KOALISI FORTIFIKASI INDONESIA
Yayasan Kegizian Pengembangan Fortifikasi Pangan Indonesia

POLICY BRIEF

THE IMPORTANCE OF CLOSING DATA GAPS TO STRENGTHEN THE IMPACT EVALUATION OF MANDATORY FOOD

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Background

Large-Scale Food Fortification (LSFF) is a food-based approach to improving population nutritional status that has proven effective in reducing micronutrient deficiencies, offering the lowest cost with the highest gain and thus representing a highly cost-effective intervention). Globally, every investment of 1 USD in LSFF is estimated to generate economic benefits of up to 27 USD through improvements in health, productivity, and income[1,2]. Fortification programs have been shown to contribute to reductions in anemia by up to 34%, goiter by 74%, and neural tube defects by 41%, as well as preventing vitamin A deficiency among millions of children in various countries each year[3].

In Indonesia, mandatory food fortification has become a strategic component of nutrition improvement in the National Long-Term Development Plan (RPJPN) 2025–2045 and is further emphasized in the National Medium-Term Development Plan (RPJMN) 2025–2029 as part of the transformation toward a healthy, resilient, and sustainable food system. Iodized salt fortification has been mandatory since 1994, wheat flour since 2001, and palm cooking oil since 2019. Despite the long-standing implementation of mandatory fortification policies, scientific evidence on the achievements and impact of LSFF on nutritional status in Indonesia remains limited. The government has not yet integrated the evaluation of the effectiveness of mandatory fortification programs as part of the fortification program itself.

Data required to assess the effectiveness of fortification programs cover several aspects, among which the most important include: (i) the level of industry compliance with the applicable standards (SNI); (ii) the coverage of target populations consuming fortified foods that meet the standards; (iii) the contribution of micronutrients from mandatory fortified foods; (iv) the nutritional impact of food fortification; and (v) the cost-effectiveness of food fortification programs to complement global empirical evidence, considering the unique characteristics of Indonesia's food fortification program.

The absence of effectiveness data represents one of the key weaknesses in the implementation of food fortification programs in Indonesia. In fact, these data are among the most important information awaited by the industry to assure them that they are contributing to strengthening public health through food fortification. Moreover, such data should also be critically needed by the government to demonstrate that food fortification programs generate measurable impacts. Empirical evidence on the effectiveness of food fortification can essentially be viewed as a form of government accountability to the public and stakeholders in the use of state budgets, donor contributions, and the investments made by industry and consumers of mandatory fortified foods.

In reality, the issue of data availability in the implementation of mandatory food fortification is not limited to effectiveness data alone but also extends to other types of information, including the use of inputs (raw materials such as salt, palm cooking oil, wheat/flour, fortificant premixes—both imported and domestically produced—and laboratory requirements for quality assurance and quality control), processing technologies used, internal analytical laboratories or those managed by certification bodies (LSPro), as well as the coverage

[1]Elise Cogo, Ferruccio Pelone, Helena Pachón, Brian Buckley, Maria Christou, Gemma Villanueva, Monica Woldt, Nicholas Henschke, Becky L Tsang. medRxiv 2025.06.12.25329169; doi: https://doi.org/10.1101/2025.06.12.25329169.

[2] UNICEF, Bill and Melinda Gates Foundation and USAID (2021), A Joint Vision to Realize the Full Power of Large-Scale Food Fortification: A Proven, Cost-Effective Approach to Improve Nutrition and Unlock Human Potential at Scale.

[3] Keats, E. C., Neufeld, L. M., Garrett, G. S., Mbuya, M. N. N., & Bhutta, Z. A. (2019). 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, 109*(6), 1696–1708. https://doi.org/10.1093/ajcn/nqz023.

of mandatory fortified food products. Unfortunately, most of these data are not available; and when they are available, they are not necessarily accessible to the public, not integrated into a cross-sectoral data system, or have become obsolete and therefore no longer useful for policy and program updates.

This condition indicates that the success of large-scale mandatory food fortification (LSFF) cannot be properly assessed without the availability of the necessary data. Without a commitment to developing a digital food fortification information system supported by routine data collection, surveys and special studies, as well as periodic nutrition and health surveillance (SKI, SKMI, SDT), the benefits of mandatory fortification programs cannot be accurately evaluated.

