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ORIGINAL RESEARCH ARTICLE

Food Safety Governance of Free Nutritious Meals Program

Integration of Hygiene and Sanitation Certification and Operational Supervision in Palembang

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Abstract: The Free Nutritious Meals (MBG) program requires an effective food safety assurance system to prevent contamination and foodborne disease throughout all stages of food service operations. This study analyzed the implementation of the Hygiene and Sanitation Eligibility Certificate (SLHS) and operational supervision in ensuring food safety within the MBG program and developed an integrated food safety assurance model (IFSAM). Seven informants were selected by purposive sampling based on their involvement in the program: a representative of the Palembang City Health Office, a sanitarian, a Nutrition Fulfillment Service Unit manager, a food handler, an MBG program supervisor, a school principal, and the head of the National Nutrition Agency office serving South Sumatra province. Data were analyzed thematically, with source and method triangulation to establish the trustworthiness of the findings. The results indicate that the SLHS serves as a system readiness mechanism by ensuring the preparedness of food service providers through compliance with hygiene and sanitation standards, while operational supervision functions as an implementation compliance mechanism that maintains the consistent application of standards throughout food production, distribution, and serving. The study also identified several challenges, including suboptimal risk-based monitoring, limited supervisory resources, insufficiently integrated cross-sectoral coordination, and as yet unsystematic feedback and follow-up mechanisms, potentially affecting the effectiveness of food safety assurance. The IFSAM integrates certification, operational supervision, cross-sectoral coordination, feedback mechanisms, and continuous improvement as a conceptual framework for food safety assurance in the MBG program.

Keywords: Free Nutritious Meals program; food safety; Hygiene and Sanitation Eligibility Certificate; operational supervision; integrated food safety assurance model.

1. Introduction

Food safety is one of the primary prerequisites for the implementation of school feeding programs. In addition to ensuring adequate nutritional intake, the food provided to students must comply with food safety standards to reduce the risk of foodborne diseases. The World Health Organization (WHO) estimates that hundreds of millions of foodborne disease cases continue to occur each year, posing a major public health challenge in many countries, particularly among vulnerable groups such as children. School feeding programs, often referred to as school lunch programs, are interventions that regularly provide meals to schoolchildren (Akiyama et al., 2025). Free school lunch policies have been implemented globally to improve nutrition and academic performance (Hadinata, 2026), with successful models in the United States and Japan associated with sustainable policies, stable funding, and integration with the education and health systems (Prawijaya et al., 2025). Although these countries adopt different implementation models, all position food safety as an essential component through the application of hygiene and sanitation standards, quality control, inspection systems, and supervision mechanisms throughout food processing and distribution. The success of school feeding programs is determined not only by the nutritional quality of the meals but also by a governance system capable of ensuring sustainable food safety (Agustini & Mulyani, 2025).

In Indonesia, the Makan Bergizi Gratis [Free Nutritious Meals] (MBG) program is one of the national priority programs aimed at improving the quality of human resources through the provision of nutritious meals for students. A preliminary survey involving 99 elementary school students receiving meals through the MBG program in Palembang showed changes in body weight. The mean body weight of the children before participating in the program was 24.63 kg, which increased to 26.60 kg after one semester of program implementation, with an average weight gain of 1.97 kg. The observed increase in body weight indicates a positive change among most participants after receiving the meal intervention through the MBG program.

