

# SMARTER FUTURES

## A BRIEF OVERVIEW

*Smarter Futures is a unique public-private-civic partnership, focused specifically on Africa, that provides technical support to grain millers, governments, vitamin and mineral suppliers, international organizations, and academic institutions to make fortification of wheat flour, maize flour, and rice a reality.*

As of 2020, Smarter Futures partners include the Food Fortification Initiative (FFI) as the main implementing partner, the International Federation of Spina Bifida and Hydrocephalus (IF), Nouryon (formerly AkzoNobel), Helen Keller International (HKI), the World Food Program (WFP), Muhlenchemie, Buhler, Nutrition International (NI), the Global Alliance for Improved Nutrition (GAIN), and the Dutch Ministry of Foreign Affairs.

Smarter Futures does not itself invest large programme resources but supports and strengthens the efforts of its network partners. Current Smarter Futures funding from the Dutch Government and from GAIN runs for 2018-2021.



Photo: Rod Waddington

## OUR GOALS AND UNIQUE CONTRIBUTION

Smarter Futures has two main goals:

1. Improve the health of all, particularly women of childbearing age, adolescents girls, and children across Africa through the fortification of wheat flour, maize flour, and rice with essential vitamins and minerals, notably iron and folic acid, through the provision of technical support, and
2. Work with partner agencies in similar countries, regions, and across similar domains while simultaneously ensuring complementarity of approaches.

Smarter Futures is unique in that it:

1. Brings together key stakeholders (i.e. government officials, millers, and civil society actors) involved in grain fortification and stimulates exchanges at the regional level, providing opportunities to share experiences and motivate countries to follow the examples and progress achieved by other countries.
2. Places a particular focus on the involvement and inclusion of civil society actors such as disability groups, consumer associations, physicians and neurosurgeons, and parent associations related to spina bifida and hydrocephalus through the involvement and actions of International Federation of Spina Bifida and Hydrocephalus (IF).

As project holder, IF is driven by its mission to decrease the birth prevalence of spina bifida and hydrocephalus through primary prevention, especially fortification of folic acid, to improve the quality of life for those living with these disabilities. IF represents Members Associations in 14 countries in Africa, notably Algeria, Egypt, Ethiopia, Ghana, Kenya, Malawi, Morocco, Nigeria, South Africa, Sudan, Tanzania, Uganda, Zambia and Zimbabwe. These associations, healthcare professionals, and other interested partners provide advocacy, primary and secondary prevention activities in the countries where they are based.

## HOW WE WORK

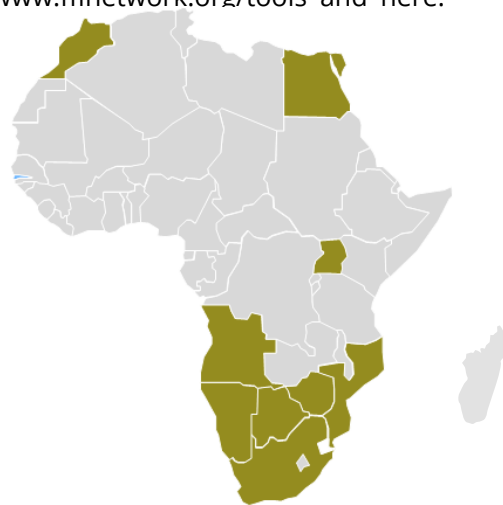
Smarter Futures provides training to millers, regulatory inspectors, program managers, and regional and international agencies on quality assurance and quality control, monitoring and surveillance, cost-benefit analyses, and fortification advocacy. This training is provided through three unique mechanisms:

*Regional workshops.* In recognition of the fact that local teams of experts in fortification are needed to support their countries' efforts, Smarter Futures provides regional workshops, some of which are Training of Trainers workshops, on topics demonstrated to be key areas of need in the region. For example, in 2020, Smarter Futures held a fortification monitoring workshop to help countries work through pressing challenges related to the collection of regulatory monitoring information and the quality production of fortified foods.

