FILLING INDONESIA'S MICRONUTRIENT GAP: THE POTENTIAL OF FORTIFIED RICE IN THE SOCIAL PROTECTION SYSTEM

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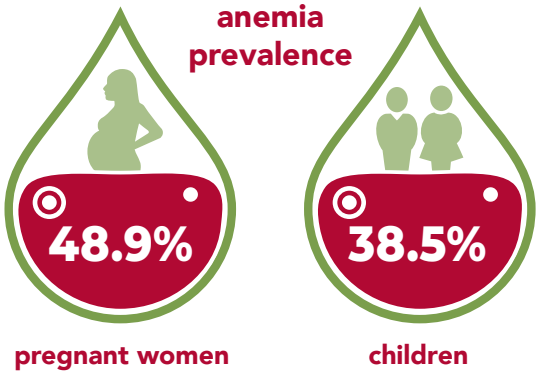
How wide is Indonesia's micronutrient gap?

Micronutrient malnutrition persists as a critical challenge in Indonesia, with those living in poverty being particularly vulnerable due to difficulty affording and accessing foods rich in micronutrients. Iron deficiency anemia, for example, is an issue of great concern, affecting 48.9% of pregnant women and 38.5% of children nationwide.[1]



Given the magnitude of this challenge and its consequences for public health, addressing nutritional inequities and protecting the well-being of Indonesia's most vulnerable communities are of pressing importance. Recognising the urgency of this problem, Indonesia's government has adopted a strategy to address micronutrient malnutrition, which includes improving dietary diversity, providing nutritional supplementation, and fortifying staple foods with critical micronutrients. National efforts have focused on improving the nutritional profiles of commonly eaten essential foods, such as salt and wheat flour, by adding micronutrients typically lacking in people's diets. So far, however, such programs have not delivered the desired objectives [1, 2]. Iron fortification in wheat flour, for example, has yielded modest outcomes, particularly within poor households, where the uptake of fortified wheat flour remains disproportionately low [3-5]. On a more positive note, significant improvements in managing vitamin A and iodine deficiencies have been seen – but this progress will only be sustained in the future through increasing resilience against potential shocks. Current evidence suggests a potential for a focused, resilient fortification strategy to address nutritional disparities and foster nutritional resilience for those most vulnerable.

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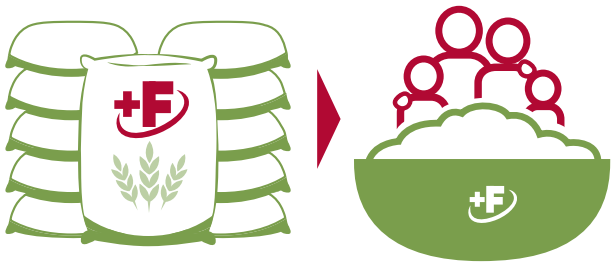
1 Data from Indonesia's Basic Health Research (*Riskesdas*), 2018.

Fortification and social protection systems – an opportunity

In addition to compulsory fortification of essential food items to improve the micronutrient composition of the Indonesian diet, the government has acknowledged the significant role that social protection, including safety net programs, plays in safeguarding people's nutritional wellbeing. It recognizes that increasing consumption of fortified staples though safety net programs has clear potential to improve nutrition and public-health in Indonesia [6].

The Government of Indonesia has also made impressive strides in broadening the coverage of safety nets, boosting their potential to facilitate nutrition impacts at scale. For example, the Sembako program (one of Indonesia's largest social assistance programs) aims to provide monthly payments to an average of 18.8 million beneficiaries [7], which take the form of cash-like food vouchers that can be used to purchase food at approved retail locations ('e-Warongs').



