



**Food
Fortification
Initiative**

Enhancing Grains for Healthier Lives

Saving lives, one grain at a time: the opportunity for wheat flour fortification in Türkiye

Jessie Genoway, FFI Communications Director
IAOM Eurasia Conference, August 2023

What is food fortification?

Fortification adds vitamins and minerals during processing so that foods are more nutritious.

Vitamins and minerals are combined in a powdery premix to add to flour during the milling process.
Photo: CDC Foundation



A photograph of a woman in a patterned dress and headwrap handing a 10,000 CFA franc note to another woman in a market setting. In the background, there are several sacks of grain, some labeled '5 KG' and 'Gendarme Saint-Louis'. The scene is brightly lit, suggesting an outdoor or well-lit indoor market.

Large-scale food fortification is one of the most cost-effective development investments that exist.

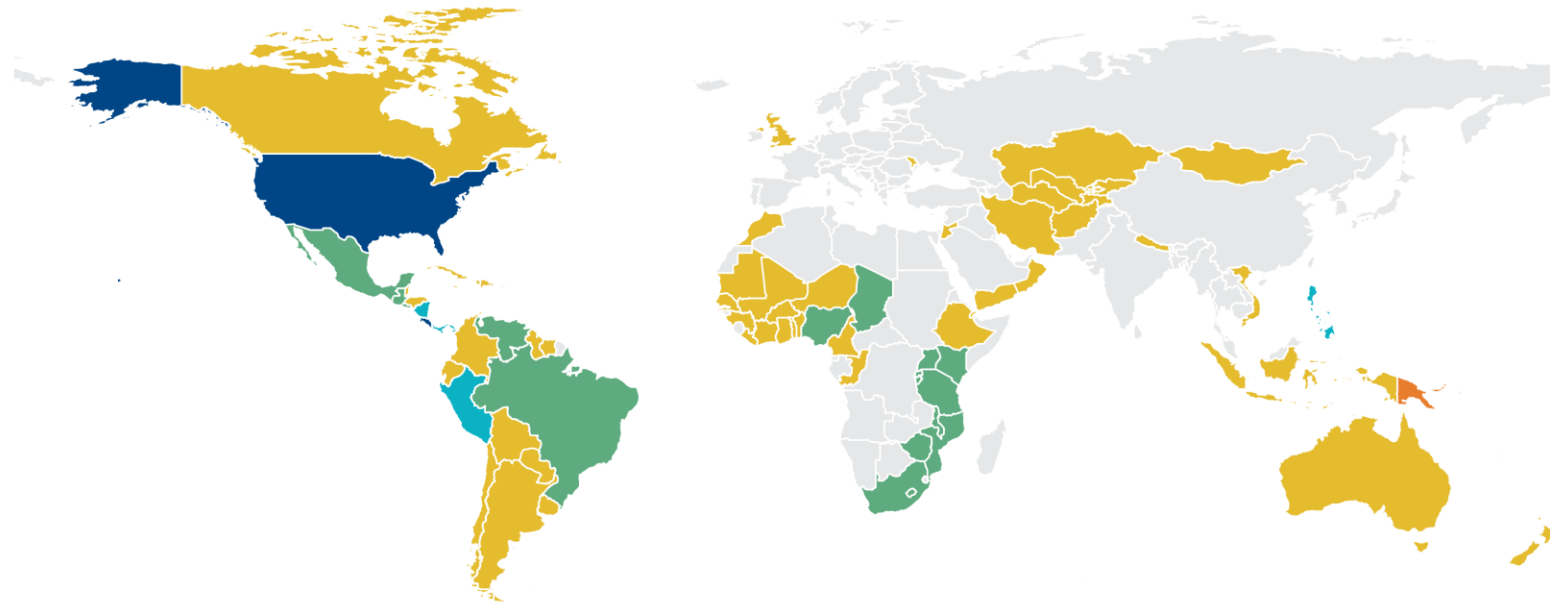
- Copenhagen Consensus^{1,2}




¹ Horton S., et al. Best practice paper food fortification with iron and iodine. Copenhagen Consensus Center. 2008.




