron, folate, and vitamin B12 deficiencies. Beneficiaries also showed a strong preference for receiving atta instead of wheat grain, with higher program uptake and reduced time and cost burdens.

The brief further underscores that distributing fortified atta through PDS can be economically sustainable. By reducing the need for household-level processing and aligning costs across government, millers, and beneficiaries, fortified atta offers a practical pathway to improve nutrition outcomes while maintaining program efficiency.

The brief lays out two beneficiary pricing options for the Government of Haryana to recover its ₹4.55/kg cost of milling and distributing fortified atta: charging ₹5/kg for a full 5 kg allocation (yielding roughly ₹6B in revenue against ₹5.46B in government expenses, for a net surplus of about ₹540M) or charging ₹4/kg for a reduced 4.85 kg allocation that accounts for the 3% cleaning/screenings loss (yielding about ₹4.8B in revenue against ₹4.5B in expenses, for a net surplus of ₹300M+). Both models are designed so that beneficiary payments cover the government’s

milling, packaging, and transport costs while still undercutting the ₹5.90/kg beneficiaries currently pay to mill wheat grain at local chakkis, making fortified atta distribution self-funding rather than a net cost to the state.

In February 2026, the Government of India temporarily suspended distribution of fortified rice through PDS and other government-supported programs schemes, after a government-commissioned study by IIT Kharagpur found that prolonged storage in central pool warehouses—often lasting two to three years—led to degradation of the iron, folic acid, and vitamin B12 blended into fortified rice kernels, undermining the intended nutritional benefits. The government stated the fortification process will remain paused until a more robust and effective nutrient delivery mechanism is developed and operationalized, and clarified that the pause would not reduce foodgrain entitlements or affect distribution volumes under existing welfare schemes.

The development drew a mixed response: civil society groups who had long called for an end

to the rice fortification program welcomed the suspension, while rice kernel producers and millers were caught off guard, with industry representatives suggesting the transition should have been phased in with the next crop season rather than halted abruptly. This shift in the rice fortification landscape reinforces the relevance of FFI’s continued work advancing fortified atta through the PDS in states like Haryana, Rajasthan, and Maharashtra—offering a complementary, and in some ways more resilient, pathway to close India’s persistent micronutrient gaps as the government reassesses its broader fortification strategy across staple grains.

While challenges remain—including policy hesitancy and implementation barriers—FFI’s continued engagement with state governments, technical partners, and civil society is building momentum. As India explores pathways to strengthen its food systems, empowering state governments to distribute fortified atta through PDS represents a scalable opportunity to deliver essential nutrients to millions and drive measurable improvements in public health.



Photo: District-level food fortification orientation workshop in Rajasthan, India. (FFI)

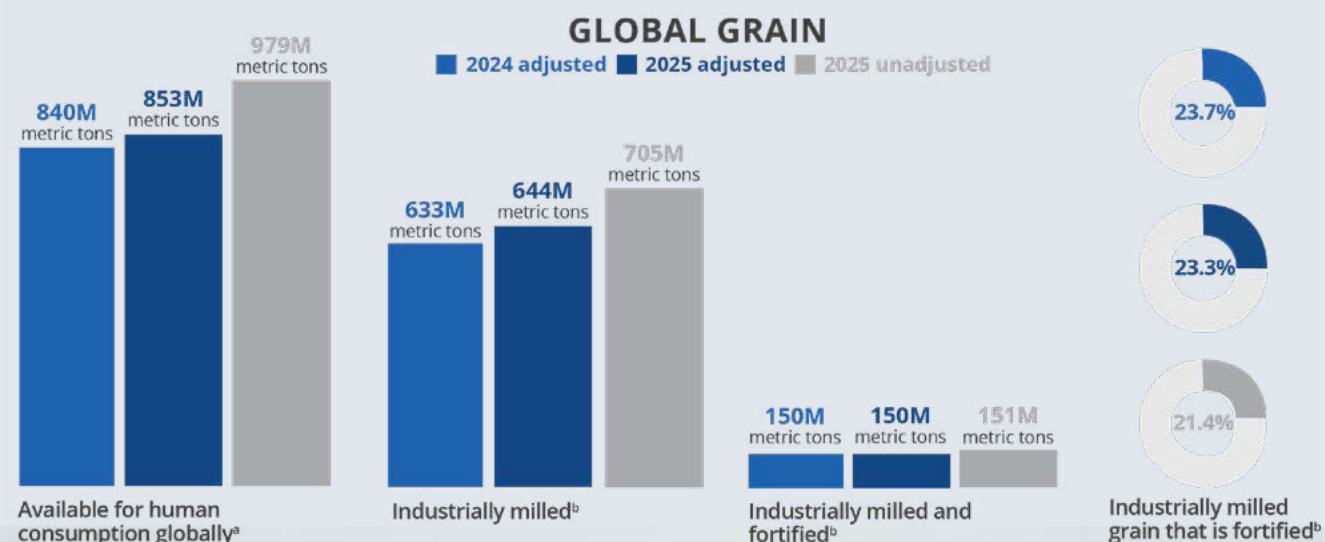
Distributing Fortified Atta instead of Grain Is Economically Sustainable for Indian State Governments

	Current system: providing wheat grains for beneficiaries to mill at local chakkis	Nutrition opportunity: providing packaged fortified atta	
	Cost (₹) per kg (for a 5 kg bag)	Cost (₹) per kg (for a 5 kg bag)	Cost (₹) per kg (for a 4.85 kg bag) (3% removed to allow for cleaning losses) ³
Beneficiary pays:	₹5.90/kg (chakki fee + cost to replace losses from processing. Add ₹1/kg cleaning fee if the beneficiary requests the chakki to clean the wheat)	₹5.00/kg (suggested)	₹4.00/kg (suggested)
Cost to govt to provide atta instead of grain:	Not applicable	₹4.55	₹3.75
Charging beneficiary ₹5 per kg (for a 5 kg bag) - Revenue = ₹6B - Expenses to government = ₹5.46B		Charging beneficiary ₹4 per kg (for a 4.85 kg bag) - Revenue ₹4.8B - Expenses to government ₹4.5B	

FFI estimates that 23.3% of the wheat flour, maize flour, or rice that could be industrially fortified was fortified in 2025. This represents a very small decrease from the previously estimated 23.7% for 2024.

Global volumes of wheat, maize, and rice grew by approximately 1.3% from 2024 to 2025, according to data from the Food and Agriculture Organization of the United Nations. The supply of maize flour increased by approximately 5 million tons, or 5%.

