KOALISI FORTIFIKASI INDONESIA
Yayasan Kegizian Pengembangan Fortifikasi Pangan Indonesia

POLICY BRIEF

THREE YEARS OF EVIDENCE ON MANDATORY FOOD FORTIFICATION FROM SUSENAS 2023–2025: POLICY IMPLICATIONS FOR ADVANCING A NATIONAL NUTRITION SECURITY SYSTEM

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SUMMARY

Indonesia continues to face significant micronutrient deficiencies, particularly iron deficiency anemia, iodine deficiency disorders, and vitamin A deficiency. Over the past decades, the country has established various public assurance systems, including social protection, health, food, education, labor, as well as disaster and crisis response. The next stage is to formulate a National Nutrition Security System that ensures every citizen obtains essential nutrient intake in a safe, affordable, and sustainable manner.

Although the National Nutrition Security System has not yet been operationally defined, mandatory food fortification has already been performing part of this function de facto. Through iodized salt, fortified wheat flour, and fortified palm cooking oil, micronutrients can reach the population widely without requiring substantial behavioral change. Therefore, fortification should be treated not only as a technical intervention, but as a policy instrument to ensure basic micronutrient adequacy.

Analysis of SUSENAS 2023–2025 shows that mandatory food fortification has contributed to micronutrient intake, but its benefits are not yet evenly distributed. Iodized salt has relatively high consumption coverage but still faces issues of quality and regional inequality. Wheat flour and its derivatives are consumed almost universally, but their nutritional contribution is influenced by disparities in consumption patterns. Packaged palm cooking oil has significant potential as a source of vitamin A, but its coverage is highly sensitive to price and supply.

Key Findings

1) Coverage of iodized salt remains stable at around 81%, but disparities across regions and income quintiles persist;
2) Salt consumption declined from 2.44 g to 2.36 g per capita per day, making iodine adequacy increasing dependent on fortification quality;
3) Wheat flour and its derivatives are consumed by more than 99% of households, but their contribution to iron and B vitamins remains around 10–20% of the recommended dietary allowance;
4) Consumption of packaged palm cooking oil fluctuated sharply from 38% to 28%, then increased to 55%;
5) Disparities in consumption across regions and income quintiles result in fortification benefits that are not yet fully inclusive.

Key Recommendations

1) Strengthening quality assurance and industry compliance;
2) Ensure price stability, supply, and access to packaged palm cooking oil;
3) Integrate fortification indicators into national food, nutrition, and health data systems; and
4) Position mandatory food fortification as a foundational pillar of the National Nutrition Security System. With its broad reach, mandatory fortification should be directed to ensure basic micronutrient adequacy in a more equitable, measurable, and sustainable manner.

BACKGROUND

Indonesia continues to face a triple burden of malnutrition, with micronutrient deficiencies remaining one of the most persistent challenges. Anemia among women of reproductive age affects productivity, pregnancy risks, and the quality of human capital across generations. Iodine deficiency is still found in several regions despite long-standing salt iodization efforts, while vitamin A adequacy remains uneven across socio-economic groups. These conditions indicate that micronutrient deficiencies in Indonesia are not only a matter of prevalence, but also of regional and income inequality [1,2,3,4,5,6].

The impacts of micronutrient deficiencies are far-reaching, as they reduce productivity, increase healthcare costs, and weaken the quality of human capital. In this context, mandatory food fortification is recognized as a cost-effective intervention, as it can reach a large population through commonly consumed foods. However, the effectiveness of fortification does not occur automatically. Its impact is determined by the coverage of fortified food consumption, adequacy of fortificant levels, industry compliance, and the strength of regulatory and monitoring systems [2,7,8,9].

Indonesia has established various public assurance systems, but a National Nutrition Security System still needs to be operationally defined. Within this framework, mandatory food fortification can be positioned as a foundational instrument, as it operates at the population level, reaches households across regions, and is relatively independent of individual behavior change. This positioning is critical, as basic micronutrient needs must be consistently ensured, including for low-income populations and those living in remote areas [10].

Currently, mandatory food fortification in Indonesia is applied to several key commodities, particularly iodized salt, wheat flour fortified with iron, zinc, and B vitamins, and palm cooking oil fortified with vitamin A. These commodities have distinct implementation characteristics. Iodized salt has strong population reach but is vulnerable to variability in iodine content. Wheat flour has wide distribution, but its impact follows uneven consumption patterns. Fortified palm cooking oil has the potential to reach many households, but is highly influenced by price, supply, and market policies [6,11].

PROGRAM IMPLEMENTATION WITHOUT EFFECTIVENESS EVALUATION

Although mandatory food fortification has been implemented for more than three decades, its effectiveness evaluation remains limited. Several persistent issues include variability in product quality in the market, uneven producer compliance, limited regulatory oversight, and the lack of integration between consumption data, quality data, and nutritional status data. As a result, a gap remains between the nationally designed fortification policy and the actual impact experienced by households [12,13]. Empirical evidence is needed not only to assess the benefits of fortification on public health, but also to strengthen policy direction. Mandatory food fortification must be ensured to function as a system, from the selection of food vehicles, setting of fortification standards, industry compliance, market oversight, to monitoring and evaluation. Without a complete implementation chain, fortification risks becoming merely an administrative obligation rather than a true instrument of nutrition security.