² Hoddinott J., et al. Investments to reduce hunger and undernutrition. Copenhagen Consensus Center. 2012.

92 countries with legislation to fortify industrially milled flour and/or rice

Legislation in 91 countries mandates fortification of wheat flour alone or in combination with maize flour and/or rice. One country (Papua New Guinea) has legislation to only fortify rice.



	Wheat flour alone – 67 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) July 2022.

UNMET POTENTIAL

Most of the world's industrially milled grains are not yet fortified.

	WHEAT FLOUR million metric tons	MAIZE FLOUR million metric tons	RICE million metric tons
Available for human consumption	414	70	320
Industrially milled	338	25	126
Industrially milled and fortified	105	10	11
% industrially milled and fortified	31%	42%	9%

A woman wearing a red shawl with intricate patterns is sitting in a lush, green forest. She is looking down and slightly to the right. The background is filled with tall, thin trees and dense foliage. The text "About us" is overlaid in white, bold, sans-serif font in the center of the image. A thin white vertical line is positioned to the left of the text.

About us

1. Sole focus on cereal grains



Rice



Wheat flour



Maize flour

2. Sole focus on large-scale, industrial fortification

Industrial mill



Non-industrial mill



3. Network of private, public, and civic partnerships

FFI'S UNIQUE MODEL



PRIVATE SECTOR

Millers, equipment and flour-product companies, wheat traders, baking organizations and other affiliated businesses



CIVIC SECTOR

Disability groups, advocacy associations and other civic organizations



PUBLIC SECTOR

Agencies of the United Nations, government agencies and other national entities, non-governmental organizations and academic organizations