The estimated proportion of industrially milled wheat flour, maize flour, and rice that is fortified dropped by 0.5%, in part due to updated data reflecting lower levels of compliance than in previous reporting periods.



^a FAO data with additional, openly available data sources. 2024 estimates: 2022 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2022 Data: <https://www.fao.org/faostat/en/#data/SCL> 2025 estimates: 2021 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2023 Data: <https://www.fao.org/faostat/en/#data/SCL>

^b FFI calculations.

Photo: Xaume Olleros/RTI

When looking at countries FFI deems as a good opportunity for fortification of a given grain, the proportion of wheat flour that is industrially milled and fortified increased by an estimated 1.2%. Maize flour continues

to be the grain with the highest proportion of industrially milled flour that is fortified, at an estimated 41.9% of the global supply. Wheat flour comes in second at 31.9%, followed by rice at 10.9%.

How we calculate global estimates

Measuring global progress in grain fortification through an annual survey.

Methodology

We measure global progress in grain fortification using multiple data sources. We begin with data from the Food and Agriculture Organization (FAO) of the United Nations that describes how much flour or milled rice is available in the food supply for each country.

FFI applies specific criteria to data from each country that focuses our calculations on the grain(s) that would be good candidates and excludes the grain(s) that would not be good candidates for large-scale fortification. This primarily means emphasizing grains that are widely consumed and mostly industrially processed. The methods are described in “How we calculate global estimates – opportunity.”

Flour and rice available

For countries with FAO data, we use the [Supply Utilization Account \(SUA\)](#) food supply quantity (tons) element to determine the amount of available wheat flour, maize flour, and milled rice. If a country or territory does not have FAO data available, we use publicly available data and, as needed, extraction rates to convert grain numbers to flour available. If country-specific extraction rates are available, those are applied. Otherwise, the default extraction rate for wheat in its conversion from grain to flour is 75%. The default extraction rate for maize varies by region, with 67.5% used for Africa, 72.5% for the Americas, and 70% elsewhere. We collect data on milled, hulled, and broken rice in our estimates. As a result, it is not necessary to apply a default extraction rate to rice.

Industrially milled & percentage fortified

We then determine the amount of flour or milled rice that is industrially produced. For countries in FFI's [Europe region](#), we assume that 100% of the wheat flour, maize flour, and rice are industrially milled. Countries in FFI's [Americas region](#) are assumed to industrially process 100% of their wheat flour.

We also ask national partners in governments, milling associations, nongovernmental organizations, the private sector, and UN agencies worldwide to estimate how much of each grain is industrially processed and fortified in their country. We then compile the country figures into global estimates. It is important to note that, at times, FFI is not aware of changes to national milling infrastructure when they happen, which can cause a data lag. Furthermore, many countries do not have centralized data collection systems that report data on the percentage of food that is fortified a regular basis. Response rates for our annual data collection process are consistently low, meaning that the numbers reported are accurate to the best of our knowledge, but may not reflect the reality on the ground. We provide the best estimate of global milling based on the information currently available to us.

Adjusting for fortification opportunity

Based on these findings and calculations, FFI determines if countries could be considered a good opportunity for large-scale grain fortification. For each grain, FFI examines the grams available per person per day. If a country has more than 25 grams of wheat or more than 37.5 grams of maize or rice available per person per day, it may be a good opportunity. However, another consideration is whether one grain is much more popular than another. For example, even though the average Jordanian eats more than 37.5 grams of rice per day, they eat more than 176 grams of wheat per day. As such, rice may not be considered a priority for fortification in Jordan. Lastly, FFI is primarily concerned with large-scale fortification, meaning that grain must be primarily produced at industrial mills to be considered a good opportunity for fortifying. These factors and others, such as urbanicity, are used to determine which grain(s) may be a good opportunity for fortification in each country. When FFI calculates "adjusted estimates," we only include data from countries with a fortification opportunity.