Various food, nutrition, and health surveys have been conducted in Indonesia, such as the Basic Health Research (Riskesdas), which has evolved into the Indonesia Health Survey (Survei Kesehatan Indonesia/SKI), the Individual Food Consumption Survey (Survey Konsumsi Makanan Individu/SKMI), and other surveillance systems. However, to date, no system routinely explains the contribution of mandatory food fortification to micronutrient adequacy at the household level and across socio-economic groups. In this context, the National Socio-Economic Survey (Susenas), conducted regularly by Statistics Indonesia (BPS) since 1963, holds strategic value as a continuous monitoring instrument. Susenas data can capture consumption trends, regional disparities, differences across income quintiles, and consumption changes driven by price and policy dynamics. When properly utilized, Susenas can provide more up-to-date evidence on the performance of mandatory food fortification, particularly in terms of consumption coverage and its potential contribution to micronutrient intake [9].

LEVERAGING SUSENAS DATA AS A MONITORING INSTRUMENT FOR MANDATORY FOOD FORTIFICATION

Evaluation of food fortification in Indonesia has largely relied on industrial production data, commodity quality surveys, and limited-scale laboratory studies. While important, these approaches are insufficient to reflect actual household consumption. Yet, the impact of fortification is largely determined by whether fortified foods are actually consumed, by whom, in what quantities, and how consistently. Global literature emphasizes that household consumption data is a critical component in fortification evaluation. Household Income and Expenditure Surveys, represented in Indonesia by Susenas, can be used to estimate participation in fortified food consumption, distribution of

consumption across population groups, and potential contributions to micronutrient intake. This approach is pragmatic in addressing consumption data gaps that often constrain fortification program evaluation [9].

Susenas has three main advantages. First, it is based on actual household consumption, making it closer to real fortification exposure compared to production or distribution data. Second, its annual availability allows for trend analysis, including responses to changes in prices and policies. Third, Susenas enables disaggregated analysis at the provincial level and across income quintiles, allowing disparities in consumption coverage and intensity to be more clearly identified.

The relevance of Susenas is further strengthened by the diversity of food consumption patterns in Indonesia. Differences in staple foods, access to packaged products, purchasing power, and consumption habits result in heterogeneous exposure to fortified foods. By using Susenas, analysis can identify which groups are reached and which remain underserved, enabling more context-specific policy responses. Susenas can also serve as a proxy monitoring tool when biomarker data are not routinely available. While biomarkers remain the gold standard for assessing nutritional status, national biomarker surveys are costly and typically conducted at long intervals. In such contexts, Susenas can monitor intermediate indicators, such as coverage of fortified food consumption and estimated micronutrient intake, providing a basis for more timely policy adjustments [9].

Using Susenas as a data source creates an opportunity to integrate fortification monitoring into the established national statistical system. As a result, fortification evaluation would no longer be ad hoc, but become part of routine, institutionalized monitoring. The government can periodically assess program performance, identify implementation bottlenecks, and adjust policies in response to changes in consumption, prices, or supply. With these strengths, Susenas can serve as the backbone of monitoring mandatory food fortification consumption in Indonesia. To ensure comprehensive analysis, Susenas data need to be combined with product quality data, industry compliance, and market information. Such integration will help transform fortification from a technical intervention into a data-driven, adaptive, and more equitable nutrition policy instrument.

KEY FINDINGS FROM SUSENAS 2023–2025

Iodized Salt

During 2023–2025, national coverage of iodized salt consumption remained relatively stable at

around 81% (**Figure 1**). This indicates that the salt iodization program has reached the majority of households. However, this national achievement masks persistent disparities. Several provinces in Kalimantan and Maluku have achieved very high coverage, while East Nusa Tenggara and parts of Sulawesi still lag behind. Disparities are also evident across income quintiles, with coverage among households in the lowest quintile at around 67%, significantly lower than the highest quintile, which approaches 90% (**Figure 2**).

