



School Food Environment and Child Nutrition in Indonesia: Policy Insights from UNICEF NEAT-S Assessment

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Abstract

Schools are strategic settings for improving child nutrition because food availability, nutrition education, physical activity, and food marketing influence children's daily food choices. In Indonesia, UNICEF's recent reporting using the Nutrition Environment Assessment Toolkit for Schools (NEAT-S) highlighted important gaps in school food environments and provided policy-relevant evidence for strengthening school-based nutrition programs. This article describes policy insights on school food environments and child nutrition in Indonesia using secondary data from UNICEF Indonesia's Update Gizi Volume 6, April–June 2025, and related school nutrition references. The study applied a secondary descriptive policy review, focusing on SSGI 2024 progress and the NEAT-S assessment conducted in approximately 270 primary schools in Java, South Sulawesi, and Papua. The findings show that Indonesia achieved sustained reductions in child malnutrition between 2013 and 2024, with stunting declining from 37.6% to 19.8%, wasting from 12.1% to 7.4%, and overweight from 11.8% to 3.4%. However, the NEAT-S summary indicated that unhealthy packaged snacks and sugar-sweetened beverages remained widely available in and around schools, while access to fruits, vegetables, and balanced cooked meals was still limited. Key policy gaps included unclear canteen guidance, weak enforcement of existing rules, infrastructure constraints, and insufficient opportunities for physical activity. Improving school food environments requires integrated policies involving school canteen standards, restrictions on unhealthy food availability and marketing, nutrition education, physical activity promotion, student participation, and alignment with the national Free Nutritious Meals programme.

Keywords: Child Nutrition, Healthy School, Indonesia, NEAT-S, Nutrition Policy, School Food Environment

1. Introduction

Child nutrition is influenced not only by household food access but also by the environments in which children learn, eat, and interact. Schools are particularly important because children spend a large proportion of their day in school and are repeatedly exposed to food choices, nutrition messages, peer norms, and opportunities for physical activity [4], [5]. A healthy school food environment can support better dietary behavior by improving the availability of nutritious foods and limiting the promotion and sale of unhealthy products [2], [4]. In contrast, school environments dominated by packaged snacks, sugar-sweetened beverages, and limited physical activity may contribute to unhealthy eating patterns and childhood overweight [12], [13]. Therefore, school-based nutrition policy is a central component of

broader child nutrition and public health strategies [4], [5].

Indonesia has made measurable progress in reducing malnutrition among children under five, but the country continues to face a complex nutrition transition. UNICEF's Update Gizi Volume 6 reported that stunting among children under five declined from 37.6% in 2013 to 19.8% in 2024, while wasting declined from 12.1% to 7.4% and overweight declined from 11.8% to 3.4% over the same period [1]. The 2024 SSGI results also showed further improvement from 2023, with stunting decreasing by 1.7 percentage points, wasting by 1.1 percentage points, and overweight by 0.8 percentage points [1], [8]. Nevertheless, the same UNICEF update emphasized that important disparities remain, including the concentration of approximately half of stunted children, or around 2.3 million children, in only six provinces [1]. These findings indicate that progress must be sustained while policy attention expands to settings that shape child diets, including schools [1], [2].

School food environments are increasingly recognized as important determinants of children's diets and nutrition outcomes. UNICEF developed the Nutrition Environment Assessment Toolkit for Schools (NEAT-S) to help schools and governments identify strengths and gaps in school nutrition environments [3]. The toolkit includes a framework for school nutrition environments, data collection instruments, environmental observations, student attitude questionnaires, dietary quality tools, and reporting forms [3]. In Indonesia, UNICEF recently used NEAT-S to generate evidence on food availability, nutrition education, physical activity, infrastructure, and children's views within school settings [1], [2]. Such evidence is important because nutrition policy should be based not only on national prevalence data but also on the lived realities of children in schools [2], [4].