Photo: Jessie Genoway/FFI



Photo: Jessie Genoway/FFI

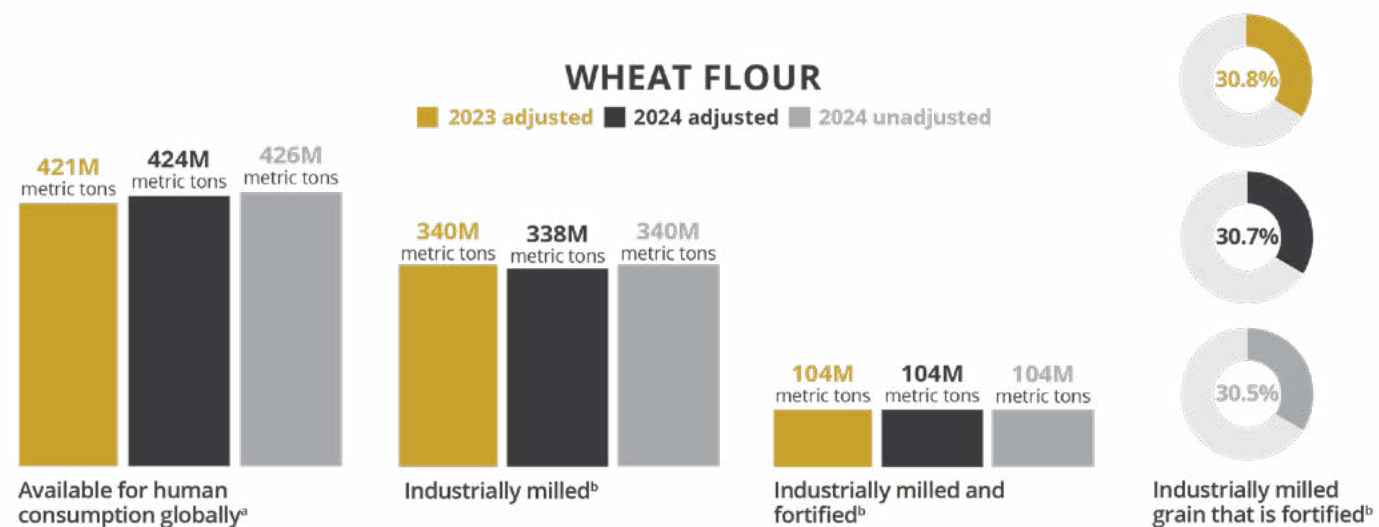


Photo: RTI

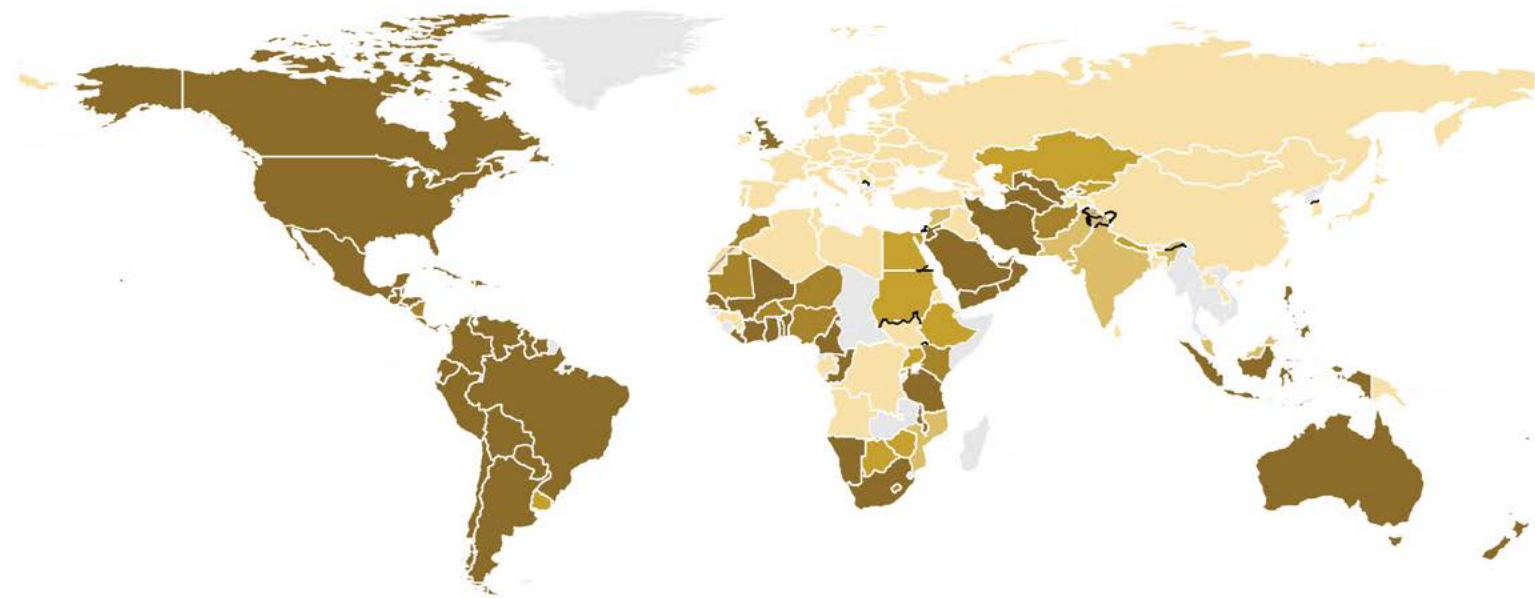
Wheat

FFI's calculations show that the amount of wheat flour globally available for human consumption increased by approximately 1%, while the proportion of wheat flour that is industrially milled remained static. However, there was an increase in the proportion of industrially milled wheat flour that is fortified (1.1%). Overall, the percentage of industrially milled wheat flour that is fortified increased from 30.5% to 31.6%. When only considering countries that FFI categorizes as good opportunities for fortification, the percentage of industrially milled wheat flour that is fortified also increased, from 30.7% to 31.9%.

This increase is partly attributable to the launch of Ethiopia's wheat flour fortification program. Additionally, the World Food Programme began supporting the production of fortified wheat flour through Egypt's government-subsidized bread program in 13 governorates in 2025. An FFI supply chain assessment in 2022 estimated that 59% of the country's flour supply is distributed through the subsidized bread program. Based on these two pieces of information, we estimate that approximately 28% of wheat flour is fortified in Egypt.



Percentage of industrially milled wheat that is fortified, adjusted for opportunity* - 2025



*See page 23 for an explanation of FFI's methodology to determine opportunity.

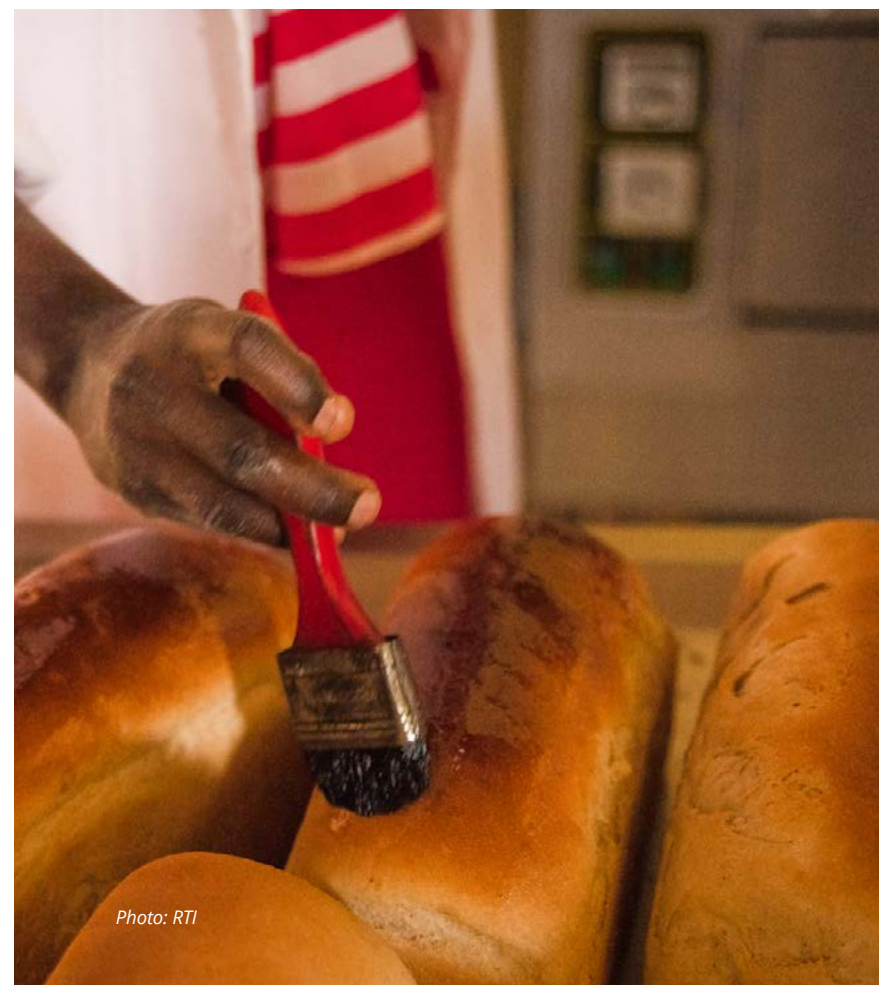
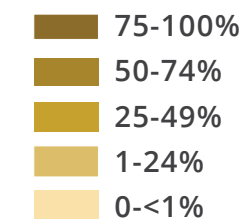


Photo: RTI

LEGEND



Not an opportunity for wheat flour fortification

^a FAO data with additional, openly available data sources. 2024 estimates: 2022 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2022 Data: <https://www.fao.org/faostat/en/#data/SCL> 2025 estimates: 2023 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2023 Data: <https://www.fao.org/faostat/en/#data/SCL>

^b FFI calculations.