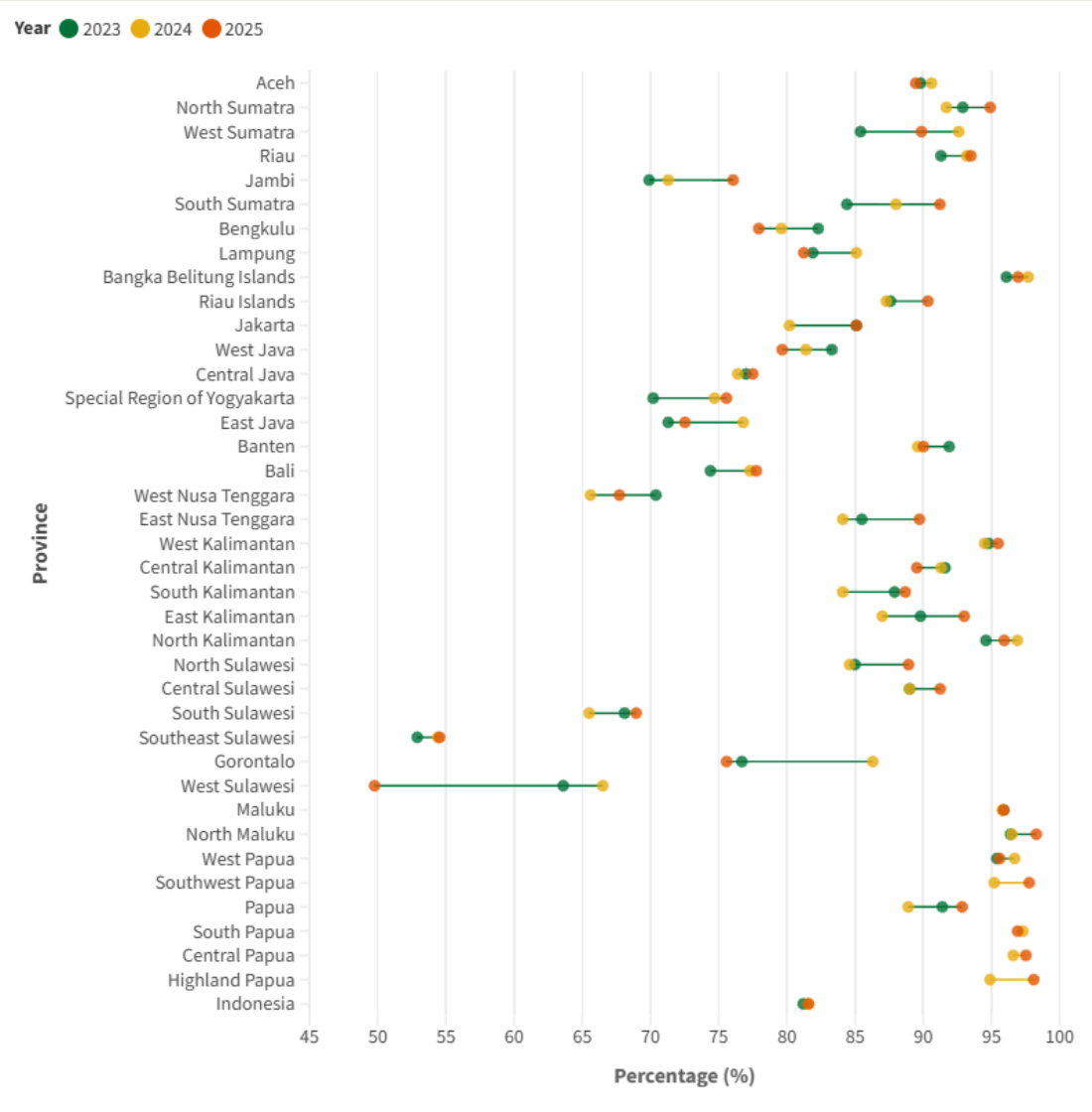


Figure 1. Trends in household participation in iodized salt consumption (%) in 2023, 2024, and 2025 by province
Source: Susenas 2023–2025, processed

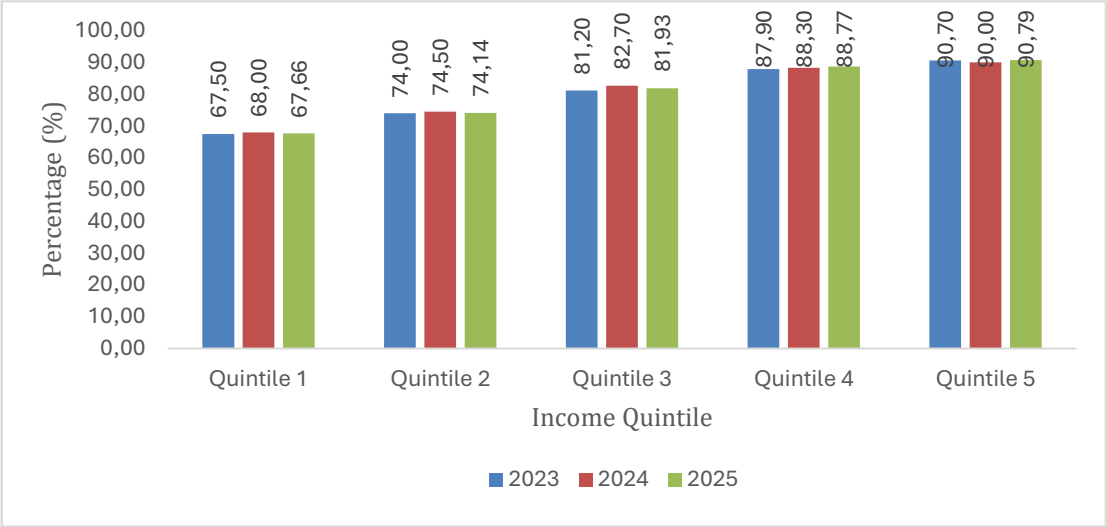
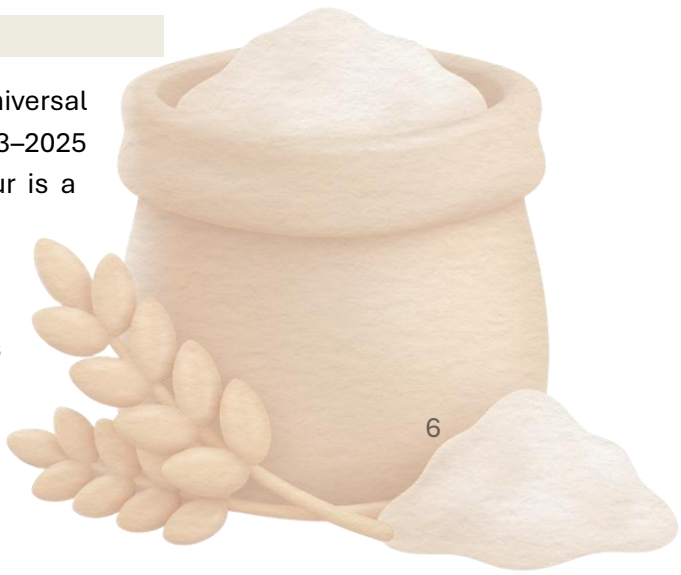