This article focuses on policy insights from UNICEF's NEAT-S assessment summary as reported in Update Gizi Volume 6. The article uses real secondary data from the UNICEF newsletter and related official sources to discuss school food environments, child nutrition, and policy priorities in Indonesia [1], [2]. The purpose is not to reanalyze individual school-level data, because the available material is a summary report rather than a raw dataset. Instead, this article organizes the available evidence into a JUNG-style policy review manuscript relevant to nutrition and health care. The findings are expected to support discussion on healthier school canteens, nutrition education, physical activity, student participation, and integration with national school-based nutrition initiatives [1], [4], [11].

2. Materials and Methods

This study used a secondary descriptive policy review design. The materials consisted of UNICEF's Update Gizi Volume 6 for April-June 2025, selected official UNICEF and WHO publications on school nutrition environments, and Indonesian nutrition policy references. The method was designed to preserve the real data reported in the UNICEF update while developing a structured article for JUNG. Each sub-section was limited to concise paragraphs and no new numerical results were created beyond the cited data sources. The article therefore presents evidence-based interpretation rather than primary statistical analysis [1], [2], [4].

2.1 Study Design

This article applied a secondary descriptive policy review design. The design was appropriate because the main data source was a published UNICEF newsletter summarizing national nutrition progress and school food environment findings, not a raw dataset [1]. Secondary descriptive review allows existing evidence to be organized into a coherent academic narrative for policy interpretation [4], [5]. The article focused on identifying key school food environment barriers and translating them into policy-relevant recommendations. No direct observation, survey, interview, or anthropometric measurement was conducted for this manuscript.

The analytical orientation was descriptive rather than causal. The article did not estimate statistical associations between school food environments and child nutritional status because individual-level NEAT-S data were not available. Instead, it used the UNICEF-reported findings to describe key issues in the availability of foods and beverages, canteen governance, infrastructure, nutrition education, physical activity, and child participation [1], [2]. This approach is consistent with the use of policy reviews to synthesize evidence for programme planning. The design also



avoids overclaiming causality while still generating practical policy insights [4], [5].

2.2 Data Sources

The primary data source was UNICEF Indonesia's Update Gizi Volume 6, covering April-June 2025 [1]. This document summarized the release of SSGI 2024, national trends in child malnutrition, the NEAT-S school nutrition environment assessment, nutrition education for frontline health workers, and local nutrition initiatives in Aceh, NTT, and South Sulawesi [1]. For this article, the main sections used were the national SSGI 2024 update and the NEAT-S school food environment summary. The document reported a NEAT-S assessment in approximately 270 primary schools in Java, South Sulawesi, and Papua [1]. It also provided qualitative policy-relevant findings on unhealthy food availability, limited healthier options, weak school food policy implementation, infrastructure constraints, and children's voices [1].

Additional references were used to support the policy interpretation. The UNICEF NEAT-S Indonesia report and the regional NEAT-S toolkit were used to clarify the purpose and structure of school nutrition environment assessment [2], [3]. WHO guidelines on healthy school food environments and nutrition action in schools were used to frame policy recommendations related to direct food provision, food and beverage standards, and nudging interventions [4], [5]. WHO physical activity guidance was used because the UNICEF update reported insufficient physical activity opportunities in many schools [1], [6]. These references allowed the analysis to connect Indonesian findings with broader school nutrition and health promotion standards [4], [5].

National nutrition references were used to contextualize the school food environment findings. SSGI 2024 and Riskesdas reports were relevant because the UNICEF update presented trend data from Riskesdas 2013 and 2018 and SSGI 2019, 2021, 2022, 2023, and 2024 [1], [8]-[10]. UNICEF's child food poverty report and the State of Food Security and Nutrition in the World were used to frame the wider challenge of access to diverse, nutritious, and affordable diets [7], [20]. Studies on food labels, packaged snacks, and adolescent nutrition in Indonesia were included to support interpretation of the school environment and food literacy issues [14]-[18]. Together, these sources strengthened the article's relevance to both child nutrition outcomes and school-based dietary behavior.