To ensure food safety in mass food service operations, the government has established control instruments, one of which is the implementation of the Sertifikat Laik Higiene Sanitasi [Hygiene and Sanitation Eligibility Certificate] (SLHS), which serves as formal recognition that a food processing facility has complied with hygiene and sanitation requirements covering building conditions, sanitation facilities, equipment, food processing practices, and food handler behavior. Food safety is governed nationally by Undang-Undang Republik Indonesia Nomor 18 Tahun 2012 tentang Pangan [Law of the Republic of Indonesia No. 18 of 2012 on Food] and its implementing regulation, Peraturan Pemerintah Republik Indonesia Nomor 86 Tahun 2019 tentang Keamanan Pangan [Government Regulation of the Republic of Indonesia No. 86 of 2019 on Food Safety]. At the technical level, the implementation of the SLHS in Satuan Pelayanan Pemenuhan Gizi [Nutrition Fulfillment Service Unit] (SPPG) kitchens is governed by Peraturan Menteri Kesehatan Republik Indonesia Nomor 11 Tahun 2025 tentang Standar Kegiatan Usaha dan Standar Produk/Jasa pada Penyelenggaraan Perizinan Berusaha Berbasis Risiko Subsektor Kesehatan [Regulation of the Minister of Health of the Republic of Indonesia No. 11 of 2025 on Business Activity Standards and Product/Service Standards in the Implementation of Risk-Based Business Licensing in the Health Subsector]. In addition to certification, the effectiveness of food safety control also depends on continuous supervision by the relevant authorities through technical guidance, field inspections, and evaluations of food service providers' compliance (Albaburrahim et al., 2025; Ayuni, 2025).

Although control mechanisms have been implemented, incidents of health problems associated with food consumption in the MBG program have continued to be reported in several regions of Indonesia. Data compiled by the Jaringan Pemantau Pendidikan Indonesia [Network for Education Watch Indonesia] indicate that the number of suspected food poisoning victims associated with the MBG program reached 21,254 people from January 2025 to January 2026 (Jumantoro & Fahamsyah, 2026). Furthermore, around the observance of World Food Day on October 16, 2025, reports of food poisoning attributed to MBG meals became increasingly widespread (Sibuea et al., 2025). The Badan Pengawas Obat dan Makanan [Indonesian Food and Drug Authority] (BPOM) recorded 17 food poisoning outbreaks associated with the MBG program across 10 provinces from January 6 to May 12, 2025. This information was presented by the Head of BPOM during a hearing with Commission IX of the Dewan Perwakilan Rakyat Republik Indonesia [House of Representatives of the Republic of Indonesia] and was subsequently reported by national media outlets. The same information was also published on the BPOM Data and Information Center portal in its discussion of the BPOM–Badan Gizi Nasional [National Nutrition Agency] (BGN) collaboration. The BPOM investigation identified systematic violations of food safety standards at SPPGs where the poisoning incidents occurred, including inadequate kitchen facilities, poor hygiene and sanitation practices, and insufficient temperature control (Khoiriah & Mulyanti, 2026).

In Palembang, national media reported that several students from State Elementary School 178 Palembang and State Junior High School 31 Palembang were suspected of suffering from food poisoning after consuming meals provided through the MBG program, requiring hospitalization. The Palembang City Government stated that the cause had not been established and that food samples had been submitted for laboratory testing (Pramana, 2025). This indicates that the existence of regulations and certification instruments does not automatically guarantee that all stages of food service implementation comply with food safety principles (Asfarani et al., 2024). Food poisoning incidents associated with meal provision in the city indicate issues that require further investigation, particularly regarding the implementation of hygiene and sanitation standards, the operation of supervision mechanisms, and coordination among stakeholders in ensuring food safety. The risk of food poisoning in the MBG program continues to be managed reactively, characterized by weak early detection, fragmented roles among stakeholders, limited integration of technical and social data, and low levels of transparency and public participation (Syari et al., 2026). These conditions indicate a gap between established food safety policies and their implementation in practice. The existence of the SLHS as an administrative instrument is insufficient to explain how these standards are implemented in the operational activities of SPPGs, how supervision mechanisms operate, and how inter-agency coordination functions in preventing food poisoning incidents (Erinaldi et al., 2025).

Food safety in school feeding programs depends not only on compliance with technical standards but also on the effectiveness of governance in ensuring sustained adherence to those standards. In regulatory governance, a distinction is drawn between ex-ante regulation, which aims to ensure the readiness of service providers through instruments such as certification and licensing, and ex-post regulation, which operates through inspections, monitoring, evaluation, and corrective actions to ensure compliance during implementation. These two mechanisms are complementary in establishing an effective regulatory system.

In the implementation of the MBG program, the SLHS serves as an ex-ante instrument that ensures the readiness of service providers before operations begin, while operational supervision functions as an ex-post instrument to ensure that hygiene and sanitation standards continue to be implemented throughout food production, distribution, and serving. This approach is consistent with the principles of risk-based regulation, which emphasize that regulatory effectiveness is determined not only by initial requirements but also by continuous supervision (OECD, 2021).