Figure 2. Trends in household participation in iodized salt consumption (%) in 2023, 2024, and 2025 by income quintile
Source: Susenas 2023–2025, processed

Average salt consumption per capita declined from 2.44 grams in 2023 to 2.36 grams per day in 2025. This decline aligns with public health efforts to reduce salt intake for the prevention of non-communicable diseases. However, in the context of fortification, lower salt consumption means that iodine intake becomes increasingly dependent on fortification quality. With reduced consumption, each gram of salt must contain iodine at standard levels to ensure health benefits are maintained. The primary challenge of the iodized salt program is no longer limited to household access, but rather to the effectiveness of fortification in practice. High consumption coverage alone is insufficient if iodine levels are inconsistent, market surveillance is weak, and vulnerable groups continue to consume low-quality salt. Therefore, declining salt consumption should not be viewed as a problem, but as a condition that demands stronger assurance of fortification quality. Every gram of salt consumed must deliver iodine in accordance with standards. Accordingly, policy direction needs to shift from expanding coverage toward strengthening quality, industry compliance, and market oversight to ensure more equitable iodine benefits across the population.

Wheat Flour

Wheat flour fortification demonstrates near-universal participation, with coverage exceeding 99% during 2023–2025 (**Figure 3**). From a distribution perspective, wheat flour is a highly ready fortification vehicle, as it has reached almost all households. However, high coverage does not automatically translate into equitable nutritional impact. Wheat consumption varies significantly across regions



and income groups. In Highland Papua, wheat flour consumption is around 19 grams per capita per day, with lower participation rates, reflecting both limited access and the strong presence of local non-wheat staple foods. In contrast, higher consumption is observed in urban areas and among higher-income households. The highest quintile consumed more than 67 grams per day in 2025, while the lowest quintile consumed around 39 grams per day (**Figure 4**).

