Highlight 2: Building the Evidence Base

2018 saw the publication of two key studies establishing the efficacy of iron and zinc biofortification to improve health and nutrition.

First, a study published in the *Journal of Nutrition* showed that biofortified high-iron pearl millet can stem the negative ripple effects of iron deficiency by significantly improving nutrition and cognitive performance. Nearly half of all Indian women and children under five are anemic; iron deficiency is a major cause.

When Indian adolescents consumed biofortified pearl millet twice daily as *bhakri* (a local flatbread) or *shev* (a savory snack) for six months, researchers found the students had significantly improved learning and mental abilities related to perception, attention, and memory.

This is the second landmark study to demonstrate such functional improvements, which could profoundly impact women’s and teens’ ability to succeed at school and work.

“If we can improve adolescents’ performance in school by improving their iron status, we may also have longer-term impacts in terms of their ability to secure a good job, or be admitted to a college program,” said Samuel Scott, research fellow at the International Food Policy Research Institute and lead author of the publication.

Second, when vulnerable young children in India ate foods prepared with zinc-enriched wheat, they spent significantly fewer days sick with pneumonia and vomiting, according to a study published in *Nutrition Journal*. Diets in India commonly lack sufficient zinc, and consequently nearly 40 percent of children under age five are physically stunted and markedly vulnerable to common infections. If stunting is not corrected before the second year of life, it may become irreversible and gravely impair individual and societal development.

“This is the first large trial evaluating biofortified zinc wheat to increase zinc in diets and improve nutritional status and related health outcomes in young children and their mothers,” said lead researcher Dr. Sunil Sazawal, director of the Center for Public Health Kinetics in New Delhi and senior associate of Global Disease Epidemiology and Control at Johns Hopkins University.

In the study, children who ate the high-zinc wheat—as *chapatti* or *puri* flatbread, or as porridge—experienced 17 percent fewer days with pneumonia and 39 percent fewer days vomiting, compared to children who consumed a lower zinc variety typical of conventional wheat. Mothers who ate high-zinc wheat spent 9 percent fewer days with fever.

A review of *ex ante models* on cost-effectiveness (Lividini et al.)—as measured in terms of cost per DALY (disability-adjusted life year) saved—found biofortification to be a highly cost-effective intervention, by the World Bank’s standard of cost-effectiveness.

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