Photo: Xaume Olleros/RTI

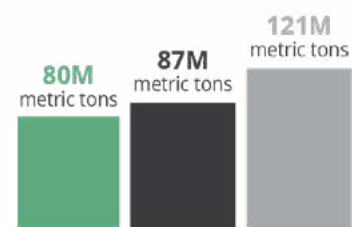
Maize

According to FAO data, the amount of maize available for human consumption increased by 5% from 2024 to 2025, with over 5 million additional metric tons in the global food supply. FFI estimates that the proportion of industrially milled maize is 4 million metric tons less than in 2024. However, the decrease is largely due to new information about the use of maize for human vs livestock consumption in Poland. While Poland is a major producer of maize (almost 9 million tons for this data year), only 10% of production is used for human consumption. Globally, the volume of

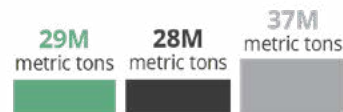
industrially processed and fortified maize flour increased by around 400,000 metric tons, but the reduced estimate of industrially processed maize flour means the amount of fortified maize flour increased from 27.3% to 31.7%. When focusing on countries that FFI considers a good opportunity for maize flour fortification, the supply of maize flour increased by 8%, but less maize flour was industrially processed (32.3% versus 36.5% last year). An additional 500,000 metric tons of maize flour were fortified, bringing the estimated share of industrially milled maize flour fortified to any level to 41.9%.

MAIZE FLOUR

■ 2024 adjusted ■ 2025 adjusted ■ 2025 unadjusted



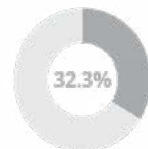
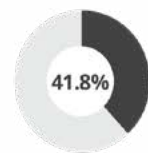
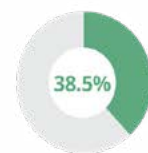
Available for human consumption globally^a



Industrially milled^b

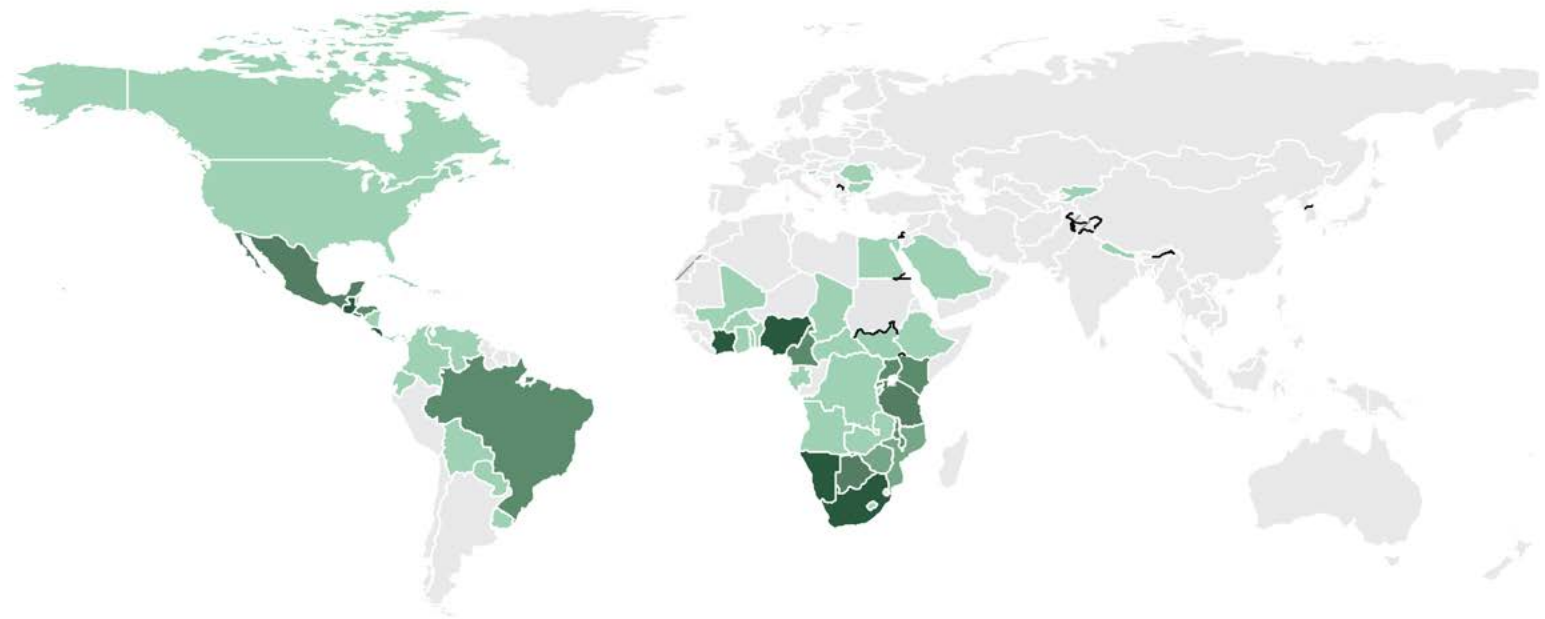


Industrially milled and fortified^b



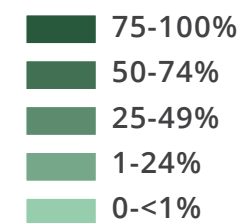
Industrially milled grain that is fortified^b

Percentage of industrially milled maize that is fortified, adjusted for opportunity* - 2025



*See page 23 for an explanation of FFI's methodology to determine opportunity.