*Tools and resources.* Smarter Futures develops tools and publications to assist country teams in their work. Current tools and resources can be found here: <https://www.ffinetwork.org/tools> and here: <https://www.smarterfutures.net/resources>

*Direct technical assistance.* Smarter Futures provides direct support to 10 countries across the continent in collaboration with other development partners. These countries include:

- Angola
- Botswana
- Egypt
- Mauritius
- Morocco
- Mozambique
- Namibia
- South Africa
- Uganda
- Zimbabwe



### Areas of work



#### ADVOCACY

The advocacy by the IF parent associations and associated experts such as neurosurgeons has been shown to be particularly effective with millers, who often do not know why they should fortify. Advocacy is also provided to Ministers of Finance and Economic Affairs on the cost and the benefit of fortification to ensure their willingness to invest and reduce taxes on imports of premix.



#### STRATEGIC DEVELOPMENT

Developing and expanding strategies for grain fortification using the African Maize Fortification Strategy and the Rice Fortification Feasibility study for Africa completed in 2016.



#### CAPACITY BUILDING

Building capacity for quality assurance and quality control (QA/QC) and developing and disseminating suitable tools for effective implementation and monitoring.



#### TECHNICAL ASSISTANCE

Providing technical assistance to address pressing roadblocks in implementation at the country level.

## WHY WE WORK

The fortification of food with vitamins and minerals is widely recognized as a cost-effective and sustainable strategy to improve the nutritional health status of populations [1-3] and is a unique health intervention in that it leverages the expertise and delivery platform of the private food sector relieving often overburdened healthcare systems. As a result, fortification has the potential to reach very large portions of the population and is an important complement to other nutrition-specific and nutrition-sensitive interventions. There is strong evidence that food fortification has led to significant positive impacts on nutritional status as cited by numerous studies [4]. A recent systematic review and meta-analysis of large-scale food fortification programs found that these programs, when implemented population-wide, were associated with a 34% reduction in anemia from improved iron stores, a 74% reduction in the odds of goiter from improved iodine intake, and a 41% reduction in the odds of NTDs from improved folic acid intake [5]. A specific focus will be given to the implications of folic acid fortification and the prevention of neural tube defects (NTDs) below.

### ROLE OF FOLIC ACID IN THE PREVENTION OF NTDs

Folic acid is essential for the proper closing of the neural tube of a fetus. The neural tube closes within 28 days after conception, which is usually before a woman knows she is pregnant. Failure to close properly can result in an NTD such as spina bifida, which can lead to permanent disability, and anencephaly, which always causes death. In 1991, a study done in the United Kingdom showed that 400 micrograms of folic acid taken daily by women from 8 weeks before conception till 12 weeks into the pregnancy can help reduce the risk of NTDs in their offspring by up to 70%.

Unfortunately, it is very difficult for a woman to eat enough natural food folate to prevent neural tube defects. She would need to eat one of the following servings of food--4 cups raw spinach, 2 cups cooked black beans, 3 slices of beef liver, 4.5 cups cooked broccoli, or 44 raw tomatoes--every day to get sufficient folate from food to protect her fetus from an NTD.

Two ways have proven effective in providing the required quantity of folic acid needed to prevent NTDs: 1) through the provision of folic acid tablets or 2) through fortification of cereal grain with folic acid. Encouraging individuals to take daily supplements has limitations since it requires behavior change. Additionally, supplements are not easily available in most countries in Africa, and many pregnancies are unplanned. Also, while pregnant women all over the world are given iron and folic acid tablets during pregnancy, mostly in the third trimester, it is too late for preventing NTDs.