FFI around the world: 2022-23

HOW TO READ THE MAP

COUNTRY
million

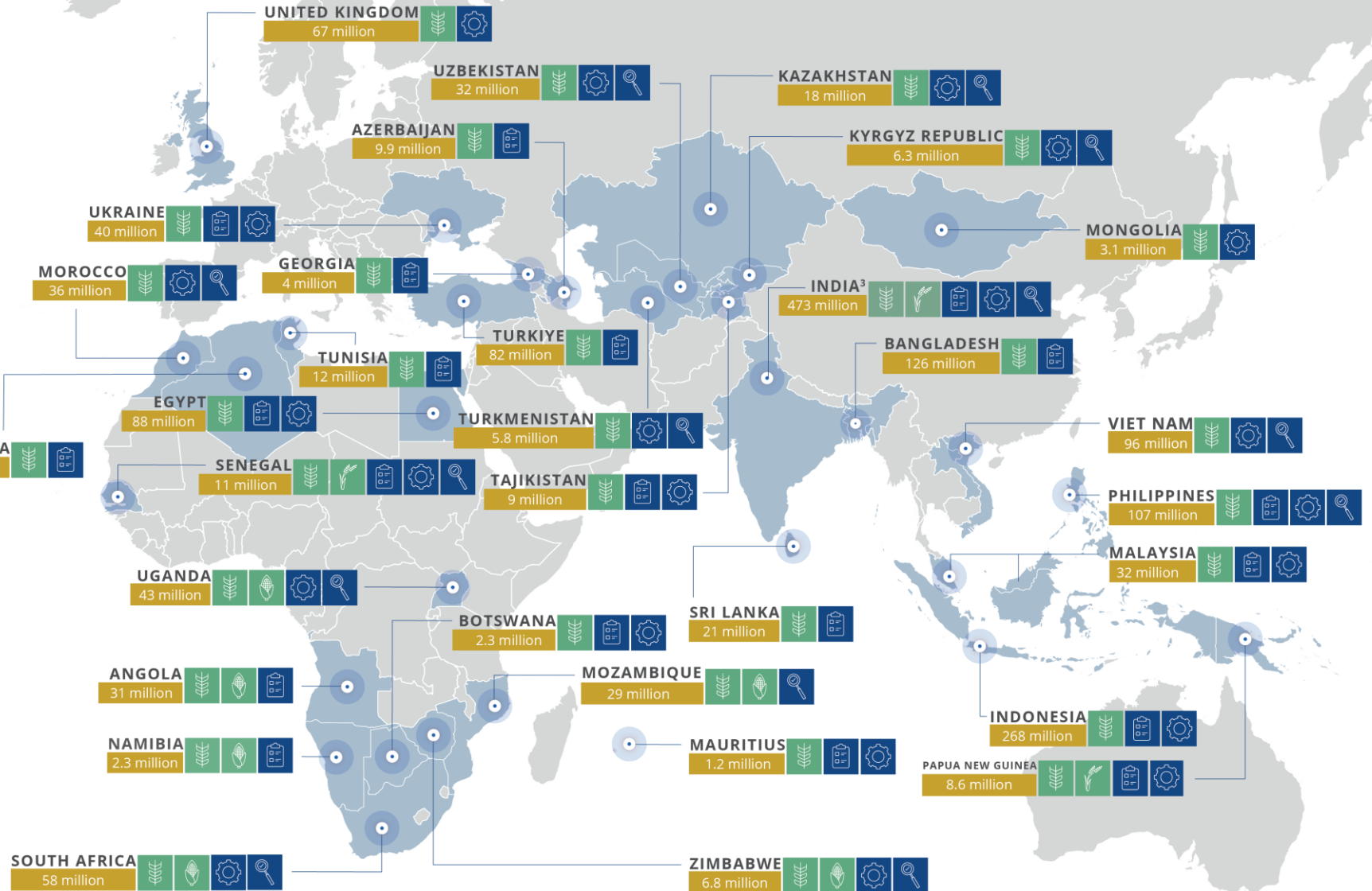
Potential Reach²
in millions of people

Industrially Milled Grain

- WHEAT
- MAIZE
- RICE

FFI in Action

- PLAN
- IMPLEMENT
- MONITOR



Our strategy works: Haryana, India example

	PHASE 1 (baseline)	PHASE 3 (end-line)		Reduction in prevalence after fortification project
Test parameters	Deficiency or insufficiency (%)	Deficiency or insufficiency (%)	P-value	
Anemia <12 g/dL	51.21% (46.37, 56.56)	41.24% (36.52, 46.57)	<0.001	20%
Severe anemia <8 g/dL	3.2%	2.2%	-	33%
Serum folate <7 nmol/L (deficiency)	8.89% (6.42, 12.32)	4.31% (2.67, 6.96)	0.009	50%
RBC folate <748 nmol/L (insufficiency)	79.46% (75.45, 83.68)	50.00% (45.16, 55.36)	<0.001	38%
RBC folate <305 nmol/L (deficiency)	8.11% (5.75, 11.43)	1.08% (0.41, 2.87)	<0.001	87%
Vitamin B12 ≤300 pg/mL (insufficiency)	81.67% (77.83, 85.70)	56.03% (51.24, 61.35)	<0.001	31%
Vitamin B12 <200 pg/mL (deficiency)	59.84% (55.05, 65.04)	23.45% (19.51, 28.18)	<0.001	64%

Source: Unpublished data. Food Fortification Initiative. Haryana Demonstration Project. 2022.

A close-up photograph of a person's hands cupped together, holding a large quantity of golden-brown wheat grains. More grains are falling from the top of the frame, creating a sense of abundance and movement. The background is a soft, out-of-focus grey, which makes the hands and the texture of the wheat stand out. The overall mood is one of care and sustenance.

THE OPPORTUNITY FOR

**Wheat flour
fortification in
Türkiye**

Vitamin and mineral deficiencies in Türkiye



Photo: Bulent Kilic/Getty Images



Spina bifida is a malformation of the baby's spine. It causes permanent disability.



