Fortification and Climate Change:
Building Resilience Through Nutrition

THE CHALLENGE

The world is in a climate crisis. Impacts and disruptions associated with climate change—including heightened temperatures, changing weather patterns, and rising levels of ambient carbon dioxide (CO_2) are threatening our food systems, the nutritional value and availability of our foods, and human health.

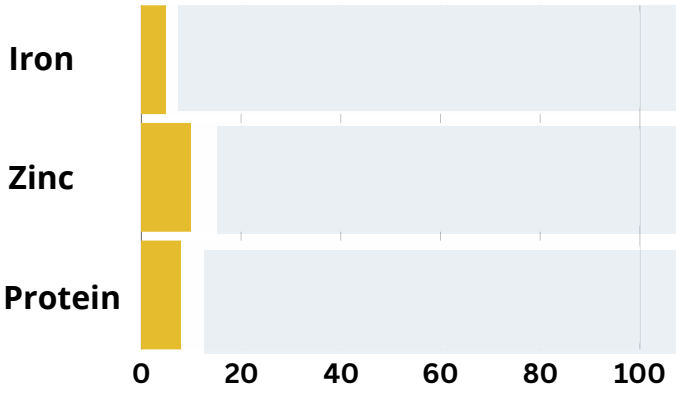
Changing weather patterns resulting from global warming affect crop yields.[1] Pests and diseases may become more prevalent, affecting the quality and quantity of produce.[1] As the temperature changes, pests will also enter climate regions where they were not previously found, presenting new agricultural challenges. Agricultural diversity, and therefore food and nutrient diversity, decreases when farmers are forced to focus on crops that will remain stable despite climate change.[1] Soil degradation as a result of climate change also impacts the quantity and quality of food produced.[1]

Furthermore, ambient CO_2 levels affect the nutritional content of crops, including two of the world's most commonly consumed foods: wheat and rice.[1,2]

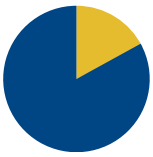
When wheat and rice are exposed to predicted CO_2 levels in 2050, scientists find a 5% decrease in iron, a 10% decrease in zinc, and an 8% decrease in protein.[2] Many of the world's most vulnerable people rely on wheat and rice for their daily diet, and this loss of nutrient value will lead to increased rates of disease, death, and developmental delays.[2,3,4]

These food systems consequences of climate change are exacerbated for populations that rely on a single crop for food, such as the quarter of the world's population whose diet relies on rice.[6]

Percentage of nutrient lost in wheat and rice due to increased CO_2 exposure



Projections of global micronutrient deficiencies in 2050 are dire.



1/5 of world population

1.4 billion women of childbearing age and children under 5 years who are currently at high risk of iron deficiency could have their dietary iron intakes further reduced.[5]

175 million people

1.9% of the global population could become deficient in zinc.[5] Staple foods such as wheat flour and rice can be fortified with micronutrients including zinc, B vitamins, iron, and more.

Photo: Neil Palmer/CIAT

FORTIFICATION AS A STRATEGY TO BUILD RESILIENCE

Large-scale food fortification, or the process of adding essential micronutrients to food that people eat every day, is one solution to micronutrients loss as a result of climate change. The carbon footprint of fortification is 100-1000 times smaller than the footprint of producing staple foods.[7] Fortification is a proven, self-sustaining, cost-effective way to prevent micronutrient deficiencies, save lives, and build a more climate-resilient future without adding an undue burden on the environment.

ABOUT FFI

The Food Fortification Initiative (FFI) champions effective grain fortification so people have the nutrition they need to be smarter, stronger, and healthier. To do this, FFI helps country leaders plan, implement, and monitor sustainable, country-led fortification programs. The only global group that focuses exclusively on the world's most commonly consumed grains--industrially milled wheat flour, maize flour, and rice--FFI's data-driven approach effectuates large-scale change by engaging public, private, and civic stakeholders. Established in 2002, FFI is based at Emory University's Rollins School of Public Health.

RESOURCES

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6. Chunwu Zhu et al., Carbon dioxide levels this century will alter the protein, micronutrients, and vitamin content of rice grains with potential health consequences for the poorest rice-dependent countries, Sci. Adv. 4, eaaq1012 (2018).
7. Garrett, Greg S. et. al., Can Food Fortification Help Tackle Climate Change? (2019).

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Food Fortification Initiative

Enhancing Grains for Healthier Lives