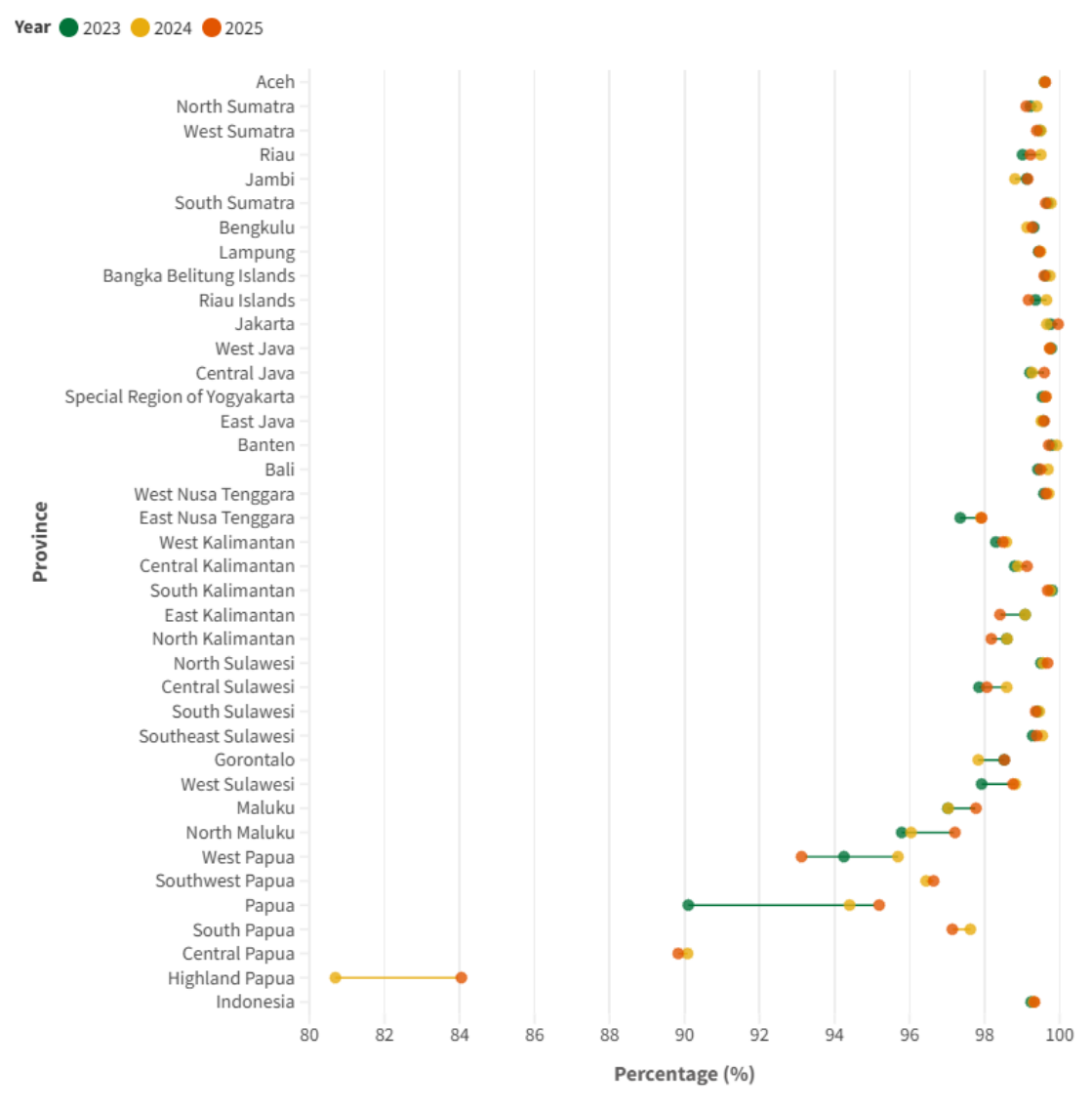


Figure 3. Trends in participation in wheat flour and its derivatives consumption (%) in 2023, 2024, and 2025 by province

Source: Susenas 2023–2025, processed

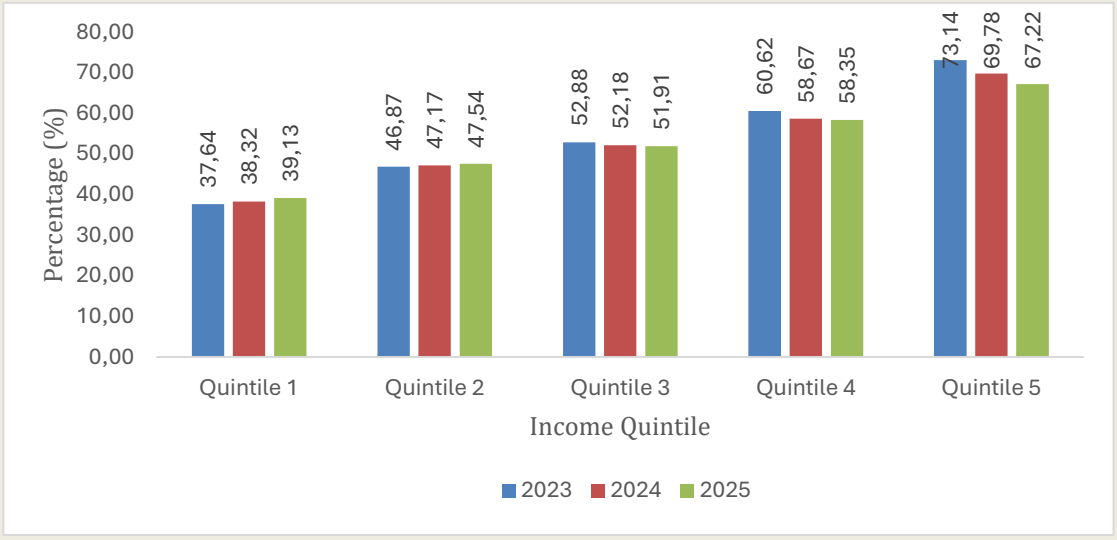


Figure 4. Trends in average household consumption of wheat flour and its products (g/capita/day) in 2023, 2024, and 2025 by income quintile

Source: Susenas 2023–2025, processed

Wheat flour is also predominantly consumed in processed forms, such as noodles, fried snacks, biscuits, and bread. Therefore, the contribution of fortification depends on the frequency and quantity of consumption of these processed products, which varies across household groups. In terms of estimated micronutrient intake, the contribution of iron and B vitamins from wheat flour is significant but remains in the range of 10–20% of the recommended dietary allowance. This indicates that wheat flour fortification serves as a complementary source rather than a sole solution for meeting micronutrient needs. The implication of this analysis is that wheat flour fortification is strong in terms of distribution systems but limited in terms of equitable impact. In regions with low wheat consumption, the benefits of fortification are constrained. Therefore, fortification policy needs to be complemented by diversification of food vehicles that better align with local consumption patterns, such as sago, maize, cassava, or their derivatives, where technically feasible and supported by population consumption patterns.