To date, data on the intake of mandatorily fortified foods and the contribution of micronutrients have been derived from proxy estimates using Susenas data by KFI, which contain considerable limitations both in terms of data quality and methodology.

Therefore, efforts to close the data gaps in food fortification are a fundamental prerequisite to enable credible and evidence-based evaluations of LSFF impacts, and to ensure that mandatory food fortification policies can be appropriately directed and improved.

Policy Questions

Over the past two decades, Indonesia has established a regulatory and policy framework for mandatory fortification for several key commodities such as salt, wheat flour, and palm cooking oil. Regulations such as the Indonesian National Standard (SNI) and various derivative regulations from the Ministry of Industry, the National Agency of Drug and Food Control (BPOM), and the Ministry of Health serve as the foundation for the implementation of LSFF[4,5]. However, the effectiveness of these policies in reducing micronutrient deficiencies remains difficult to measure comprehensively. In this context, the LSFF data landscape analysis is intended to address the following policy questions:

1. **Has the regulatory framework and cross-sectoral coordination for LSFF effectively ensured compliance and fortification quality?**

Although standards for fortificant levels have been established through SNI and sectoral regulations, implementation in practice is often constrained by limited monitoring capacity and the absence of routine reporting mechanisms across institutions. This creates the need to assess whether regulatory mandates and cross-sector coordination mechanisms are sufficiently strong to ensure industry compliance with fortification standards and to guarantee the quality of products circulating in the market[6].

2. **To what extent does mandatory food fortification reach priority target groups equitably?**

In addition to the regulatory framework, the next policy question relates to the coverage of the fortification program. Household survey data such as SUSENAS, SKMI, and RISKESDAS/SKI have not yet been able to capture the consumption of fortified food products. This raises questions about the actual extent to which mandatory fortification programs reach their primary target populations.

3. **Is the fortification quality control system sufficiently consistent to ensure implementation quality?**

The next question concerns the quality of implementation. Producer compliance with fortificant levels specified in the SNI, the reliability of

[4] UNICEF Indonesia. (2023). Landscape analysis: Large-scale food fortification in Indonesia. Jakarta: UNICEF. https://www.unicef.org/indonesia/reports/fortification-landscape-analysis
[5] GAIN. (2020). Large-scale food fortification in Indonesia: Evaluation report. Geneva: Global Alliance for Improved Nutrition. https://www.gainhealth.org/resources/reports-and-publications

[6] UNICEF. (2022). Policy brief: Strengthening fortification governance in Indonesia. Jakarta: UNICEF Indonesia.

premix supply, and the effectiveness of quality monitoring systems determine the success of LSFF. Field evaluations show substantial variation in the actual fortificant levels found in products circulating in the market[7], indicating the need for more routine and representative testing systems. In addition, differences in capacity between large producers and small- and medium-scale producers create disparities in the quality of implementation in the market.

The primary objective of LSFF is to reduce the prevalence of micronutrient deficiencies such as anemia, iodine deficiency, and vitamin A deficiency[8]. However, to date, no mechanism exists that links data on fortified food consumption with national biomarker data on nutritional status, as no national health survey had measured these indicators up to 2025. Without such integration, it is difficult to determine the extent to which LSFF programs have made a tangible contribution to improving population nutritional status.

Overall, these four aspects—standards and regulations, program coverage, implementation quality, and nutritional and health impacts—constitute the main focus of the policy questions to be addressed through the LSFF data landscape analysis in Indonesia. Understanding the interconnections among these aspects will help identify priority actions for strengthening the data system and ensuring that food fortification policies genuinely contribute to sustainable improvements in population nutrition.

LSFF Data Landscape, Adequacy, and Quality

The data landscape analysis shows that although Indonesia has established a well-developed mandatory food fortification policy, the available data system has not yet been able to support comprehensive evaluation of LSFF coverage, implementation quality, and impact[9]. LSFF data remain dispersed across sectors, are not integrated, are largely outdated, and have not been designed to link fortification implementation with population nutrition outcomes.