Recent technological strides in rice fortification[2] are emerging as an important opportunity to improve vitamin and mineral intake in Indonesia; particularly given the importance of rice in Indonesian diets (Figure 1). Incorporating essential vitamins and minerals into rice could potentially alleviate micronutrient shortages across the Indonesian population. The effectiveness of rice fortification initiatives relies on establishing and implementing national micronutrient regulations and initiatives to guarantee widespread acceptance and distribution of the fortified product, particularly among the most susceptible individuals. While scaling up rice fortification has the potential to positively influence micronutrient intake across the population, including fortified rice in safety net programs may be particularly impactful, as safety nets, such as Sembako, are a key source of rice for many nutritionally vulnerable people who may not otherwise be able to access fortified rice in retail markets.

Understanding the potential role of rice fortification

To better understand the critical gaps in micronutrient intake that rice fortification might fill, the Ministry of Health, in partnership with the Global Alliance for Improved Nutrition (GAIN), conducted a comprehensive micronutrient gap assessment (MGA)[3]. The assessment looked at micronutrient intake across the Indonesian population, describing the disparities between current consumption levels and recommended dietary intake levels. These efforts are fundamental building blocks for establishing specific criteria for formulating fortified rice kernels (FRK) that correspond to critical nutritional needs. They also highlight the government's proactive position on nutritional enhancement as a crucial element of national health and development.

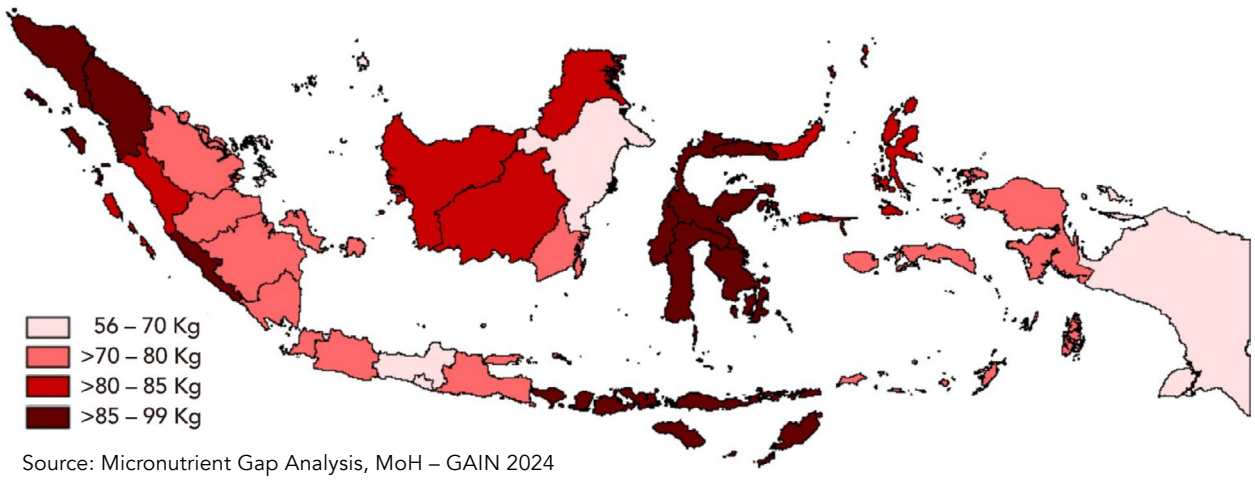
The MGA identified several micronutrient gaps which rice fortification may contribute to alleviating. On average, rice consumption in Indonesia was estimated at 78.2 kg/person/year, with substantial geospatial variability – from 56.2 kg/person/year in

2 The procedure entails deliberately integrating fortified rice kernels into conventional rice, maintaining the grain's inherent sensory attributes while enhancing its nutritious content.

3 An innovative methodological approach was employed in the MGA, which drew from several sources of robust food consumption and household expenditure data from Indonesia, including SKMI 2014, SUSENAS 2014, and SUSENAS 2023.