Packaged Palm Cooking Oil

In contrast to iodized salt and wheat flour, consumption of packaged palm cooking oil fluctuated significantly during 2023–2025. Household participation declined from 38% in 2023 to 28% in 2024, before increasing to 55% in 2025 (**Figure 5**). These fluctuations indicate that consumption of packaged cooking oil is highly sensitive to price, supply, and market policies. The decline in 2024 is associated with tighter Domestic Market Obligation (DMO) policies, which affected

supply and prices. The increase in 2025 coincided with price stabilization and improved affordability of packaged cooking oil, including through price convergence with the MinyaKita program. Consumption patterns also indicate that packaged cooking oil is not yet dominant nationally. Some households continue to consume bulk cooking oil, which is generally not fortified. This pattern is more common among lower-income households, those with lower education levels, and those with larger household sizes (**Figure 6**). In contrast, consumption of packaged cooking oil is higher among more affluent groups.

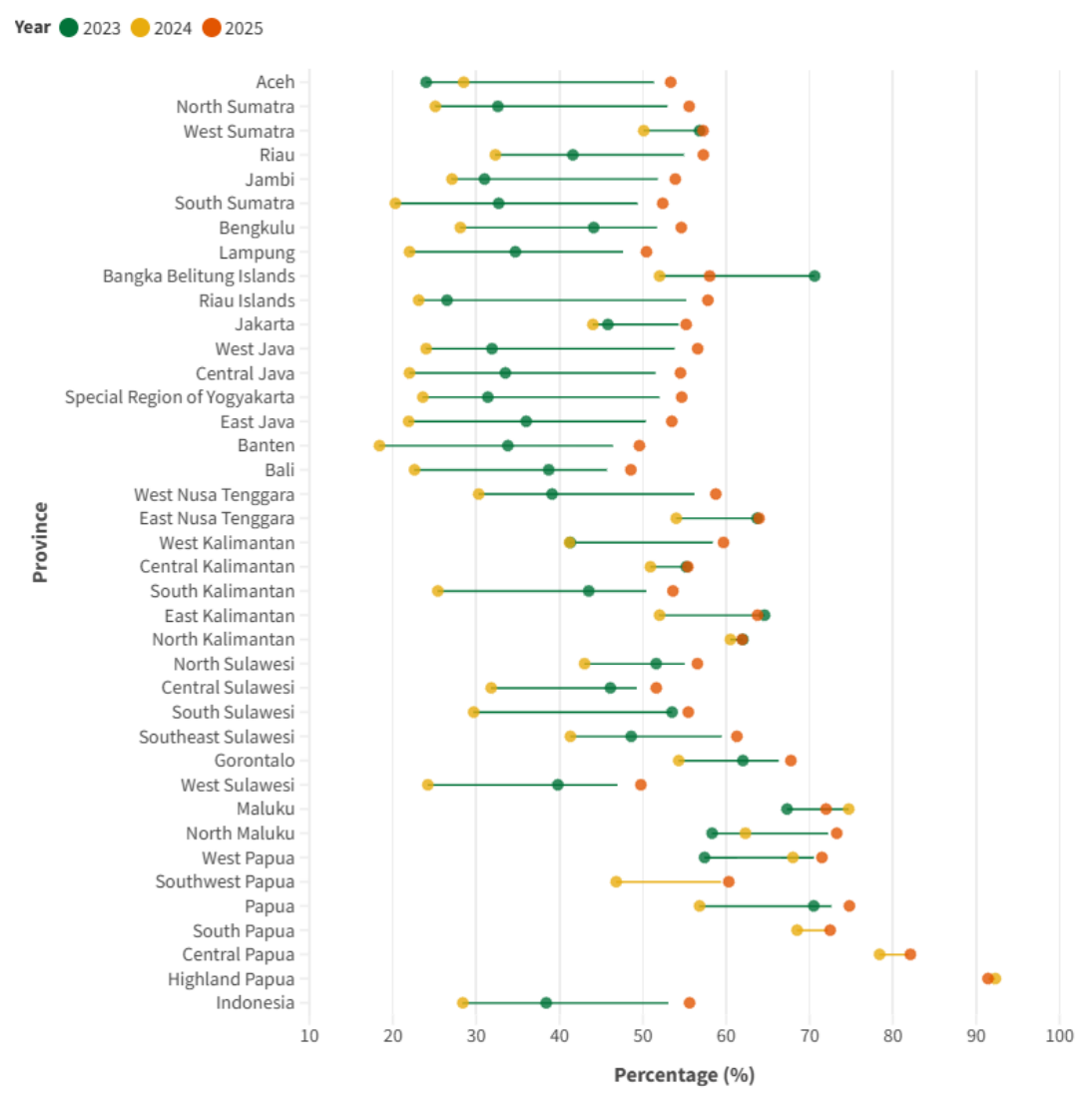


Figure 5. *Trends in household participation in packaged palm cooking oil consumption (%) in 2023, 2024, and 2025 by province*
Source: Susenas 2023–2025, processed