LEGEND



■ Not an opportunity for maize flour fortification

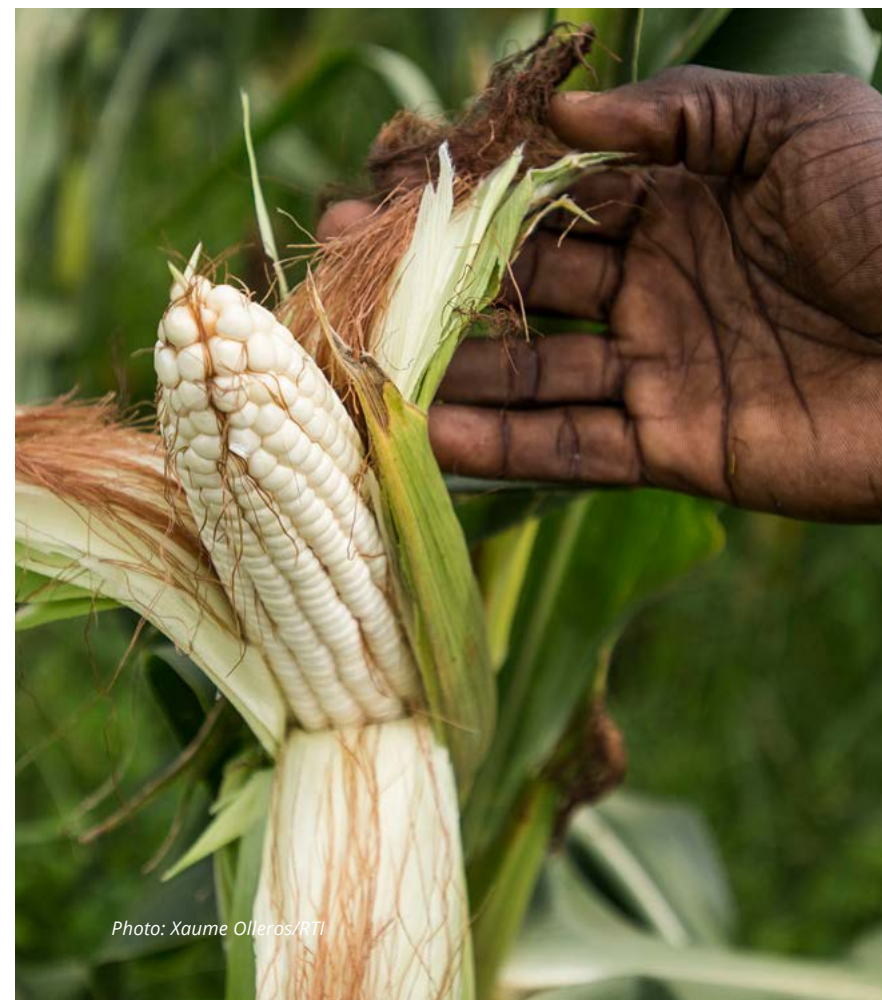


Photo: Xaume Olleros/RTI

^a FAO data with additional, openly available data sources. 2024 estimates: 2022 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2022 Data: <https://www.fao.org/faostat/en/#data/SCL> 2025 estimates: 2023 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2023 Data: <https://www.fao.org/faostat/en/#data/SCL>

^b FFI calculations.