At the international level, food safety systems have been developed based on frameworks such as the Codex Alimentarius, the Hazard Analysis and Critical Control Point system, and ISO 22000, which focus on hazard control and food safety management systems at the organizational level (WHO, 2023). However, these frameworks do not specifically address food safety governance in school feeding programs involving multiple government institutions and service providers. This study develops an integrated food safety assurance model (IFSAM) as a governance framework that integrates system readiness, implementation compliance, cross-sectoral coordination, feedback mechanisms, and continuous improvement. The contribution of this study lies in the integration of these components into a single governance model designed to support food safety in Indonesia's MBG program. The study therefore analyzes the implementation of food safety governance in the MBG program by examining the implementation of the SLHS, SPPG operations, the supervision system, and the factors affecting the effectiveness of food safety control in Palembang.

2. Methods

This study employed a qualitative approach using an embedded single-case study design (Asysyauki & Widjaja, 2026; Yin, 2018). The case examined was food safety governance in the implementation of the MBG program in Palembang. Palembang was selected as a single case because it is an implementation site for the MBG program involving multiple stakeholders and food safety governance mechanisms, thereby providing an appropriate context for examining the implementation of the SLHS, operational supervision, cross-sectoral coordination, and feedback mechanisms within a single implementation system.

The study population comprised all stakeholders involved in the implementation of the MBG program in Palembang, including representatives of government agencies, SPPG management, food service providers, educational institutions, and the BGN. The study included seven informants: a representative of the Palembang City Health Office (A1), a sanitarian and environmental health inspection officer (B2), the manager of the SPPG kitchen at 29 Ilir, Palembang (C3), a food handler (D4), an MBG program supervisor (E5), the principal of State Elementary School 175 Palembang (F6), and the Head of Kantor Pelayanan Pemenuhan Gizi Palembang [Palembang Nutrition Fulfillment Service Office], the BGN unit whose jurisdiction covers South Sumatra province (G7). The informants were selected by purposive sampling on the basis of their knowledge, experience, authority, and direct involvement in the implementation of food safety governance within the MBG program. The number of informants was determined by information adequacy, with data collection ceasing once the information obtained was sufficient to address the research objectives and no substantial new information emerged.

Data were collected through in-depth interviews, field observations, document review, and policy document analysis to explore the implementation of the SLHS, the

implementation of operational supervision, coordination among stakeholders, compliance with food safety standards in SPPGs, challenges in the implementation of the MBG program, and improvement efforts that have been undertaken. Data trustworthiness was ensured through source triangulation and method triangulation, as well as by adhering to the trustworthiness criteria of credibility, dependability, confirmability, and transferability (Rashid & Rasheed, 2026). Data were analyzed thematically through interview transcription and data reduction. The resulting themes were synthesized to identify the relationships between the implementation of the SLHS and operational supervision in the food safety governance of the MBG program. This synthesis was used to explain the factors contributing to the persistence of food safety problems despite the implementation of both instruments, and it served as the basis for developing the IFSAM as a conceptual framework for food safety assurance in the MBG program.

3. Results and Discussion

3.1. Implementation of Hygiene and Sanitation Certification in the Free Nutritious Meals Program

The SLHS has become a mandatory requirement for SPPGs in the implementation of the MBG program. The certification process consists of administrative verification, sanitation inspection, and the determination of eligibility based on the applicable hygiene and sanitation standards. This mechanism indicates that the government has established a food safety control system prior to the commencement of food service operations (Noviastuti & Putranti, 2021). These findings indicate that the SLHS functions as a system readiness instrument by ensuring that service providers are prepared to comply with food safety standards before services are delivered.