2.3 Analytical Focus

The analytical focus was divided into two main components. The first component described national child nutrition trends reported in the UNICEF update, including stunting, wasting, and overweight from 2013 to 2024 [1]. These indicators were used to show that Indonesia has made progress in reducing several forms of malnutrition. The second component examined school food environment issues from the NEAT-S summary. This included unhealthy food and beverage availability, limited healthy food options, canteen policy gaps, infrastructure limitations, physical activity, student voice, and policy translation [1], [2].

The article treated school food environment as a policy entry point rather than as a single exposure variable. This was necessary because the UNICEF update reported multiple interacting issues, including the sale of packaged snacks and sugar-sweetened beverages, limited access to fruits and vegetables, unclear canteen guidance, and insufficient facilities [1]. WHO guidance similarly emphasizes that school food environments involve food provision, standards for foods and beverages sold or served, and interventions that nudge healthier choices [4]. Therefore, the analysis used a thematic structure to organize the evidence. This thematic approach is useful for translating summary data into policy recommendations for school nutrition programmes [4], [5].

2.4 Data Analysis and Ethical Considerations

Data analysis was conducted descriptively. Numerical data from the UNICEF update were tabulated without modification, including stunting, wasting, and overweight prevalence by year and the reported changes from 2023 to 2024 [1]. Qualitative findings from the NEAT-S summary were grouped into policy themes: food availability, school canteen governance, infrastructure, physical activity, child participation, and programme integration [1], [2]. The findings were then compared with recommendations from WHO and UNICEF publications to develop policy insights [3]-[5]. Because no raw school-level data were available, no statistical testing was conducted.



This article used publicly available aggregate and narrative data. It did not involve new human participants, individual identifiers, school identifiers, or personal health records. Therefore, additional ethical approval was not required for this secondary descriptive article. Ethical reporting was maintained by citing the original data sources, preserving the original meaning of the findings, and avoiding unsupported causal claims. The article also avoids stigmatizing schools, canteen operators, parents, or children, and instead frames the findings as opportunities for policy improvement [1], [4].

3. Results

The results are presented in four sub-sections. First, the national child nutrition context is summarized using the SSGI and Riskesdas trend values reported in the UNICEF update. Second, the NEAT-S assessment characteristics are described. Third, the main barriers in school food environments are summarized. Fourth, child-centered insights and policy translation opportunities are presented. All findings in this section are based on real data and statements reported in the cited sources [1]-[4].

3.1 National Child Nutrition Context

Indonesia has experienced sustained improvement in child nutrition indicators over the last decade. According to the UNICEF update, stunting among children under five decreased from 37.6% in 2013 to 19.8% in 2024 [1]. Wasting declined from 12.1% to 7.4%, while overweight declined from 11.8% to 3.4% over the same period [1]. These trends indicate progress in addressing multiple forms of child malnutrition. However, the remaining prevalence of stunting and wasting indicates that child nutrition remains an important public health priority [1], [8].

The SSGI 2024 results also showed improvement compared with 2023. The UNICEF update reported that stunting declined by 1.7 percentage points, wasting by 1.1 percentage points, and overweight by 0.8 percentage points from 2023 to 2024 [1]. The Minister of Health reaffirmed the government's commitment to reducing national stunting to 14.2% by 2029, aligned with the RPJMN target [1]. Despite this progress, the update noted that disparities remain across provinces. Approximately half of all children affected by stunting, or about 2.3 million children, were concentrated in only six provinces [1].