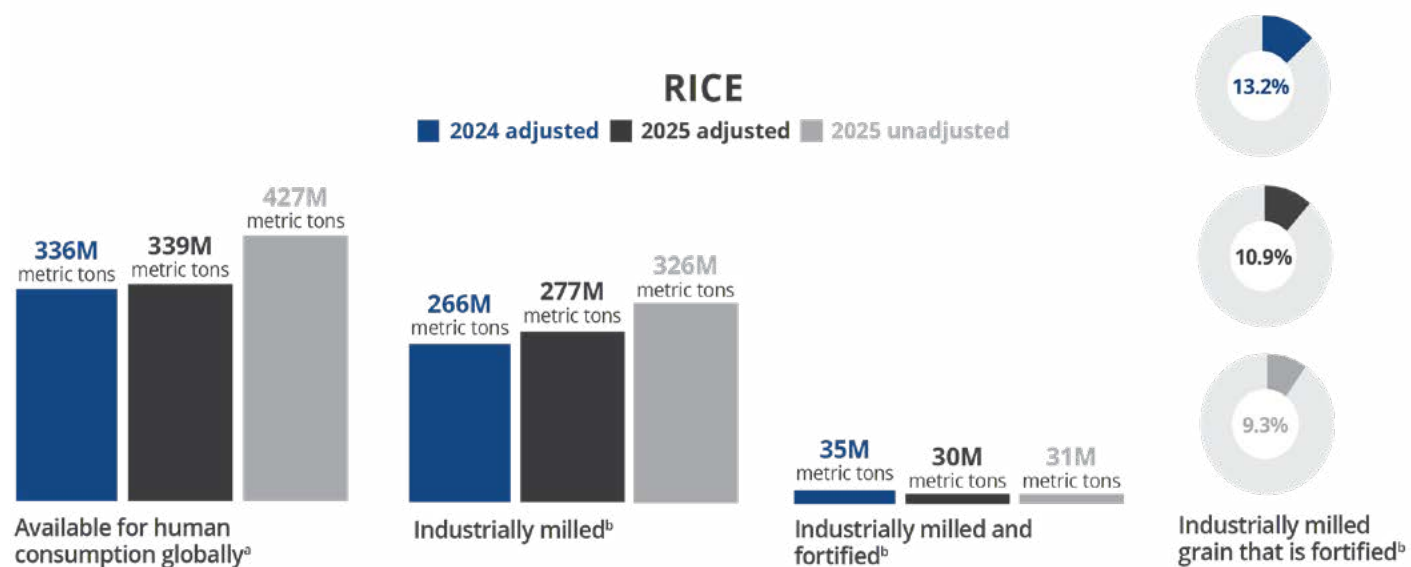
Photo: Tran Thi Hoa/World Bank



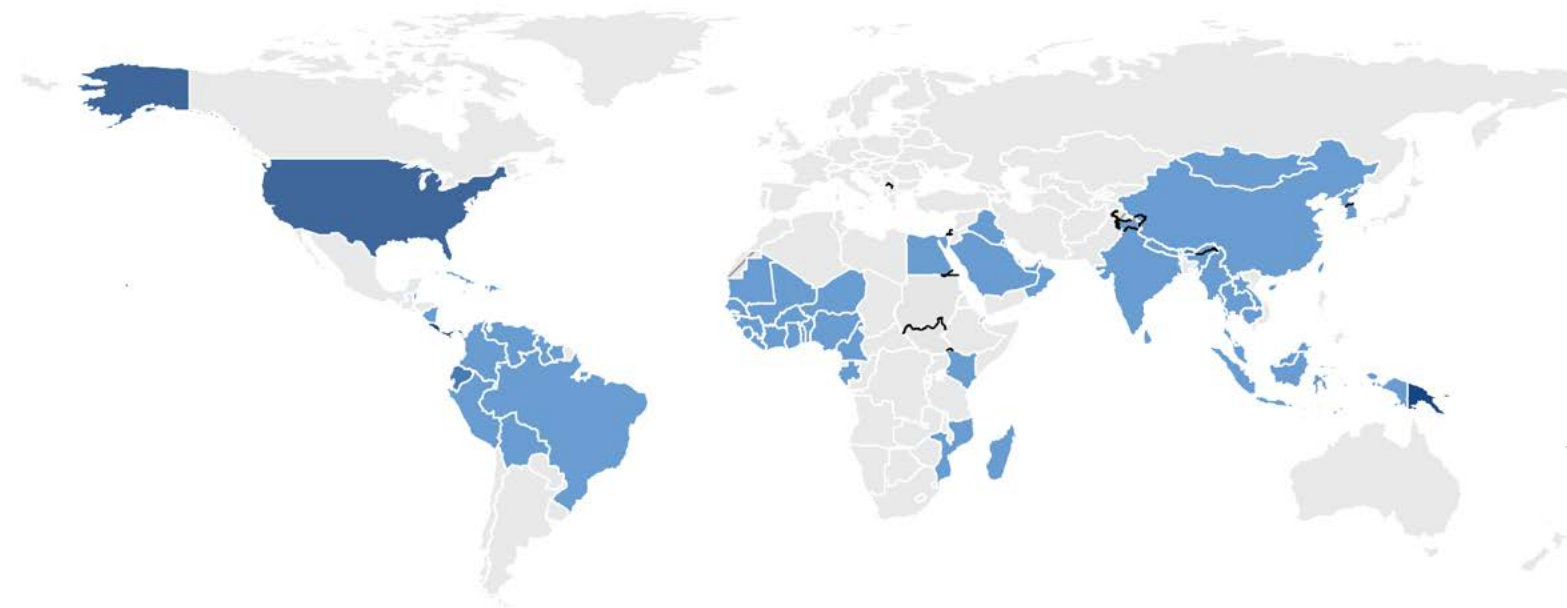
Rice

The volume of rice available for human consumption increased by 1% in 2025, and the volume of industrially processed rice increased by 6%. However, the volume of fortified rice decreased. This difference of about 4 million tons is due to a change in the amount of fortified

rice that India reported distributing through the state-operated social protection program in 2025. With this reduction and considering only countries that are good opportunities for rice fortification, we estimate that 10.9% of industrially milled rice is fortified.



Percentage of industrially milled rice that is fortified, adjusted for opportunity* - 2025

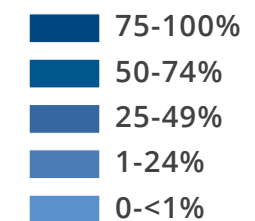


*See page 23 for an explanation of FFI's methodology to determine opportunity.



Photo: Xaume Olleros/RTI

LEGEND



Not an opportunity for rice fortification

^a FAO data with additional, openly available data sources. 2024 estimates: 2022 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2022 Data: <https://www.fao.org/faostat/en/#data/SCL> 2025 estimates: 2023 FAOSTAT, Supply Utilization Accounts, Food (element 5141) 2023 Data: <https://www.fao.org/faostat/en/#data/SCL>

^b FFI calculations.



Photo: Travelwayoflife/Flickr

Legislation Update

Globally, 86 countries have legislation to mandate fortification of at least one industrially milled cereal grain. Of these, 85 countries mandate the fortification of wheat flour alone or in combination with other grains. One country—Papua New Guinea—has a mandate only for rice fortification.

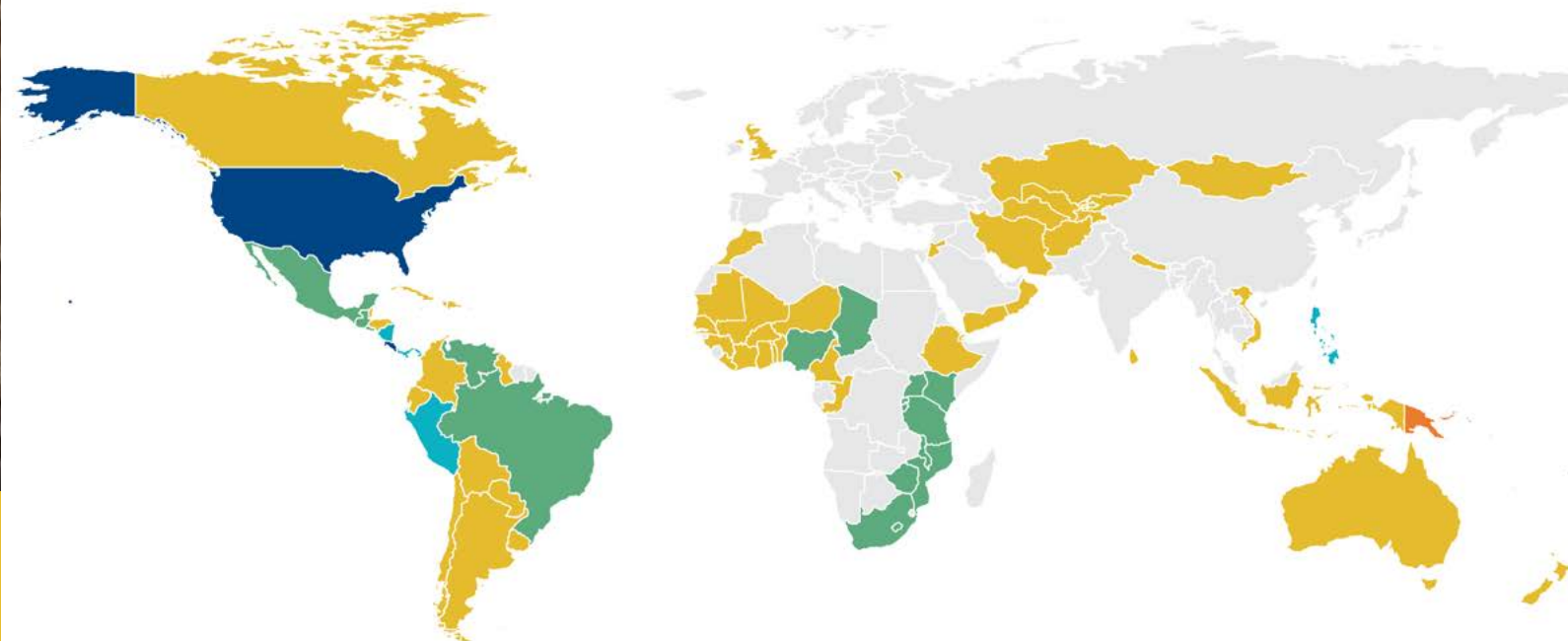
When FFI was founded in 2002, only 38 countries mandated the fortification of wheat flour, maize flour, or rice.