In general, data sources relevant to LSFF can be categorized into three main groups: (1) data related to standards and regulations, (2) data on program performance (program coverage and implementation quality), and (3) data describing health and nutrition impacts[10]. These three categories reflect the main dimensions of a comprehensive LSFF monitoring system—from governance aspects, to program implementation, and ultimately to outcomes in population nutritional status.

[7] GAIN. (2020). Large-scale food fortification in Indonesia: Evaluation report. Geneva: Global Alliance for Improved Nutrition. https://www.gainhealth.org/resources/reports-and-publications

[8] UNICEF Indonesia. (2023). Landscape analysis: Large-scale food fortification in Indonesia. Jakarta: UNICEF. https://www.unicef.org/indonesia/reports/fortification-landscape-analysis

[9] Koalisi Fortifikasi Indonesia (KFI). (2025). Preliminary Report: Pemetaan Ketersediaan Data dan Analisis Kesenjangan untuk Menunjukkan Dampak Large Scale Food Fortification (LSFF) di Indonesia

[10] Koalisi Fortifikasi Indonesia (KFI). (2025). Preliminary Report: Pemetaan Ketersediaan Data dan Analisis Kesenjangan untuk Menunjukkan Dampak Large Scale Food Fortification (LSFF) di Indonesia

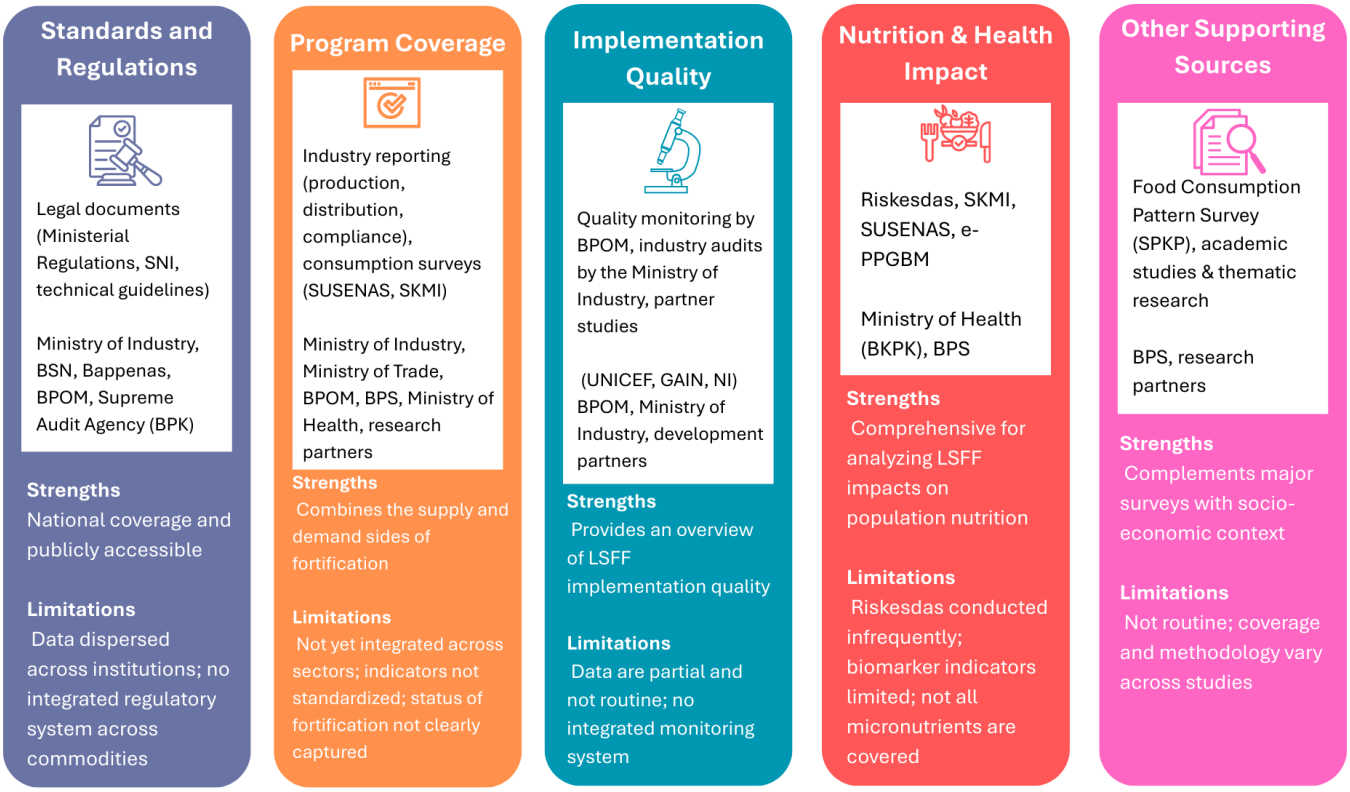

Figure 1. Sources and Characteristics of LSFF Data in Indonesia

Overall, the adequacy of data on mandatory food fortification in Indonesia remains limited to moderate, with data quality generally categorized as moderate[11]. Although various data sources exist at the national level—from statistical agencies, food regulatory authorities, and the industrial sector—most of them are not updated regularly and are not integrated across institutions.

For salt fortification, the main limitation lies in the lack of updated data from individual consumption surveys (SKMI) and biomarker surveys (Riskesdas). Existing data no longer reflect the current status of iodized salt coverage at the household level or its impact on population iodine status. In addition, industry and quality monitoring data remain sectoral, without an integrated reporting mechanism among BPOM, the Ministry of Industry, and the Ministry of Health.

For wheat flour fortification, the greatest challenge is the lack of routine reporting data related to production, distribution, and industry compliance with fortificant level standards. Although the regulation is mandatory and the latest SNI has been established, monitoring implementation has not yet been conducted systematically. Data on consumption and micronutrient intake (Fe, Zn, folate) have also not been updated since 2014, making it difficult to assess the effectiveness of the policy in reducing micronutrient deficiencies.