Photo: Benedicte Kurzen/UNICEF

1. Hoddinott J, Rosegrant M, Torero M. Hunger and malnutrition. In: Lomborg B, editor. Global problems, smart solutions: costs and benefits. New York: Cambridge University Press and Copenhagen Consensus Center; 2013. p. 332–367.
2. Horton S. The economics of food fortification. J Nutr. 2006; 136(4):1068–1071. Medline
3. Baltussen R, Knai C, Sharan M. Iron fortification and iron supplementation are cost-effective interventions to reduce iron deficiency in four subregions of the world. J Nutr. 2004;134(10): 2678–2684. Medline
4. Beal, T.; Massiot, E.; Arsenault, J.E.; Smith, M.R.; Hijmans, R.J. Global trends in dietary micronutrient supplies and estimated prevalence of inadequate intakes. PloS one 2017, 12, e0175554, doi:10.1371/journal.pone.0175554.
5. Keats, E.C.; Neufeld, L.M.; Garrett, G.S.; Mbuya, M.N.N.; Bhutta, Z.A. Improved micronutrient status and health outcomes in low- and middle-income countries following large-scale fortification: evidence from a systematic review and meta-analysis. The American journal of clinical nutrition 2019, 10.1093/ajcn/nqz023, doi:10.1093/ajcn/nqz023

Fortifying wheat and maize flour as well as rice, which are important staples in Africa, with iron, folic acid, and other vitamins and minerals provides adolescent girls and women with these important micronutrients well before pregnancy occurs. Fortified grain has proven [6, 7] to be the only viable way to provide these nutrients to adolescent girls and women in Africa in a sustainable manner.

In most countries, cereals are staple foods than are consumed daily. They are often the main energy source especially where poverty and economic crisis impact the nutrition security of the consumer – a situation exacerbated by the Covid-19 pandemic. As people eliminate higher priced items such as proteins, fruits, and vegetables from their diet to stretch their food budget, they can still get essential vitamins and minerals if their staple foods are fortified according to internationally agreed standards.

The cereal processing industry in much of Africa is well established with large-scale sophisticated operations, especially in the case of wheat flour.

## **FLOUR FORTIFICATION OFFERS A HIGH BENEFIT FOR COST**

### **FOLIC ACID**

Fortification of maize and wheat flour is possible in most countries at a cost of only around 8-10 cents per person per year. Three countries recently compared the costs of adding folic acid to flour with the costs of treating people with spina bifida [8-10]. Each study showed significant annual net savings in healthcare expenses when spina bifida is prevented. Note these savings do not take into account savings resulting from the provision of *other* vitamins and minerals such as iron, zinc, and vitamin B12 in the fortified flour.

In Chile, where only the cost of surgical repair and rehabilitation costs through age 22 years were included, the annual net savings were 2.3 million USD. South Africa study calculated annual net savings of 5.3 million USD while the US estimate is highest at 603 million US dollars partly because it estimates lifetime costs, and it includes the value of the time required for parents to care for children with spina bifida.

Another way to look at these numbers is to compare the cost of fortification with the savings or the cost-benefit analysis. For every dollar spent on mandatory folic acid fortification, the healthcare savings were 12 times that investment in Chile, 30 times the investment in South Africa, and 48 times the investment in the US. Also iron and zinc fortification have a high benefit for cost.

### **IRON**

Lack of iron in the diet contributes to iron deficiency anemia. Both of these deficiencies cause lower productivity in adults in the current workforce particularly in the manual and heavy manual labour sectors. In addition, it causes lower future productivity in children (as adults). Recent studies have shown the current losses in productivity in African countries ranged from 2.5% to 5.0% of GDP. In African countries the cost benefit analysis of maize and wheat flour fortification has shown that \$1 invested can return \$7.00 to \$14.00 to the national economy.

### **ZINC**

Lack of zinc in the diet results in lower resistance to infections in both adults and children. In a pilot study, the cost benefit of including zinc in the fortification programme estimates that \$1 invested can return \$4.00 to \$5.00 to the national economy. (If iron and zinc are included in the fortification programme the cumulative benefit of \$1.00 invested is \$11.00 to \$19.00.)