No additional country adopted mandatory cereal grain fortification legislation in 2025. However, after a review of fortification mandates, FFI and the Global Fortification Data Exchange (GFDx) determined that eight countries in the CARICOM region previously considered to have wheat flour fortification mandates do not mandate wheat flour fortification.

The countries affected include: Antigua and Barbuda, Bahamas, Barbados, Dominica, Jamaica, St. Kitts and Nevis, St. Vincent and the Grenadines, and Suriname.

FFI and GFDx previously used 1992 CARICOM fortification standards as justification for mandatory fortification across these Caribbean countries. However, regional CARICOM standards are not automatically mandatory; they must be adopted by the countries. These eight countries do not have mandatory wheat flour fortification as they a.) have not adopted the CARICOM standard and b.) do not have any legislation (law or regulations) that state that fortification is required.

Mandatory Cereal Grain Fortification Legislation, 2026



LEGEND

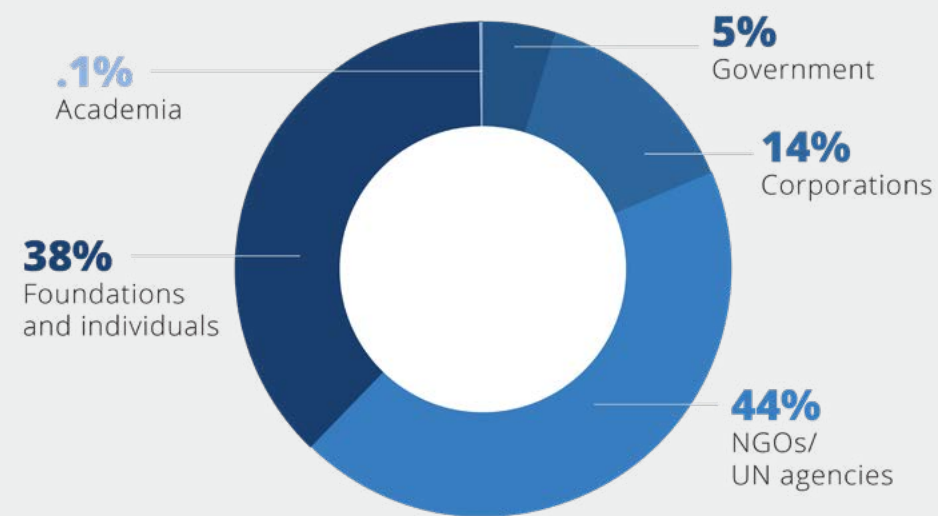
- **Wheat flour alone – 61 countries**
- **Rice alone – 1 country (Papua New Guinea)**
- **Wheat flour and maize flour – 17 countries**
- **Wheat flour and rice – 5 countries**
(Nicaragua, Panama, Peru, Philippines, Solomon Islands)
- **Wheat flour, maize flour, and rice – 2 countries**
(Costa Rica and the United States)
- **No mandatory fortification legislation or data not available**

Legislation has effect of mandating grain fortification with at least iron or folic acid.

Legislation status from the Food Fortification Initiative (www.FFINetwork.org) August 2026.

Gift Profile

We are grateful to the individuals and donors who support our work. Contributions for 2025 were US \$1.4 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 to FFI](#).



Executive Management Team

An Executive Management Team (EMT) representing global leaders in the public, private, and civic sectors provides FFI's strategic direction.

Markus Lotsch, EMT Chair
President, Europe, the Middle East, and Africa and Global Health and Wellness
Archer-Daniels-Midland Company

Troy Anderson (former member as of May 2026)
Vice President, Operations
Ardent Mills

Jeff Zyskowski (former member as of May 2026)
Vice President, Supply Chain
Ardent Mills

Reynaldo Martorell
Woodruff Professor of International Nutrition (Emeritus)
Senior Advisor, Global Health Institute
Emory University

Florencia Vasta
Program Lead, Large Scale Food Fortification
Global Alliance for Improved Nutrition

Melinda Farris
CEO
International Association of Operative Millers

Sylvia Roozen
Secretary General
International Federation for Spina Bifida and Hydrocephalus

Homero Martinez
Senior Technical Advisor
Nutrition International

Manpreet Chadha
Nutrition Specialist - Food Systems for Children
United Nations Children's Fund (UNICEF)

In addition to our EMT members, leaders from the CDC and WHO are EMT observers, including:

Jenny Williams

*Team Lead, Neural Tube Defects
Surveillance and Prevention Team,
Division of Reproductive Health -
National Center on Birth Defects and
Developmental Disabilities
Centers for Disease Control and
Prevention*

Juliawati Untoro

*Scientist, Multisectoral Action in Food
Systems
World Health Organization*



Photo: Carsten ten Brink



Photo: Jordi Vaque/FAO

FFI’s Unique Contributions

to Global Grain Fortification



Expertise

FFI’s in-house leadership and technical expertise enable us to apply a data-driven approach to program planning, implementation, and monitoring.



Rigor

FFI operates through a unique model, bringing together voices from the public, private, and civic sectors through our Executive Management Team and our technical assistance to make sustainable change.

FFI conducts supply chain analyses for any given grain to discover and act on opportunities to advance fortification.

FFI documents and publishes up to 196 countries’ annual potential and progress toward successful cereal grain fortification.



Focus

FFI is the only global group that focuses exclusively on large-scale fortification of the three most consumed grains: wheat flour, maize flour, and rice.

Inspired by the Good to Great model by Jim Collins

How We Work

FFI’s strategic approach to scaling grain fortification, based on two decades of experience conducting research and providing on-the-ground assistance, offers a replicable method to building and strengthening fortification programs.

FFI chooses countries, regions, states, and

provinces through rigorous research. We take a holistic, objective approach with the goal to help eliminate micronutrient deficiencies in every country where industrially milled cereal grain is commonly consumed. FFI does not have a predetermined set of countries it will support; instead, it relies on data to identify where the needs and opportunities are greatest.

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 including consumption and milling analyses, nutrition needs assessments, market analyses, political readiness assessments, systematic reviews, and partner interviews. Once an opportunity for fortification is determined, FFI uses a four-stage phased approach to help countries plan, implement, and monitor a fortification program that can generate and sustain large-scale impact.