Meanwhile, for palm cooking oil fortification, regulations mandate vitamin A fortification but currently apply only to packaged palm cooking oil. Data indicate a substantial gap between the consumption of packaged palm cooking oil (which is fortified) and bulk cooking oil (which is commonly consumed by lower-income groups and is not consistently fortified). This gap directly affects inequality in access to the benefits of fortification.

In general, data fragmentation across institutions (BPOM, the Ministry of Industry, the Ministry of Health, BPS, and the Ministry of Trade) constitutes the main barrier to producing comprehensive cross-sectoral analyses. The absence of an Integrated Fortification Monitoring System makes it difficult to

[11] Koalisi Fortifikasi Indonesia (KFI). (2025). Preliminary Report: Pemetaan Ketersediaan Data dan Analisis Kesenjangan untuk Menunjukkan Dampak Large Scale Food Fortification (LSFF) di Indonesia.

connect data from upstream stages (regulation and production) to downstream outcomes (dietary intake and nutritional impact).

Table 1. Adequacy and Quality of Mandatory Food Fortification Data in Indonesia

No.	Commodity	Standards dan Regulations	Program Performance (Program Coverage and Implementation Quality)	Nutrition and Health Impact
1.	Salt	**Mandatory regulation exists** (Ministerial Decree of Industry 1995; SNI 3556:2016), but cross-sector harmonization is still needed.	• Coverage data are limited; the latest survey was conducted in 2013–2014; no routine industry reporting • Quality monitoring is sectoral and partial, depending on ministerial/institutional activities.	Biomarker surveys (UIC, IDD) are outdated and not conducted routinely.
2	Wheat flour	**Mandatory regulation exists** (Minister of Industry Regulation 61/2024; SNI 3751:2018).	• Data on production and industry compliance are not routinely available; consumption data have not been updated since 2014 • Audits and sectoral monitoring depend on ministerial/institutional activities	Biomarker data (anemia, iron and zinc deficiency) are limited and not specific to LSFF
3	Palm Cooking Oil	**Mandatory regulation exists** (Minister of Industry Regulation 46/2019; SNI 7709:2019), but implementation is largely limited to packaged palm cooking oil.	• Population coverage is limited; bulk oil consumption remains high among lower-income quintiles • Monitoring remains sectoral; no cross-ministerial reporting system exists	Biochemical surveys are limited; no national survey exists to assess LSFF impact

Key Gaps and Their Implications for LSFF Monitoring

The main gaps in Indonesia's LSFF data system are caused by the lack of updated and representative data (obsolete data) and the low quality and integration of data across ministries and institutions (data quality). These two issues reduce the capacity of the national system to conduct continuous monitoring of the implementation of mandatory food fortification.