Table 1. Child nutrition status trends in Indonesia, 2013-2024

Indicator	2013	2018	2019	2021	2022	2023	2024
Stunting (%)	37.6	30.8	27.7	24.4	21.6	21.5	19.8
Wasting (%)	12.1	10.2	7.4	7.1	7.7	8.5	7.4
Overweight (%)	11.8	8.0	4.5	3.8	3.5	4.2	3.4

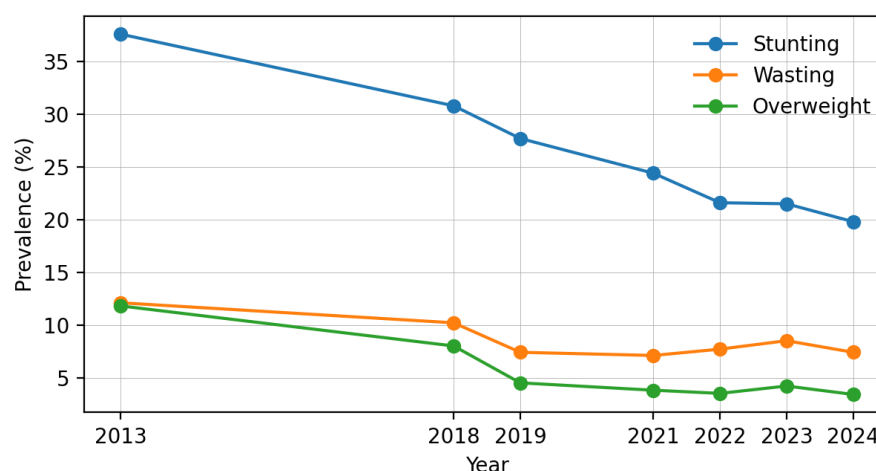


Figure 1. Trends in stunting, wasting, and overweight among children under five in Indonesia, 2013-2024

3.2 NEAT-S Assessment Characteristics

UNICEF's Update Gizi reported that a school nutrition environment assessment was conducted using NEAT-S in approximately 270 primary schools in Java, South Sulawesi, and Papua [1]. The assessment was intended to identify strengths and gaps in school efforts to promote healthy diets and address all forms of malnutrition [1]. The NEAT-S toolkit is designed to help policymakers and schools understand the status of school nutrition environments and prioritize improvements [3]. In Indonesia, this assessment produced evidence for national and local policy discussions on school food and child health [1], [2]. The geographic coverage across Java, South Sulawesi, and Papua is important because school food environments may differ across regions [1].

The assessment examined several dimensions of the school environment. These included the availability of foods and beverages in and around schools, the operation of school canteens, access to healthier food options, infrastructure for food safety, and opportunities for physical activity [1]. It also captured children's own views on healthier schools [1]. This child-centered element is important because children are the primary users of school food environments and can identify practical barriers in their daily school life [1], [2]. The findings therefore provide both institutional and student perspectives on school nutrition environments [1].

3.3 Key Barriers in School Food Environments

The UNICEF update reported that unhealthy food and beverage options remained widely available in and around school environments [1]. School canteens often sold packaged snacks and sugar-sweetened beverages because these products were affordable, easy to store, and popular among students [1]. This finding is consistent with broader evidence that the school food environment can reinforce unhealthy food preferences when ultra-processed and high-sugar products are easily accessible [4], [12]. At the same time, healthier choices such as fresh fruits, vegetables, and balanced cooked meals were still limited in many areas [1]. This imbalance between unhealthy and healthy options is a major challenge for school nutrition policy [1], [4].

The assessment also identified gaps in the implementation of school food policies. Many schools lacked clear guidelines for canteen operations or faced difficulties enforcing existing rules [1]. Without clear and enforceable standards, school canteens may continue to prioritize foods that are profitable, easy to store, and preferred by children rather than foods that support healthy diets [1], [4]. WHO guidance emphasizes the importance of standards or rules for foods and beverages provided, served, or sold in schools [4]. Therefore, the lack of clear canteen guidance represents a policy and implementation gap [1], [4].

Infrastructure constraints further limited the ability of schools to provide safe and nutritious foods. The UNICEF update highlighted inadequate water supply, refrigeration, and food preparation areas as constraints in several schools [1]. Such limitations can make it difficult for schools to provide fresh foods, safe meals, and balanced cooked options [1]. Infrastructure is therefore not a separate issue from nutrition, but a necessary condition for healthier school food provision. Strengthening school canteens requires investment not only in rules but also in facilities that make healthy options feasible [1], [4].