6. Anaemia prevalence may be reduced among countries that fortify flour, Jonathan S. Barkley, Kathleen S. Wheeler and Helena Pachon

7. Folate, and Vitamin B-12 Status Increased among Women and Children in Yaoundé and Douala, Cameroon, 1 Year after Introducing Fortified Wheat Flour, Reina Engle-Stone, Martin Nankap, Alex O Ndjebayi, Lindsay H Allen, Setareh Shahab-Ferdows, Daniela Hampel, David W Killilea, Marie-Madeleine Gimou, Lisa A Houghton, Avital Friedman, Ann Tarini, Rosemary A Stamm, and Kenneth H Brown, <http://jn.nutrition.org/content/early/2017/06/07/jn.116.245076> (accessed 3 July 2017)

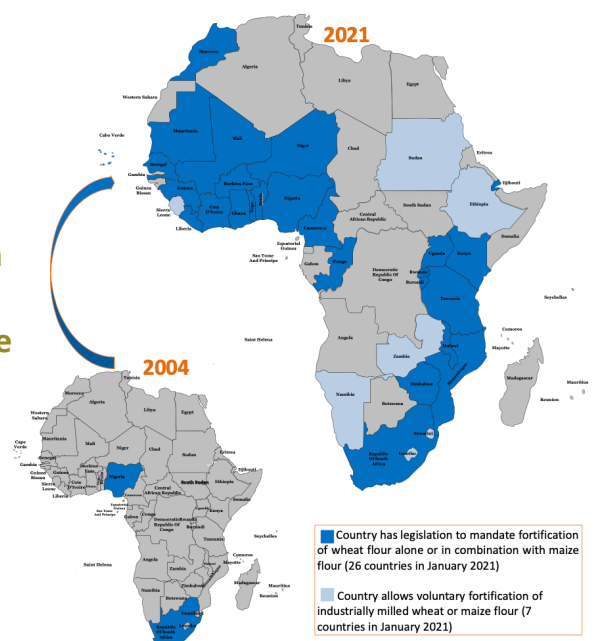
8. Economic Consequences of Iron Deficiency: S. Horton and J. Ross





### Flour Fortification in Africa: 17 Years of Progress

**Fortifying wheat and maize flour as well as rice, which are important staples in Africa, with iron, folic acid and other vitamins and minerals provides adolescent girls and women with these essentially important micronutrients well before pregnancy occurs.**



### AFRICA HAS MADE GREAT STRIDES IN FLOUR FORTIFICATION

Currently, 26 countries in Africa have mandatory cereal fortification while another 7 are fortifying their flour voluntarily [11].

Over the 10 years of Smarter Future's existence, 41 countries have participated in its meetings, workshops, trainings and other events, many more than once. Of those who ever participated only 5 countries have not yet started planning a national cereal fortification programme.

8. Llanos, A., Hertrampf, E., Cortes, F., Pardo, A., Grosse, S. D., & Uauy, R. (2007). Cost-effectiveness of a folic acid fortification program in Chile. *Health Policy*, 83(2), 295-303.

9. Sayed, A. R., Bourne, D., Pattinson, R., Nixon, J., & Henderson, B. (2008). Decline in the prevalence of neural tube defects following folic acid fortification and its cost-benefit in South Africa. *Birth Defects Research Part A: Clinical and Molecular Teratology*, 82(4), 211-216.

10. Grosse, S. D., Berry, R. J., Tilford, J. M., Kucik, J. E., & Waitzman, N. J. (2016). Retrospective assessment of cost savings from prevention: folic acid fortification and spina bifida in the US. *American journal of preventive medicine*, 50(5), S74-S80.

11. [www.FFInetwork.org/Africa](http://www.FFInetwork.org/Africa)



Nouryon



Photo: Julien Harneis