Papua to 98.7 kg/person/year in West Sulawesi (**Figure 1**). While urban populations tended to consume more rice on average than their rural counterparts, there was little observable variation across income quintiles. This confirms that rice is an important staple for most Indonesians, and, thus, a viable vehicle for delivering micronutrients

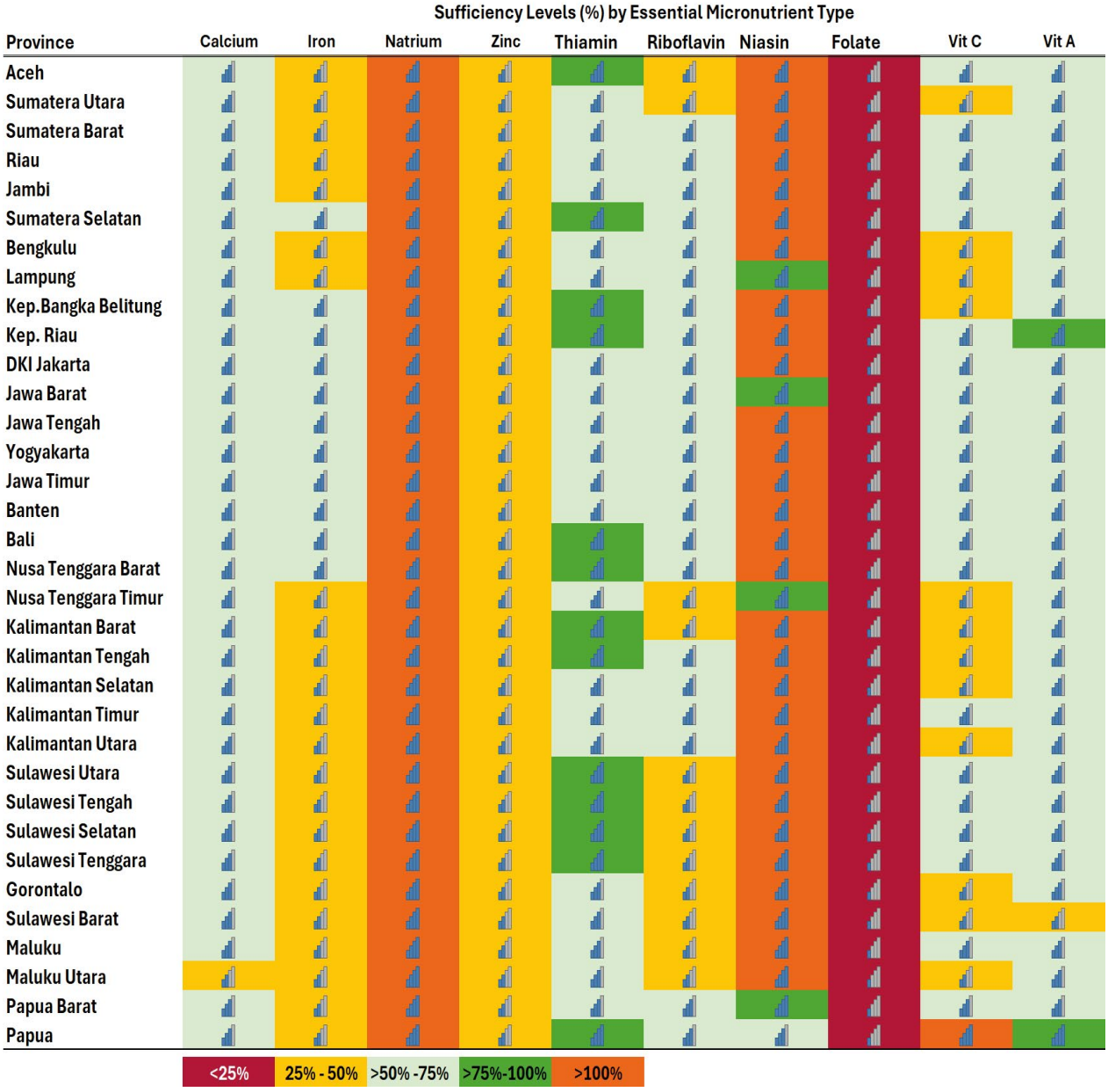
Figure 1 Average Rice Consumption per Province (Kg per capita per year)



