



Yayasan Kegizian
Pengembangan Fortifikasi
Pangan Indonesia

SOLID COLLABORATION OF STAKEHOLDERS IN LARGE-SCALE FOOD FORTIFICATION (LSFF) IS IMPORTANT STRATEGY TO IMPROVE THE QUALITY OF HUMAN RESOURCES AMID EXTREME CLIMATE CHANGE THREATS

Extreme Climate Change and its impact on Food Systems, Health and Human Resource Quality

The world is expected to face significant challenges in the future. Based on Megatrend 2045, 10 global challenges will strongly affect the availability and access to food for people around the world, including Indonesia, namely changes in demographic trends, urbanization, international trade, global finance, middle-income class, competition for natural resources, climate change, technological advances, geopolitical changes, and geoeconomic changes. The impact of these ten changing trends on food production and access to food consumption will be reflected directly or indirectly by society.

One of the significant threats, extreme climate change, can affect food systems in several ways, such as decreased soil fertility, decreased water availability, reduced food yields, reduced concentration and bioavailability of food nutrients, increased nutritional inhibitors in food, and increased incidence of infectious diseases. Climate change, such as floods, droughts, or changes in seasonal patterns, can hamper agricultural

production and decrease food supply, increasing food prices. This situation will further worsen the ability of the bottom 40% of the population, who tend to experience deficiencies in essential micronutrients such as iron, folic acid, vitamin A, iodine, etc., due to limited purchasing power for diverse foods. Research by WFP (2021)¹ states that although almost all Indonesians can meet the needs of an energy-source diet, the price of a healthy diet, which is about 4-5 times the price of a calorie-source diet, means that only 1 in 2 Indonesians can afford it.

In addition, research by Owino et al. (2022)² mentioned that climate change can reduce food production and affect human health by altering the nutritional content of food through increased atmospheric CO₂ concentrations. This increase in CO₂ results in faster growth rates but can reduce the content of plant protein and micronutrients such as calcium, iron, and zinc. Grains and tubers, including rice, wheat, barley, and potatoes, experience a 7-15% decrease in protein content. An increased CO₂ concentration of 550 ppm can cause a decrease in zinc and iron concentrations in grains, legumes, and cereals by 3 - 11%. Under more extreme conditions, CO₂ concentrations of 690 ppm can even cause a 5-10% decrease in

¹ [WFP] World Food Program. 2021. Fulfill the Nutrient Gap Indonesia Validation and Prioritization.

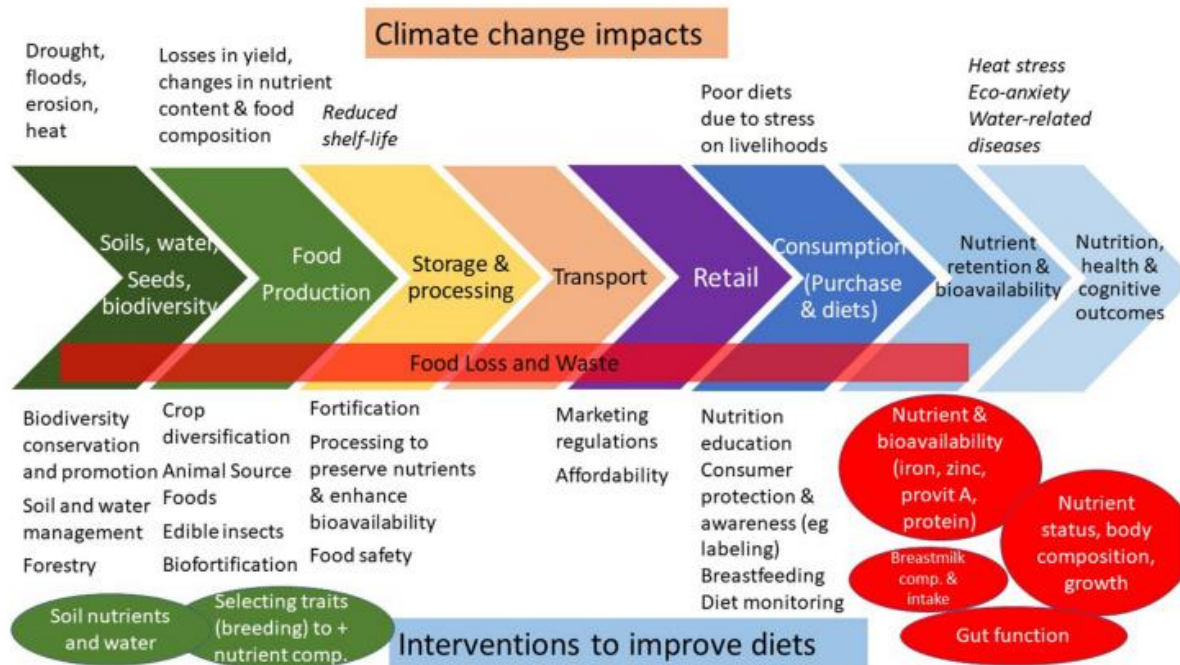
² Owino, V, Kumwenda C, Ekesa B, Parker ME, Ewolth L, Ross N, Lee WT, Tome D.