Plan

PHASE 1: EXPLORE AND ENGAGE

- Engage private sector
- Engage birth defects groups, neurosurgeons, and consumer associations
- Identify key challenges and opportunities
- Identify fortification champion(s) within the government
- Determine what it will take to move forward

MILESTONE

Once the government expresses permission and willingness to move forward, FFI will move to the next phase of planning: map the context.

PHASE 2: MAP THE CONTEXT

- Conduct a thorough supply chain analysis
- Assess industry structure, including readiness and reach of mills
- Assess monitoring structure and needs
- Map the legislative process
- Assess budgetary needs (initial investment by sector and annual recurring costs) to ensure commitment and sustainability
- If necessary, conduct a cost-benefit analysis making the case for fortification’s impact on national health and economic indicators

MILESTONE

At this stage, FFI gives a formal presentation to government stakeholders to recommend effective staples and market channels based on diagnostic results. Once the government expresses permission and support for the plan, FFI will move to the next phase: implement - design and develop.



Implement

PHASE 3: DESIGN AND DEVELOP

- Draft recommended standards
- Identify miller, regulatory inspector, and laboratory training needs
- Support the premix procurement process
- Engage the legislative process
- Develop a communication and education strategy
- Integrate realistic fortification monitoring into an existing framework

MILESTONE

Clear budget and implementation plan.

- Train millers on quality assurance/quality control practices
- Train regulatory monitoring inspectors and lab staff; map agency responsibilities
- Facilitate the passage of legislation
- Develop a National Guideline for Fortification document and national logo, as necessary

MILESTONE

The fortification program is implemented and ready to scale.



Monitor

PHASE 4: MONITOR FOR COMPLIANCE AND IMPACT

- Support collection of monitoring data
- Ensure monitoring data is shared with relevant stakeholders
- Augment government monitoring partnerships with civic entities
- Ensure action is taken to improve program performance based on monitoring data

MILESTONE

Ensure program reaches intended population

- When applicable, partner with stakeholders to measure impact



Photo: Neil Palmer/CIAT

Why Fortify?

Nutrition can be a matter of life and death. More than two billion people globally suffer from vitamin and mineral deficiencies.¹

One in two preschool-aged children and two in three women of reproductive age worldwide suffer from at least one vitamin or mineral deficiency, increasing their vulnerability to infectious disease and compromising child growth and development.¹ Fortifying grains to prevent these micronutrient deficiencies can strengthen the health of individuals, populations, and countries' economies.

Micronutrient deficiencies affect an estimated:¹

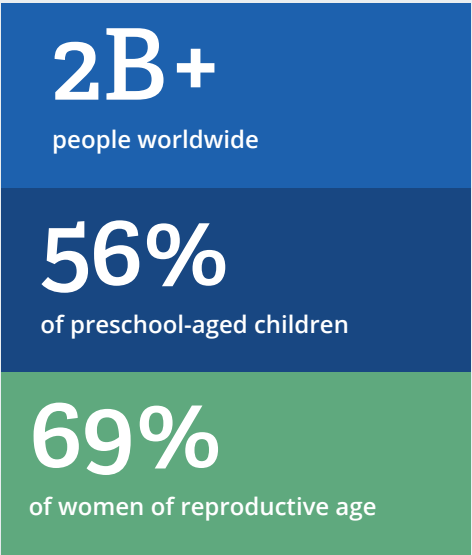


Photo: Khome Ollerios/RTI

Anemia is often caused by deficiencies of micronutrients including iron and zinc. Children, pregnant women, and women of reproductive age (15-49 years) who are unable to include enough micronutrients in their diet are at risk for anemia. Pregnant women with severe anemia are twice as likely to die during or shortly after pregnancy than non-anemic women.² Globally, nearly 250 million women of reproductive age are affected by iron deficiency anemia; if they stood head to toe, they could reach the moon and circle it.³

Iron deficiency in childhood stunts cognitive development, which hinders academic performance and future earnings potential as adults.⁴

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.⁵

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.⁶ 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.⁷ 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.⁷

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



A call to action

Research published using FFI data credited fortification with preventing 63,600 brain and spine birth defects globally in

2024 for an average of 174 healthier babies a day.⁸ Yet according to estimates, an additional 76% of birth defects of the brain and spine⁸ and 34% of anemia⁹ could still be prevented globally through adequate intake of iron and

folic acid. That’s why FFI’s mission to build high-impact, self-sustaining fortification programs is so important. **By improving nutrition, we can create a smarter, stronger, and healthier world.**



Photo: World Bank/Sarah Farhat

“We can create a smarter, stronger, healthier world.”



Photo: Yamanaka Tamaki

1	Stevens, G. A., et al. <u>Micronutrient deficiencies among preschool-aged children and women of reproductive age worldwide: a pooled analysis of individual-level data from population-representative surveys</u> . <i>The Lancet Global Health</i> . 2022.	5	Black, R., et al. <u>Maternal and child undernutrition and overweight in low-income and middle-income countries</u> . <i>The Lancet</i> . 2013.	8	Kancherla, V., et al. 2026. <u>A global update on the status of prevention of folic acid-preventable spina bifida and anencephaly in year 2024</u> . <i>Birth Defects Research</i> . 2026.
2	Daru, J., et al. <u>Risk of maternal mortality in women with severe anemia during pregnancy and postpartum: a multilevel analysis</u> . <i>The Lancet Global Health</i> . 2018.	6	Blencowe, H., et al. <u>Estimates of global and regional prevalence of neural tube defects for 2015: a systematic analysis</u> . <i>Annals of the New York Academy of Sciences</i> . 2018.	9	Keats, E., et al. <u>Improved micronutrient status and health outcomes in low- and middle-income countries following large-scale fortification: evidence from a systematic review and meta-analysis</u> . <i>American Journal of Clinical Nutrition</i> . 2019.
3	World Health Organization. <u>The global prevalence of anemia in 2011</u> . 2015.	7	Beckett, E., et al. <u>Reduced plasma homocysteine levels in elderly Australians following mandatory folic acid fortification: a comparison of</u>		<u>two cross-sectional cohorts</u> . <i>Journal of Nutrition and Intermediary Metabolism</i> . 2017.
4	Horton, S. and J. Ross. <u>The</u>		<u>economics of iron deficiency</u> . <i>Food Policy</i> . 2003.		

NAVIGATING
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THROUGH THE
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Food Fortification Initiative
Enhancing Grains for Healthier Lives



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