Source: Micronutrient Gap Analysis, MoH – GAIN 2024

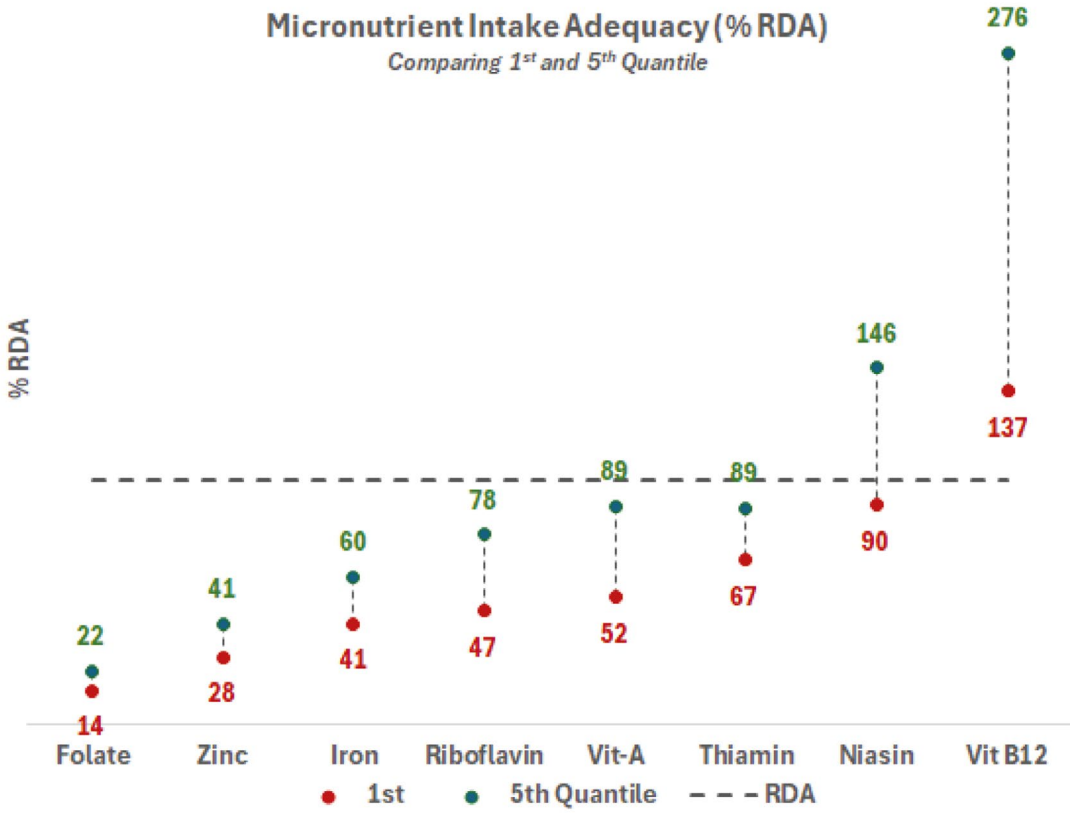
Looking at intake levels of 8 key micronutrients, including iron, zinc, vitamin A, thiamine (vitamin B1), riboflavin (vitamin B2), niacin (vitamin B3), folate (vitamin B9), and vitamin B12. The MGA revealed that compared to recommended dietary allowances (RDAs), current average intake levels observed in the study were particularly inadequate for vitamin B9 (19% adequacy), zinc (32% adequacy), and iron (50% adequacy). Vitamins A, B1, and B2 exhibited adequacy levels >50% relative to the RDAs, while excess intake (>100% of RDA) was observed for vitamins B3 and B12. The micronutrient gaps observed differed across geographical regions of the country, with iron, thiamin, riboflavin, and vitamin C exhibiting the greatest spatial variability (**Figure 2**).