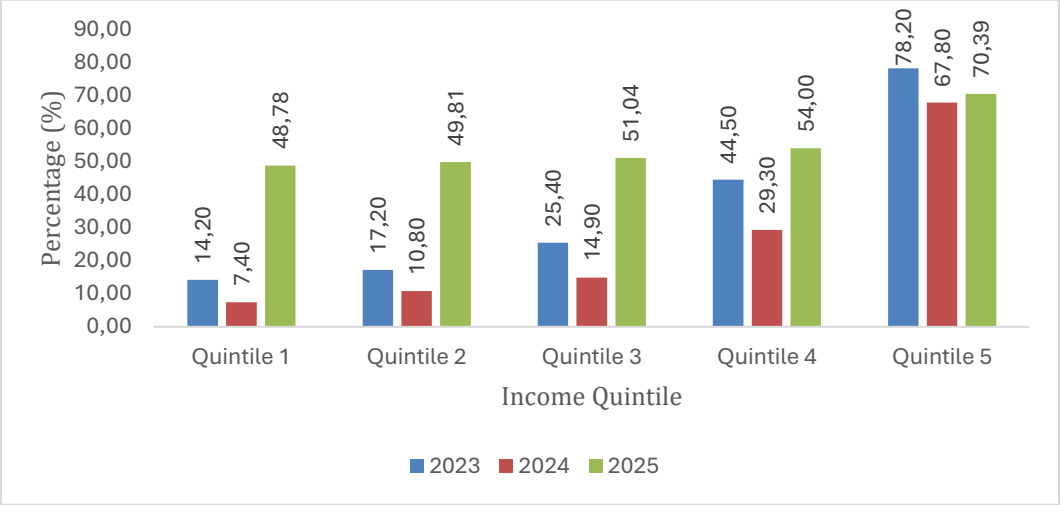


Figure 6. Trends in household participation in packaged palm cooking oil consumption (%) in 2023, 2024, and 2025 by income quintile

Source: Susenas 2023–2025, processed

From a micronutrient intake perspective, packaged palm cooking oil contributes significantly to vitamin A intake, with increased contribution observed in 2025. However, as consumption of this product is highly influenced by access and affordability, the benefits of vitamin A fortification remain unstable and uneven. Thus, the effectiveness of palm cooking oil fortification depends on the stability of the market ecosystem, not solely on the existence of fortification regulations. Without affordable prices, stable supply, and broad access, the benefits of vitamin A from fortified cooking oil are easily diminished, particularly for low-income households.

GAPS THAT NEED TO BE ADDRESSED

Findings from SUSENAS 2023–2025 indicate that the **challenge of mandatory food fortification in Indonesia is no longer at the stage of policy adoption, but rather at effectiveness, equity, and implementation resilience.**

Eastern Indonesia lags behind in several fortification vehicles. Wheat flour consumption in Highland Papua is very low, access to packaged palm cooking oil remains fluctuating, and high coverage of iodized salt does not always translate into adequate iodine intake. This indicates that consumption coverage and product quality must be assessed together.

Disparities are also evident across income quintiles. Households in the lowest quintile consume less of certain fortified foods, particularly wheat flour and packaged cooking oil, resulting in lower micronutrient intake. In contrast, higher-income groups (top quintile) tend to benefit more due to higher and more diverse consumption. The implication is that those most in need—low-income households and populations in remote areas—are not yet fully

reached by the benefits of fortification. Policy needs to shift from a national average-based approach toward a more targeted approach focusing on priority regions and population groups.

Findings from SUSENAS 2023–2025 indicate that the challenge of mandatory food fortification in Indonesia is no longer at the stage of policy adoption, but rather at effectiveness, equity, and implementation resilience.

The following five lessons should serve as the basis for strengthening policy:

1. High participation does not automatically translate into high impact

High consumption coverage of iodized salt and wheat flour is not always accompanied by adequate micronutrient intake. In the case of iodized salt, stable national coverage is still associated with variations in iodine intake across regions, indicating issues related to fortification quality and industry compliance. Therefore, success indicators should not rely solely on household participation. Fortification performance must also incorporate product quality, fortificant levels, market share of compliant products, and consistency of market oversight.

2. Fortification works, but is highly dependent on consumption patterns

The effectiveness of fortification depends on the alignment of food vehicles with population consumption patterns. Although wheat flour has near-universal coverage, it does not deliver the same contribution in areas with low wheat consumption. Packaged palm cooking oil shows a different pattern. Its potential as a source of vitamin A is substantial, but its benefits depend on whether fortified packaged products are affordable and consistently consumed. Therefore, diversification of food vehicles should be selectively considered based on local consumption patterns.

3. National averages mask inequality

National figures may suggest strong performance but often conceal disparities. Behind high participation rates, two major gaps persist:

- Eastern Indonesia lags in several fortified commodities;
- Households in the lowest income quintile have lower micronutrient intake.

These findings underscore the need for fortification policies to be more targeted toward vulnerable populations, rather than focusing solely on national-level achievements.