2022. The impact of climate change on food systems, diet quality, nutrition, and health outcomes: a narrative review. *Front. Clim.* 4:941842. doi:10.3389/fclim.2022.941842.



phosphorus, potassium, calcium, sulfur, magnesium, iron, zinc, copper,

and manganese concentrations in various crops.



Source : Owino et al. (2022)

Figure 1. Schematic continuum of the effects of climate change on food systems, nutrition, and health and the quality of human resources (cognitive).

The Importance of Cross-Stakeholder Cooperation and the Role of the LSFF Coordination Forum

To address the mentioned challenges, food fortification efforts supported by food biofortification, supplementation, and food diversification are part of the solution now and in the future. Highlighting the importance of micronutrients in improving the quality of Indonesia's human resources, the ten megatrends - especially climate change

- must be addressed with inclusive efforts involving cross-actors. Empirical evidence shows that food fortification, biofortification, and food acidification have significantly improved public health (Owino et al., 2022)³.

The LSFF is effective in reducing hidden hunger and is highly cost-effective. Food fortification was the most cost-effective method for USD 66 per Disability-Adjusted Life Years (DALY), while supplementation and dietary diversification had costs of USD 179 and USD 103 per DALY, respectively (Olson

³ Owino, V, Kumwenda C, Ekesa B, Parker ME, Ewolth L, Ross N, Lee WT, Tome D. 2022. The impact of climate change on food

systems, diet quality, nutrition, and health outcomes: a narrative review. *Front. Clim.* 4:941842. doi:10.3389/fclim.2022.941842.



et al., 2021)⁴. The estimated health benefit-cost ratio is USD17 for every USD1 invested (Spohrer et al., 2013)⁵. The cost of food fortification to address iodine, vitamin A, and iron deficiencies in many countries is generally less than 0.5% of the product price, with no additional costs for distribution to consumers.

In the implementation of LSFF, the involvement of cross-sector actors at every stage is very important, from the preparation stage, drafting laws and regulations, program implementation, and monitoring and evaluation. Cross-sector coordination of the LSFF forum is carried out at BAPPENAS, the most competent institution to coordinate all ministries, institutions, industry, researchers and development partners, and CSOs/NGOs. Within BAPPENAS, the involvement of relevant cross-departments is also a must because implementation arrangements in the field will require the role of each Deputy. The involvement of all components of stakeholders is necessary so that the food fortification program can be well designed, digested, fully understood, and fully supported by the stakeholders.

In the planning and implementation of the food fortification program, the Ministry of Health acts as an initiator through the proposal to change the SNI of fortified food, which is voluntary into a mandatory SNI as stipulated in

⁴ Olson R, Gavin-Smith B, Ferraboschi C, Kraemer K. 2021. Food Fortification: The Advantages, Disadvantages and Lessons from Sight and Life Programs. *Nutrients*. Volume 13.

⁵ Spohrer R, Larson M, Maurin C, Laillou A, Capanzana M, Garrett GS. 2013. The growing

Government Regulation No. 17 on Food Security and Nutrition, Article 38 paragraph 3 points a, b, and c. The determination needs to be supported by a solid academic paper based on reliable scientific evidence whose preparation involves various parties, both academics and ministries / KL.

The Ministry of Industry has a vital role in standard setting both through internal studies and through the National Standardization Agency (BSN). Voluntary SNI set by BSN can be made mandatory by the Ministry of Industry at the request of the Ministry of Health. The Ministry of Trade is needed to regulate the circulation of fortified food. The Food and Drug Monitoring Agency (BPOM) monitors producers' compliance with the quality and content of fortificants in food circulating in the community.

Meanwhile, advocacy efforts are needed at domestic and foreign institutions, especially the World Trade Organization, for internationally traded food products. (WTO). The government needs Approaches and advocacy so that the mandatory fortification program is not included in the category as a trade barrier.

Food industry practitioners, especially food producers that must be fortified (vehicles), must be involved initially because their position is central and essential. This group of business actors

importance of staple foods and condiments used as ingredients in the food industry and implications for large-scale food fortification programs in Southeast Asia. *Food and Nutrition Bulletin*. 34(2): 50-59.



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(industry) is leading in implementing the mandatory food fortification program. Various approaches and advocacy are needed to convince the industry about the importance of fortification. Shared understanding and synergistic

cooperation between industry and government are fundamental to achieving common goals, as illustrated in Figure 2.



Figure 2: Synergy of Public Health and Industry Development through LSFF

An equal, solid, and mutually beneficial partnership between government, industry, and the consumer community in realizing 'better public health and good business' through 'Public and

Private Partnership' (PPP) needs to be built and coordinated through the cross-actor LSFF coordination forum at BAPPENAS.