The data presented in Table 1 show that, as of June 2026, there were 210 SPPG kitchens in Palembang, of which 188 had obtained the SLHS. Several kitchens were still in the process of fulfilling the required technical and administrative

Table 1. Progress of the Sertifikat Laik Higiene Sanitasi [Hygiene and Sanitation Eligibility Certificate] (SLHS) Process for Satuan Pelayanan Pemenuhan Gizi [Nutrition Fulfillment Service Unit] (SPPG) Kitchens in South Sumatra

No.	Regency/City ^a	Operational SPPG Kitchens	SLHS Issued	Food Handlers Trained
1	Ogan Komering Ulu Timur	49	49	1,475
2	Ogan Komering Ulu Selatan	7	7	300
3	Ogan Komering Ulu	21	19	651
4	Ogan Ilir	39	34	827
5	Ogan Komering Ilir	57	39	1,090
6	Lahat	8	11	476
7	Pagar Alam	10	6	284
8	Empat Lawang	16	11	322
9	Muara Enim	29	22	762
10	Penukal Abab Lematang Ilir	6	4	300
11	Prabumulih	12	8	416
12	Banyuasin	45	26	1,078
13	Musi Banyuasin	32	23	1,450
14	Musi Rawas	35	23	1,078
15	Lubuklinggau	29	18	1,050
16	Musi Rawas Utara	14	0	750
17	Palembang	210	188	1,837
Total		619	488	14,146

^a Palembang, Prabumulih, Pagar Alam, and Lubuklinggau are cities; the remaining 13 units are regencies.

Source: South Sumatra Provincial Health Office (2026).

requirements. These findings indicate that although the implementation of the SLHS has progressed well, its coverage has not yet extended to all MBG service providers. This suggests that expanding certification coverage remains a challenge in achieving an equitable food safety system.

Informant B2 indicated that compliance with the SLHS requirements was supported by the availability of hygiene and sanitation facilities, the implementation of standard operating procedures, and technical assistance provided by the Health Office throughout the certification process. However, several challenges remained, including the limited number of sanitarians, the need to improve certain facilities, and the time required to fulfill all technical requirements. These findings indicate that the effectiveness of SLHS implementation depends not only on the readiness of service providers but also on the government's institutional capacity to provide adequate resources, technical assistance, and supervision. The limited number of sanitarians may reduce the frequency of technical assistance and inspections, thereby limiting the effectiveness of certification and capacity-building activities. This finding is consistent with street-level bureaucracy theory, in which frontline implementers often make decisions that directly affect the public without adequate oversight, potentially resulting in policy deviations (Sede et al., 2025). These resource constraints encourage frontline officers to adjust work priorities and exercise discretion in carrying out their duties, which may ultimately affect the consistency with which hygiene and sanitation standards are implemented. Strengthening institutional capacity through additional resources, enhanced staff competencies, and improved inter-agency coordination is therefore an essential prerequisite for improving the effectiveness of the certification system.

Although the implementation of the SLHS has progressed, holding the certificate does not fully guarantee the consistent application of food safety standards in daily operations. Informant C3 stated that the support provided by technical officers and sanitarians to the SPPG kitchens in Palembang remains primarily focused on assisting service providers in meeting certification requirements, while supervision of the consistent implementation of standards after the certificate has been issued remains limited. The most frequently identified problems include kitchen ventilation that does not meet the required standards, suboptimal waste management, inadequate separation of raw and cooked food materials, incomplete compliance with requirements for laboratory testing of water quality and cooking-utensil swabs, and the absence of competency certificates among some food handlers.

These findings indicate that the implementation of the SLHS remains more oriented toward compliance-based certification than toward strengthening continuous operational compliance. This condition suggests a gap between the ex-ante regulatory mechanism, which assesses the readiness of service providers before operations begin, and the ex-post regulatory mechanism, which ensures that food safety standards continue to be implemented in daily practice. Beyond limited supervisory capacity, this condition also reflects the suboptimal integration of cross-sectoral guidance, monitoring, and evaluation functions. Consequently, certification has not yet fully functioned as a sustainable food safety assurance instrument but has instead primarily served as an initial verification of compliance with requirements prior to the commencement of operations.

Certification places greater emphasis on compliance with requirements during the initial stage, whereas adherence to standards throughout food preparation, distribution, and serving requires continuous supervision (Noor & Fatmiasih, 2017). These findings are consistent with the food safety system principles of WHO and the

Food and Agriculture Organization, which regard certification as an initial step in food safety assurance, with its effectiveness depending on continuous supervision and evaluation. The SLHS serves as a foundation for food safety governance; however, it is insufficient unless integrated with operational supervision.