Anencephaly is malformation of the baby's brain. It is always fatal.

30%

Preschool-aged children have anemia.¹

30%

Women of reproductive age are considered anemic.¹

~3500

Babies are born each year with an NTD that can be prevented with folic acid.²

₺149 billion

Türkiye loses over ₺149 billion (€5 billion) in GDP to hidden hunger annually.³

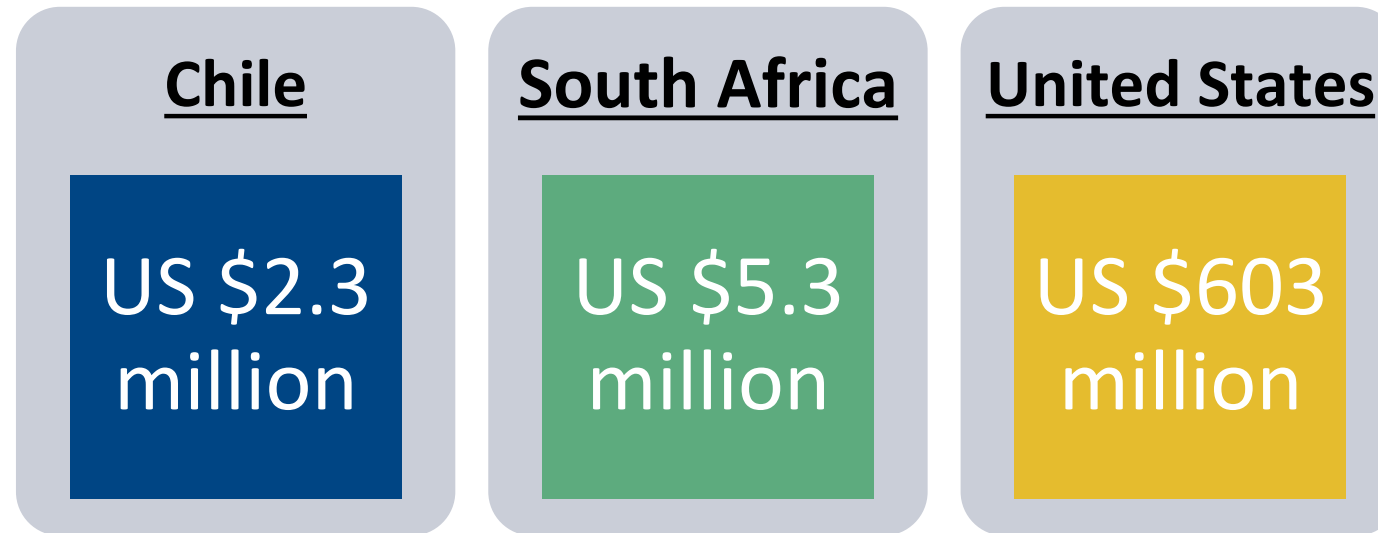
¹ World Health Organization. The global prevalence of anemia in 2011. Switzerland. 2015.

² Çaylan et al. BMC Pregnancy and Childbirth. 2022.

³ World Bank. World Development Indicators (Database). 2009.

Fortification is a cost-effective strategy to promote health and avert millions in healthcare expenditures

Annual net savings from adding folic acid to wheat flour



These are conservative estimates!

Türkiye is well positioned to scale up wheat flour fortification



Flickr photo

- Wheat flour is the most significant staple food, with consumption of >350 g/person/day
- World-class milling infrastructure with state-of-the-art mills
- Türkiye exports more than 3 million MTs of wheat flour to more than 100 countries each year, and many of the destination countries specify that imports are fortified
- Türkiye is the home of several multi-national milling equipment vendors

For more information:

- www.FFInetwork.org
- info@ffinetwork.org
- [@FFInetwork on Facebook](#) / [Twitter](#) / [LinkedIn](#) / [Instagram](#)



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