4. Fortification effectiveness is influenced by market dynamics and policy

In the case of packaged palm cooking oil, Susenas captures sharp changes in coverage within a short period. This indicates that fortification outcomes are influenced by pricing policies, supply, distribution, and affordability.

Fortification must therefore be integrated with food and industrial policies to ensure that fortified products remain available and are consistently consumed.

5. Susenas has strong potential as a consumption-based monitoring instrument

Susenas has proven capable of capturing the dynamics of fortified food consumption, disparities across population groups, and responses to policy changes. Unlike production or distribution data, Susenas reflects what households actually consume. Therefore, Susenas should be integrated into national fortification monitoring and combined with product quality data, industry compliance, and market information.

Overall, mandatory food fortification in Indonesia has reached national scale but has not yet fully achieved equitable and sustainable impact. Going forward, success should be measured by three key dimensions: product quality that meets standards, the ability to reach vulnerable populations, and the resilience of the program to changes in the food system and policy environment.

POLICY RECOMMENDATIONS

Iodized Salt

Policy on iodized salt needs to shift from household participation indicators toward the market share of salt that meets iodine standards. Salt iodization is an effective intervention to prevent iodine deficiency, but its impact depends heavily on the quality of fortification at the production, distribution, and market levels [14,15].

Accordingly, policy direction should move from “how many households consume iodized salt” to “what proportion of salt meets standards and effectively contributes to iodine intake”.

Policy strengthening should focus on three key areas:

- Strengthening quality assurance and industry compliance through testing of iodine levels at production, distribution, and market levels;
- Implementing supply chain-based control, as the relatively concentrated nature of salt production allows for more systematic quality monitoring;
- Integrating market share data, laboratory test results, and Susenas consumption data to assess program effectiveness more comprehensively.

Wheat Flour

Policy should be directed toward three key areas:

- Mapping regions with low wheat consumption and assessing the need for additional micronutrient interventions in those areas;
- Developing diversification of fortification vehicles based on local foods that are technically feasible, consumer-acceptable, and aligned with local consumption patterns;
- Strengthening context-specific nutrition education to ensure that fortification complements, rather than displaces, the consumption of nutritious local foods.

Wheat flour fortification has high coverage, but its effectiveness is determined by consumption patterns. The fundamental principle is that fortified foods are only effective when they are consumed regularly and in meaningful quantities by the target population [16].

The recommended policy direction is to promote fortification strategies that are more aligned with local food systems to ensure more inclusive benefits.

Packaged Palm Cooking Oil

Palm cooking oil fortification has strong potential as a source of vitamin A, but its effectiveness is vulnerable to fluctuations in price, supply, and household access. Therefore, fortification policy for cooking oil needs to be considered alongside food and industrial stabilization policies.

Positioning fortified cooking oil within a nutrition-sensitive food policy framework is a key recommendation for future policy direction.

Policy priorities include:

- Maintaining price stability and supply of packaged cooking oil to prevent sharp fluctuations in household consumption;
- Aligning industrial, trade, and food policies to ensure that Domestic Market Obligation (DMO) policies do not disrupt the distribution of fortified products;
- Positioning fortified cooking oil as a public nutrition instrument, rather than solely as an economic commodity.

National Nutrition Security System

Mandatory food fortification can serve as a foundational pillar of a National Nutrition Security System if strengthened as a cross-sectoral system.

This strengthening should include:

- Integration of fortification with other interventions such as supplementation, food diversification, social protection, and nutritious food programs;
- Utilization of Susenas as a routine monitoring tool to capture actual consumption, disparities, and policy-driven changes;

- Cross-sectoral coordination among health, industry, trade, agriculture, planning, and statistics sectors;
- Data-driven decision-making to ensure policies can adapt to changes in consumption patterns, product quality, and market dynamics.

In this context, policy direction should aim to position fortification as part of an integrated, data-driven, and adaptive National Nutrition Security System architecture.

CONCLUSION

Evidence from Susenas 2023–2025 shows that mandatory food fortification in Indonesia is working, but not yet equitably. The program contributes to micronutrient intake, but disparities remain across regions, income quintiles, and consumption patterns. Therefore, the policy agenda moving forward should focus on narrowing these gaps, rather than merely expanding coverage. The next phase is to ensure that the benefits of fortification are experienced by households in both western and eastern Indonesia, across income groups, and among populations with diverse dietary patterns. This requires policies that are more adaptive, data-driven, and responsive to local food systems.

Mandatory food fortification needs to be positioned as an integral part of the National Nutrition Security System. Within this framework, fortification serves as a foundational intervention that reaches a broad population and complements supplementation, food diversification, social protection, and nutritious food programs. Its success depends on the quality of implementation, consistency of cross-sectoral policies, and strong monitoring systems.

By leveraging Susenas as a routine monitoring instrument, Indonesia has the opportunity to build a more evidence-based, responsive, and accountable nutrition policy. This momentum should be used to ensure that fortification not only achieves national scale but also delivers equitable and meaningful impact for all populations. Mandatory fortification must serve as as a foundation toward an inclusive and sustainable National Nutrition Security System.

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