NUTRITION INTERNATIONAL

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POLICY BRIEF

Large-scale mandatory food fortification urgently needed to prevent high burden of neural tube defects in Ethiopia

INTRODUCTION

Ethiopia is one of the countries with the greatest burden of micronutrient deficiencies. The levels of stunting, underweight and wasting are still unacceptably high, and result in a wide range of effects on populations in vulnerable situations and future generations. Malnutrition in Ethiopia is a public health problem and the Global Nutrition Report 2018 classified Ethiopia as experiencing two forms of malnutrition: anaemia and stunting.

WHY FOCUS ON NUTRITION?

Malnutrition contributes to increased morbidity and mortality, poor learning outcomes and decreased productivity at work, and impacts the country's economic development. Ethiopia faces a particularly high level of folate deficiency and insufficiency among women, which contributes to high rates of anaemia and can result in neural tube defects (NTDs) and neonatal mortality. The cost of undernutrition on education, productivity and health is estimated to be 16.5% of Ethiopia's Gross Domestic Product.

Cognizant to this, the Government of Ethiopia has endorsed and implemented several high-impact nutrition interventions to improve the nutritional status of the population, especially people living in vulnerable situations. However, mandatory fortification of cereals and oil is yet to be endorsed. Fortifying commonly eaten grains such as wheat, maize flour and rice is among the most high-impact and low-cost interventions to prevent disease, strengthen immune systems and nurture a healthy and productive society. Fortifying grains with iron and folic acid is an effective way to prevent anaemia and NTDs in a population. In Ethiopia, given the high prevalence of NTDs, food and grain fortification are an easy and inexpensive solution. Food fortification will help Ethiopia deliver on the Sustainable Development Goals (SDGs), particularly SDG 3.

Nutrition International leads and supports grain fortification efforts in low- and middle-income countries through several programs.

FOLATE AND NEURAL TUBE DEFECTS

NTDs are severe birth defects resulting from the developmental malformation of the central nervous system. The most common NTD cases are anencephaly and spina bifida, which typically occur due to loss of integrity of the brain and spinal cord tissues, resulting in early and premature death respectively. Folate deficiency and insufficiency and other multifarious factors, including genetics and environment, are involved in the development of NTDs.

Folate plays a key role in the closure of the neural tube (tissues and bone surrounding the spine and brain). When folate concentration is below the optimal level recommended during pregnancy in the first 28 days, the neural tube is at risk of not closing, resulting in exposure or malformation of the spinal cord or brain.

FACTS ABOUT THE BURDEN OF NEURAL TUBE DEFECTS IN ETHIOPIA

Ethiopia does not have a national surveillance system of congenital anomalies, and only ~40% of births take place in health institutions, so it is not possible to have a comprehensive picture of the prevalence of NTDs in the country. However, a recent comprehensive systematic review of available cross-sectional, cohort, and case-control studies identified a pooled estimate prevalence of NTDs among children below 17 years of age of 6.32 per 1,000 children, with the highest relative weight contributed by spina bifida (4.109 cases per 1,000 children) followed by anencephaly (1.89 cases per 1,000 children). It is relevant to highlight that ~50% of all spina bifida cases result in stillbirth, while all cases of anencephaly are incompatible with extrauterine life.

On average, 1.86 per 1,000 live births are affected by NTDs around the world. However, there is wide variation in NTD incidence globally, and this burden is disproportionately high in low- and middle-income countries in Asia and Africa. In developed countries such as in the United States, China and Canada, it has been reported that after folic acid fortification and supplementation the non-folic acid preventable NTDs rate is 0.5–1.0 per 1,000 live births.