The update also reported that physical activity levels were insufficient, with many schools not meeting WHO recommendations for children [1], [6]. This matters because child nutrition and health are shaped by both dietary intake and energy expenditure [6]. A school environment that offers unhealthy foods while providing limited physical activity opportunities may increase the risk of unhealthy weight gain [4], [6]. Improving nutrition outcomes therefore requires a whole-school approach that combines food environment improvement with physical activity promotion. This reinforces the need to connect nutrition policy, school health, and child-friendly learning environments [1], [5], [6].

3.4 Child-Centered Insights and Policy Translation

One of the important findings from the NEAT-S summary was that children voiced their own expectations for healthier schools [1]. Students called for meaningful changes, including limiting the sale of unhealthy foods, improving access to nutrition education, and creating more opportunities for physical activity [1]. This demonstrates that children are not merely passive



recipients of school nutrition policy. They can contribute practical insights into how school food environments affect their choices and daily experiences. Child-centered approaches can therefore improve the relevance and acceptability of school nutrition programmes [1], [2].

UNICEF reported that it is working with government partners to translate the findings into action [1]. These efforts include strengthening national school canteen guidelines, supporting schools to monitor and improve their food environments, and increasing awareness of healthy eating habits among students and communities [1]. The update also noted the potential integration of these actions with ongoing school-based initiatives, including the national Free Nutritious Meals programme [1], [11]. Such integration is important because food provision programmes can be more effective when accompanied by healthy food environment standards and nutrition education [4], [11]. Therefore, NEAT-S findings can guide both policy design and implementation quality [1], [2].

The key policy implications are summarized in Table 2. The main issues include unhealthy product availability, limited healthy choices, weak canteen governance, infrastructure limitations, inadequate physical activity, and the need for stronger student participation [1]. Each issue requires a corresponding response at the level of school policy, local government support, and national programme integration [4], [5]. These responses should be implemented as a package rather than as isolated activities. A comprehensive approach is more likely to support healthier child nutrition outcomes in Indonesian schools [1], [4].

Table 2. Key NEAT-S policy insights from the UNICEF Update Gizi summary

Issue identified	Reported evidence from UNICEF update	Policy implication
Unhealthy food availability	Packaged snacks and sugar-sweetened beverages remained common in and around schools.	Strengthen rules on foods and beverages sold or promoted at school.
Limited healthy options	Access to fruits, vegetables, and balanced cooked meals remained limited in many areas.	Increase availability and affordability of nutritious foods in school settings.
Canteen governance gaps	Many schools lacked clear canteen guidelines or had difficulty enforcing rules.	Develop clear national and local canteen standards with monitoring.
Infrastructure constraints	Water supply, refrigeration, and food preparation areas were inadequate in some schools.	Invest in canteen facilities and food safety infrastructure.
Insufficient physical activity	Many schools had not met WHO recommendations for children's physical activity.	Integrate nutrition programmes with structured physical activity promotion.
Student voice	Children requested healthier food options, stronger regulation, nutrition education, and more physical activity.	Use child-centered participation in school nutrition planning.

4. Discussion

The findings indicate that Indonesia has made substantial progress in reducing child malnutrition, but the school food environment remains a critical area for policy strengthening. The decline in stunting, wasting, and overweight between 2013 and 2024 shows that national nutrition efforts have produced measurable improvements [1]. However, persistent geographic disparities and the concentration of stunting in several provinces suggest that broad national progress must be accompanied by more targeted and context-sensitive interventions [1], [8]. Schools provide a strategic setting for such interventions because they reach large numbers of children and can influence everyday food choices [4], [5]. Therefore, school food environment policy should be considered part of Indonesia's broader nutrition strategy [1], [4].

