



Increasing resilience of populations to infectious diseases through improved nutrition and in particular food fortification

Good nutrition is critical to immune system function, and therefore to increasing our resistance against infectious diseases such as COVID 19. The effect of diet and in particular of micronutrients – vitamins and minerals required in small amounts by the body to support optimal growth and development – are important at every life stage in the development of the immune system. This development begins at the embryonic stage through adequate intake of essential micronutrients, continues after birth through the consumption of breast milk, and is maintained throughout life with a balanced diet.

All forms of malnutrition – including micronutrient malnutrition or “*hidden hunger*” – are a crucial impediment to our health and capacity to fight infectious diseases.

This note has been developed with three key objectives:

- 1) to show “*why*” malnutrition and limited access to nutritious foods can increase the spread and risks of infectious diseases in a given population;
- 2) to introduce food fortification a proven, cost-effective intervention that can lead to relatively rapid improvements in the micronutrient status of a population;
- 3) to illustrate “*how*” EU delegations globally can participate in scaling up food fortification, thereby contributing to the elimination of micronutrient deficiencies.

There is a bidirectional interaction between malnutrition and infection (Figure 1)ⁱ

- Our immune system needs good nutrition to function efficiently in protecting our body against infections
- Nutritional status is linked to the strength of our immune system which in turn impacts the severity of infections

Figure 1: Interaction of nutrition and infection

Malnourished children are more at risk

- Nutrition during the first 1000 days of life (from conception to a child’s second birthday) is crucial to immune maturation, and has a life-long impact on physical and cognitive development
- A baby who does not receive enough protein and vitamins is prone to infectious diseasesⁱⁱ

Micronutrient deficiencies amplify the problem

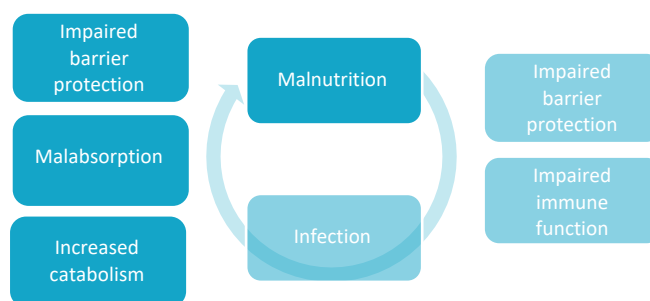
- Micronutrients provide the essential building blocks for healthy growth and a strong immune system, in particular in children
- Micronutrient-rich foods provide a range of antioxidants that are important for protection against selected noncommunicable diseases, and for enhancing immune functionⁱⁱⁱ

Evidence-based micronutrient interventions exist that can help prevent the issue^{iv}

- Diet diversification, food fortification, supplementation and bio-fortification are effective, proven interventions that exist to address micronutrient deficiencies
- Effective interventions to address micronutrient deficiency, including maternal micronutrient supplementation, and large-scale food fortification need to be accelerated

Food fortification helps alleviate the problem

- For population groups with high needs, and in contexts where the required dietary changes are not available or accessible, food fortification offers a unique opportunity to address hidden hunger
- Food fortification can lead to relatively rapid improvements in the micronutrient status of a population, and at a very reasonable cost, especially if advantage can be taken of existing technology and local distribution networks



Micronutrient deficiencies and the COVID-19 pandemic

The current global outbreak of COVID-19 has disrupted food systems around the world and may result in significant short- and long-term disruptions to food environments. It is expected that there will be a rise of the global prevalence of all forms of malnutrition, especially micronutrient malnutrition. Availability of and access to nutritious foods, particularly for poor and vulnerable populations, will be restrained through a number of factors:

- In the short term, lockdowns are anticipated to increase the consumption of non-perishable products, mainly staples and processed foods, which are a poor source of micronutrients if they are not fortified;
- In the medium term, travel restrictions and market disruptions will constrain farmers' access to essential agricultural inputs, thereby affecting their ability and capacity to produce quality products in adequate quantities;
- Many people have lost their income, and in the long term many more people will suffer from the anticipated global recession; reduced incomes will make it ever more difficult to afford balanced diets. In addition, social protection programmes may be disrupted and lack the means to reach all in need.