Figure 2 Spatial variability in micronutrient intake sufficiency across regions of Indonesia



For all nutrients examined, adequacy levels were lower for lower-income groups. Among Indonesians in the lowest income quintle, who are those most likely to receive social assistance benefits, micronutrient intake levels were below RDA values for all micronutrients except vitamin B12; the micronutrient gap is very evident when comparing the lowest income quintile with the highest: those in the highest income quintile had better intake adequacy across the board (**Figure 3**).

Figure 3 Essential Micronutrient Adequacy Levels by Income Quintile in Indonesia



Source: Micronutrient Gap Analysis, MoH – GAIN 2024

Based on these findings, and other factors relating to the production of fortified rice kernel and the fortification landscape, several key recommendations can be made regarding micronutrient fortification of rice in Indonesia (**Box 1**). The MGA supports inclusion of iron, zinc, and vitamins B1 and B2 in rice fortification initiatives but cautions against the inclusion of vitamins B3 and B12. Moreover, the study called attention to a potential feasibility barrier associated with adding vitamin A: there are substantial price and stability factors that make vitamin A fortification potentially prohibitive in this context. The study does acknowledge, however, that alternatives for increasing vitamin A uptake, including fortifying palm oil, are already operational in Indonesia. The full results of the MGA will be made available in a forthcoming publication, which will be accessible on GAIN's Social Protection website.

Box 1 Key take-aways from GAIN's Micronutrient Gap Assessment in Indonesia

- Gap analysis is critical in pinpointing micronutrient deficiencies and informing rice fortification strategies to reach those on low incomes.
- Indonesia grapples with widespread micronutrient deficiencies, significantly affecting vulnerable groups, including pregnant women – nearly 50% of whom suffer from nutritional anemia.
- The assessment advocates rice fortification as a critical intervention.
- Significant barriers to rice fortification include cost, price instability, and the absence of fortified rice kernel (FRK) standards, despite government commitment.
- Overcoming rice fortification challenges calls for detailed preparatory studies and the development of FRK premix standards.

This new evidence, which has revealed the extent of the micronutrient gap faced by Indonesia's most vulnerable, demonstrates an urgent call to action for mainstreaming approaches which have the potential to reach nutritionally vulnerable populations at scale – such as rice fortification in social protection systems. Integrating micronutrient fortification into social protection and safety nets can be an effective strategy to improve nutrition of the most vulnerable. Efforts such as the Family Hope Program (Program Keluarga Harapan) and subsidized rice distribution programs catering to poor households will be crucial mechanisms for providing fortified rice to individuals in need, including pregnant women, children, the elderly, and others.

To support this, GAIN is working to promote communication and coordination among governmental entities, private enterprises, and non-governmental organizations. GAIN's approach is driven by the need for inclusive policy creation, which leverages the perspectives of impacted communities to shape nutrition policies and initiatives that align with their specific needs.

Filling the gap through rice fortification and social protection

The MGA clearly described gaps in people's intake of several essential micronutrients; these are gaps that may in part be critical contributors to persistently high rates of anemia and micronutrient deficiencies in the Indonesian population. To encourage the widespread distribution and uptake of fortified rice in Indonesia, especially among the most susceptible populations, integrative approaches are essential. Such approaches mean strong intersectoral cooperation, active engagement of community members, and enhanced public understanding of the advantages of choosing fortified foods.

Initiatives like Sembako, the Family Hope Program (Program Keluarga Harapan), and subsidized rice distribution for low-income households can be important mechanisms for bringing fortified rice to particularly vulnerable groups. Leveraging social protection systems as a mechanism for distributing fortified rice would contribute to the overarching objectives of enhancing the availability, accessibility, and quality of food, as indicated in the stunting prevention measures specified in the Medium-Term National Development Plan (RPJMN) 2020-2024.

GAIN Indonesia is engaging multilateral stakeholders around the topic of rice fortification, including governmental bodies, commercial enterprises, and civil society groups. As the success of nutritional interventions often relies on establishing agreements and including the perspectives of the most impacted populations in the policy-making process, engaging multilateral stakeholders in this effort has set the stage for cooperative and consensus-oriented approaches in the formulation and execution of rice fortification policy in Indonesia.