The most recent hospital-based studies coming from reference hospitals in Tigray and Addis Ababa show very high incidence rates of neural tube defects in Ethiopia. The overall occurrence of NTDs was 13.1 and 12.6 per 1,000 births in Tigray and Addis Ababa, respectively. The rate is **10 times higher** than reported numbers from eight World Health Organization (WHO) member nations in Africa (1.0 to 2.0 per 1,000 live births), and 26 times what it should be if the folate status in the population was sufficient to provide the maximum level of protection against this condition. The widespread (68% to 34%) and very high prevalence of folate deficiency among women in Ethiopia, as documented in two countrywide surveys conducted within a 10-year interval, could be the reason for the high burden of NTDs. Nearly **half of Ethiopian women are at risk of poor birth outcomes**. This means that thousands of babies die every year due to a condition that is easily prevented. Implementing nutrition interventions to reach all women with adequate folic acid is the most cost-effective and efficient way to prevent folate-deficit NTDs.

PREVENTION OF NEURAL TUBE DEFECTS THROUGH LARGE-SCALE MANDATORY FOOD FORTIFICATION

Food fortification is one of the highest-impact interventions to reduce the high burden of micronutrient deficiencies. One of the most effective and efficient ways to increase folate status in women is through large-scale mandatory food fortification. The WHO recommends women ingest **400 micrograms of folic acid** daily from fortified foods or supplements, in addition to folate already provided by their regular diet, throughout their reproductive age but at minimum for at least three months prior to their pregnancy.

WHAT IS FOOD FORTIFICATION?

Food fortification is the practice of deliberately increasing the content of an essential micronutrient (vitamins and minerals – including trace elements) in a food, to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health. The process of food fortification directly enhances the nutrient composition of different foods through adding, for example, vitamins like iron, zinc, folic acid or iodine.

Food fortification with folic acid has proven to be a rewarding economic investment. This investment includes two groups of costs – upfront and on-going – which include purchasing folic acid, updating milling machinery, training, marketing, monitoring and evaluation, testing, and compliance. Further costs may be required for advocacy and education activities.

IMPACT OF FOOD FORTIFICATION ON A GLOBAL BASIS

Food fortification is endorsed as a sustainable, cost-effective intervention with a proven impact on public health and economic development by the Lancet 2008 and 2013 Maternal and Child Nutrition Series, the Copenhagen Consensus, and the Scaling up Nutrition Movement. Fortification of food increases serum micronutrient concentrations, and studies in several populations have demonstrated a significant positive impact on functional outcomes. These include: reduction of anaemia by 34%; reduction of NTDs by 41%; reduction of goiter by 74%.

WHAT IS BEING DONE IN ETHIOPIA?

In Ethiopia, the mandatory standards to fortify wheat flour and edible oil have not been endorsed, while the salt iodization standard has already been developed. In 2005, the national coverage of iodized salt was 4.2%. By the end of 2014, 95% of households had access to iodized salt (containing any amount of iodine), and 42.7% of households had access to adequately iodized salt. In 2018, 86% of households had access to adequately iodized salt.

WHAT STILL NEEDS TO BE DONE?

The NTD burden confirms that it is extremely important for Ethiopia to approve the mandatory fortification of commonly consumed food vehicles, including wheat flour, oil and salt (with both iodine and folic acid), to reduce the burden of micronutrient deficiencies and its consequences, including neonatal and infant mortality, as well as life-long disabilities.

Today, more than 100 countries implement salt iodization programs. The good news is that, in addition, 86 countries mandate at least one kind of cereal grain fortification, and over 30 legislate for the fortification of edible oils, margarine and ghee.

Photo credit: ReachAnother Foundation

CALL TO ACTION

1. **The Ministry of Health** should advocate and create awareness among members of the council to endorse mandatory fortification of commonly consumed food vehicles, including wheat flour, oil and salt (with both iodine and folic acid).

2. **The National Nutrition Coordination Body and the Food Fortification Steering Committee** should approve mechanisms for enforcement of all food fortification legislations.

3. **The National Nutrition Coordination Body** should bring together all potential stakeholders and mobilize more investment in food fortification in Ethiopia.