Scaling-up food fortification through nutrition sensitive/specific programming

The current geographic scope of EC-funded food fortification efforts is limited and financial commitments are small compared to other nutrition programmes.^v EC-funded fortification programmes are ongoing in ten countries and there are opportunities to scale up.

Integrating and expanding food fortification into ongoing and future EC programming

In most of the EC's 42 priority nutrition countries, the EC invests in improving the nutrition of rural and poor populations, particularly the most nutritionally vulnerable.

There are many ways the EC could encourage fortification as a contributor to sustainable food systems:

- Where sustainable access to **quality health care** is a priority in National Indicative Programmes, particularly for the most vulnerable, include fortified food incentives such as complementary flours for infants and young children and/or fortified staples in national safety net programmes.
- Where **education** programming is a priority, transform school feeding programmes into nutrition programmes, promoting fortified staple foods and point-of-use fortification.
- In all locations where the EC is working to strengthen the **resilience of vulnerable populations** to climate and environmental shocks, introduce point-of-use fortification alongside growth monitoring and prevention activities, including wherever health practitioners work with children, adolescent girls, and pregnant and lactating women.
- Where support for developing sustainable agricultural **value chains** is a priority, integrate fortified and biofortified staples and crops into these chains, e.g. EC-funded fortification of cassava and beans (DRC) and sweet potatoes (Ethiopia). There is room for expansion and knowledge sharing.
- Where support for implementing **social protection programmes** is a priority, promote the production and distribution of fortified/biofortified products and staples in food aid distribution schemes. Prioritize fortified foods in EU grants, through distribution and social protection programmes.
- Where **nutrition knowledge** is limited, and inappropriate eating and care behaviours impede consumption of fortified foods especially by the most vulnerable, develop information campaigns and social and behaviour change communication to generate demand.
- Support **research**, such as the impact of biofortification on women and children, and on economic and social changes (costs, distribution, and the value to commercial stakeholders).
- Where **rural development programmes** are a priority, partner with agricultural institutions to support the development of biofortified crops with different options for biofortification, diversified farming systems and value chains. Where biofortified crops have been established, support scale-up of farmers and uptake by consumers. Support operations research (the effects of climate change on biofortified crops and the impact on child and maternal nutrition) as a part of programming, with national and global benefits.
- Where there is less potential for biofortified staples, give priority to supporting the most **nutritious crops** (e.g. niabe and millet) and **value chains**.
- Where **innovation and technology** are priorities, consider product innovations in ingredients and micronutrients, and systems innovations that would build on big data management and artificial

intelligence. Establish data-driven feedback loops to optimize the impact of fortification by assessing consumption patterns and nutrient intake.

Mainstreaming food fortification across sectors by including it in current programming and/or expanding existing food fortification pilots and programmes would be a significant response that would facilitate a comprehensive contribution to the 2030 Agenda for Sustainable Development, while at the same time improving the resilience of populations to infectious diseases.

ⁱ Adapted from Brown KH. Diarrhea and malnutrition. *J Nutr* 2003 ;133 :328S-32S

ⁱⁱ Ezenwa BN, Ezeaka VC. Is canscore a good indicator of fetal malnutrition in preterm newborn. *Alexandria J Med* 2017;54:57-61.

ⁱⁱⁱ Guidelines on food fortification with micronutrients, WHO FAO

^{iv} Osendrap S, Morris A, Atkin R. Hidden hunger and the COVID-19 pandemic

^v Hoogendoorn A, Luthringer C, Parvanta I and Garrett GS. Food Fortification Global Mapping Study. 2FAS, 2016.