The NEAT-S findings show that children's school food choices are shaped by both



availability and institutional rules. When packaged snacks and sugary drinks are affordable, easy to store, and popular, canteens may continue to offer them even when they are not aligned with healthy diet recommendations [1], [4]. This creates a gap between nutrition education messages and the foods actually available to students. Evidence from Indonesia also shows that food labels, snack choices, and nutrition literacy remain important issues for school-age children and adolescents [15], [16]. Thus, school nutrition programmes should combine education with changes in the food environment [4], [5].

Infrastructure emerged as an important but often overlooked determinant of healthy school food environments. Schools cannot easily offer fresh fruits, vegetables, or cooked balanced meals if water supply, refrigeration, and food preparation spaces are inadequate [1]. This means that school canteen reform requires investment in facilities as well as regulations [4]. The Free Nutritious Meals programme offers an opportunity to connect nutrition provision with infrastructure, food safety, education, and local monitoring systems [1], [11]. Without such integration, food provision may improve access to meals but may not fully transform the wider school food environment [4], [11].

The inclusion of children's voices is a strength of the NEAT-S approach. Students requested healthier food options, limits on unhealthy foods, more nutrition education, and greater opportunities for physical activity [1]. This aligns with the idea that school health programmes should be child-centered and responsive to children's daily realities [2], [3]. Child participation may also improve programme acceptance because students are more likely to engage with changes they understand and support. Therefore, student voice should be included in school canteen monitoring, nutrition education design, and physical activity planning [1], [2].

This article has limitations. The analysis was based on a newsletter summary and supporting references rather than raw NEAT-S school-level data, so it could not estimate regional differences, quantify school-level associations, or conduct statistical testing. The UNICEF newsletter reported approximately 270 schools, while UNICEF's standalone NEAT-S Indonesia report page describes 268 schools, so future manuscripts should verify the final sample figure from the full report before submission [1], [2]. Despite these limitations, the available evidence provides useful policy insights for strengthening school food environments in Indonesia. Future research should use the full NEAT-S dataset, compare provinces, examine differences by school type and location, and evaluate the impact of school canteen reforms and the Free Nutritious Meals programme on children's diets and nutrition outcomes [2], [4], [11].

5. Conclusions

UNICEF's Update Gizi Volume 6 shows that Indonesia has made sustained progress in reducing child malnutrition, with stunting, wasting, and overweight all declining between 2013 and 2024 [1]. However, progress in national indicators does not eliminate the need to improve the environments where children make daily food choices. Schools are important settings because they influence food access, nutrition education, physical activity, and child behavior [4], [5]. The NEAT-S assessment summary highlights that unhealthy food availability, limited healthy choices, unclear canteen guidance, infrastructure constraints, and insufficient physical activity remain important challenges in Indonesian schools [1]. These issues should be addressed as part of a whole-school nutrition and health promotion strategy [1], [4].

Policy responses should include clear school canteen standards, stronger regulation of unhealthy foods and beverages, improved access to fruits and balanced meals, and investment in water, refrigeration, and food preparation facilities. Nutrition education should also be strengthened so that children understand healthy diets and can translate knowledge into daily food choices [5], [16]. Physical activity promotion should be integrated with nutrition actions because child health depends on both dietary and activity environments [6]. Student participation is also essential because children directly experience school food environments and can identify practical barriers to healthy eating [1], [2]. Therefore, school nutrition policy should be child-centered, evidence-based, and supported by both national and local implementation mechanisms [1], [4].

The findings are highly relevant to ongoing national initiatives such as the Free Nutritious



Meals programme. This programme can become more effective if it is linked with NEAT-S-based monitoring, canteen reform, school health education, and food safety infrastructure [1], [11]. Future studies should analyze the full NEAT-S dataset, investigate regional disparities, and evaluate whether school food environment improvements lead to better dietary intake and nutrition outcomes. Although this article used secondary summary data, it provides a structured policy interpretation that can support academic discussion and programme planning. Overall, improving school food environments is an important pathway for protecting child nutrition and promoting healthier growth in Indonesia [1], [2], [4].

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