To bridge the micronutrient gap and to address the changing nutritional requirements of its population, Indonesia must persistently innovate and improve its approaches to nutrition interventions, including fortification. This includes improving how the effectiveness, potential for expansion, and long-term viability of fortification initiatives is evaluated. The acquisition of knowledge from practical experience and international best practices, together with the subsequent adaptation of tactics, will be key to overcome technical, policy, and evidentiary obstacles that presently constrain widespread adoption of rice fortification in the social protection system and in food markets.

A roadmap for scaling-up rice fortification for social protection and beyond

The following roadmap outlines critical steps for expanding Indonesia's rice fortification efforts, integrating them into social protection programs, and ensuring broad coverage and impact:

1 Stakeholder Engagement and Consensus Building

Objective:
Secure commitment and cooperation from all relevant stakeholders.

Actions:

- Convene a multi-stakeholder forum with representatives from government agencies, the private sector, civil society, international organizations, and the community.
- Develop a shared vision and goals for rice fortification to address micronutrient deficiencies.
- Establish working groups focused on policy, technical standards, production, distribution, advocacy, and monitoring.

2 Policy Development and Regulatory Framework

Objective:
Create a supportive policy and regulatory environment for rice fortification.

Actions:

- Collaborate with the Ministry of Health and other relevant bodies to draft and adopt national standards for fortified rice.
- Ensure the inclusion of fortified rice in national nutrition policies and social protection programs.
- Advocate for regulatory incentives for producers and suppliers of fortified rice.

3 Technical Capacity and Production Scaling

Objective:
Build technical capacity for rice fortification and scale production.

- Provide technical assistance and training to rice millers and producers on fortification processes and quality control.
- Facilitate access to fortification technology and micronutrient premixes.
- Encourage public-private partnerships to increase production capacity and efficiency.

4 Integration with Social Protection Programs

Objective:
Incorporate fortified rice into social protection and safety net programs.

Actions:

- Integrate fortified rice and coordinate with agencies responsible for social protection schemes.
- Pilot fortified rice distribution in select communities to refine logistics and gauge acceptability.
- Scale up distribution across national social protection programs, ensuring access among vulnerable populations.

5 Awareness and Demand Generation

Objective:
Increase public awareness and demand for fortified rice.

Actions:

- Launch national and community-level awareness campaigns showing the benefits and taste/texture equivalence of fortified rice.
- Engage healthcare providers, community leaders, and educators in promoting fortified rice consumption.
- Utilize social media and mass communication strategies to reach broad audiences.

6 Monitoring, Evaluation and Adaptation

Objective:
Establish a robust system for monitoring and evaluating the impact of rice fortification.

Actions:

- Develop indicators and data collection tools for assessing coverage, consumption, and nutritional impact of fortified rice.
- Conduct regular evaluations to gather evidence on program effectiveness and areas for improvement.
- Adapt strategies based on evaluation findings, scaling successful practices, and addressing challenges.

7 Sustainability and Scaling Beyond Social Protection

Objective:
Ensure the long-term sustainability and expansion of rice fortification efforts.

Actions:

- Explore sustainable financing models, including government funding, private sector investment, and international aid.
- Identify opportunities for expanding fortified rice into regular market channels beyond social protection schemes.
- Foster innovation in fortification technology and supply chain logistics to reduce costs and increase accessibility.

This roadmap aims to build a cohesive and sustainable approach to scaling up rice fortification in Indonesia, leveraging the strengths of multiple sectors to improve public health outcomes.

Conclusion

Indonesia can make substantial progress toward reducing the micronutrient gap by promoting collaborative and inclusive innovation in rice fortification and across the nutrition sector. Social protection systems have a key role to play in scaling up provision of fortified rice to the Indonesian population, and particularly those who are the most nutritionally vulnerable. Success hinges on solid collaboration, continuous learning, and adaptability to ensure that fortified rice reaches all segments of the population, significantly reducing micronutrient deficiencies.

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