Table 2. Data Gap Analysis

Commodity	Gap Dimension	Key Findings	Implications for LSFF Monitoring
Iodized Salt	**Obsolete Data**	Data on iodized salt consumption coverage and iodine intake still refer to SKMI 2014 and older IDD	Information on the actual coverage of the IDD program and the effectiveness of salt

Commodity	Gap Dimension	Key Findings	Implications for LSFF Monitoring
		surveys; no recent data are available that represent the national situation.	fortification cannot be assessed accurately.
	Data Quality	Salt quality monitoring and industry compliance data are dispersed across multiple institutions (BPOM, Ministry of Industry, Ministry of Trade) with limited testing coverage and no integrated system; there is no harmonization between national and subnational data.	Monitoring of iodized salt quality and distribution is not continuous, and monitoring results are difficult to compare across regions.
Fortified Wheat Flour	**Obsolete Data**	Most indicators (consumption, nutrient intake, fortification coverage) still rely on SKMI 2014; there are no updated industry data or consumption surveys representing current conditions.	Evaluation of the achievements and impact of wheat flour fortification on micronutrient status cannot be conducted validly.
	Data Quality	Differences in methodologies and indicators across institutions (Ministry of Industry, BPOM, Ministry of Health, BPS); reporting on industry compliance and quality monitoring is not conducted routinely and is not connected across levels of government.	Data remain partial and inconsistent, making them unsuitable as a basis for national LSFF indicators.
Vitamin A–Fortified Palm Cooking Oil	***Obsolete Data***	Data on palm cooking oil consumption and vitamin A intake are still based on SKMI 2014; there are no recent data on fortification coverage or changes in consumption patterns between bulk and packaged oil.	It is difficult to assess the effectiveness of palm cooking oil fortification on population vitamin A status and to guide current LSFF policy directions.
	Data Quality	Quality monitoring remains based on ad hoc and non-routine inspections; industry, monitoring, and consumption data are dispersed across BPOM, the Ministry of Industry, the Ministry of Trade, and the Ministry of Health without integration mechanisms.	Low harmonization and integration of data across institutions mean that the LSFF monitoring system has not yet functioned optimally.

Priority Policy Options

To address the data gaps that hinder the evaluation of the impact of mandatory food fortification, the government needs to undertake the following strategic actions:

1. Updating and harmonizing national nutrition and food consumption surveys

The government needs to update and harmonize major national surveys such as SKMI, SUSENAS, and Riskesdas by ensuring the availability of consistent indicators related to the consumption of fortified foods, micronutrient nutritional status, as well as the coverage and quality of mandatory food fortification implementation. Harmonization of variable definitions, measurement methods, and data collection periods is necessary to enable continuous analysis of trends in fortification exposure and its impacts.

2. Integrating consumption, biomarker, and industry compliance data into a single LSFF monitoring system

The government needs to develop an integrated LSFF monitoring system that combines data on production and industry compliance, quality monitoring, household consumption, and nutritional biomarkers (Hb–ferritin, retinol, UIC, zinc, folic acid). This integration will enable direct

linkage between exposure to fortified foods and public health outcomes, which has so far been difficult to analyze due to cross-sectoral data fragmentation.

3. Strengthening the quality monitoring and industry compliance system

The government needs to strengthen fortification quality monitoring through routine reporting and the digitalization of industry data, including production volumes, fortificant levels, and laboratory testing results. Strengthening laboratory networks and conducting regular proficiency tests (PT) are also necessary to ensure the consistency of fortification quality data across regions and over time.

4. Establishing coordinated national LSFF data governance

The government needs to establish a clear national LSFF data governance framework by integrating LSFF indicators into the national nutrition monitoring system and the One Data Indonesia framework. Strengthening cross-ministerial and inter-agency coordination, with the National Food Fortification Coordination Forum playing a central role, is necessary to ensure the sustainability and effective use of LSFF data for policy decision-making

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