3.2. Operational Supervision in the Implementation of the Free Nutritious Meals Program

Operational supervision in the implementation of the MBG program in Palembang is conducted continuously, beginning with food preparation at the SPPGs, followed by distribution to schools, and continuing until the meals are received and consumed by students. This supervision aims to ensure that the hygiene and sanitation standards met at the time of certification are consistently maintained throughout the entire food service chain (Putra, 2022).

Based on the interview with informant F6, the primary objective of applying these standards is to ensure food safety for the program's target beneficiaries, particularly children receiving meals through the MBG program. Every SPPG kitchen in Palembang is required to comply with hygiene and sanitation requirements and apply for the SLHS through the Health Office. Informant A1 stated that sanitarians from the community health center with jurisdiction over each SPPG monitor the hygiene and sanitation aspects of the kitchens, including building cleanliness, equipment sanitation, water quality, waste management, the use of personal protective equipment by food handlers, the separation of raw and cooked food materials, and compliance with prescribed food processing procedures. In addition to conducting field observations, the officers also review sanitation records, food handlers' health examination results, and the implementation of recommendations provided during previous supervisory visits.

Supervision does not end at the production stage but continues throughout the food distribution process to schools, which serve as the final service delivery points of the MBG program. Informant E5 stated that officers monitor food packaging procedures, the cleanliness of food containers, the condition of distribution vehicles, the timeliness of delivery, and compliance with transportation procedures to ensure that the meals remain safe until they are received by the beneficiaries. The distribution stage receives particular attention because delayed delivery, damaged packaging, or contamination during transportation may increase the risk of deterioration in food quality and safety.

At the school level, informant F6 stated that supervision is conducted by inspecting the condition of the meals on receipt, before distribution to students. The inspection includes verifying the number of meal portions, the physical condition of the food and its packaging, and the time of meal delivery. If meals are found not to meet the required standards or are suspected of being damaged, the school immediately reports the issue to the SPPG for follow-up. Under certain circumstances, informant A1 stated that the Health Office also conducts field investigations when reports of suspected food poisoning or outbreaks associated with the MBG program are received.

The findings also indicate that operational supervision places greater emphasis on guidance and capacity building rather than on the imposition of sanctions. Informant B2 stated that any identified non-compliance, such as the inconsistent use of personal protective equipment, incomplete sanitation records, or non-compliance with distribution procedures, is initially addressed through recommendations for improvement and technical assistance. Follow-up monitoring

is then conducted to ensure that all recommendations have been implemented by the service providers so that food safety standards can be maintained continuously.

The findings indicate that operational supervision is a key component of food safety assurance in the MBG program because it ensures the sustained application of standards after service providers have obtained the SLHS. Certification reflects compliance only at the time of assessment, whereas food safety must be ensured through continuous supervision throughout food production, distribution, and serving to students.

The supervision system has adopted a food safety chain approach, under which supervision is conducted at every stage of food service implementation. This approach is essential because the risk of contamination exists not only during food preparation in the kitchen but also throughout distribution and meal serving at schools. Food safety depends not only on kitchens meeting the required standards but also on the ability of all stakeholders to maintain food quality until it is consumed by students.

Although the supervision mechanism has been implemented, this study identified several challenges, including the limited number of sanitarians relative to the large number of SPPGs requiring supervision, inconsistencies in monitoring practices across different areas, and reporting coordination that needs to be strengthened among SPPGs, schools, community health centers, and the Health Office. These conditions may reduce the effectiveness of early detection of hygiene and sanitation deficiencies as well as food safety risks during food distribution (Robuwan et al., 2025).

Operational supervision should be strengthened through the implementation of a more integrated monitoring system, increased frequency of risk-based inspections, the development of well-documented reporting mechanisms, and enhanced cross-sectoral coordination (Fauziah & Suparmi, 2022). Extending supervision across the entire food service chain, from food preparation at SPPGs to meal delivery and receipt by students at schools, will provide stronger assurance of food safety and support the sustainable implementation of the MBG program (Febryanti et al., 2025).

3.3. Analysis of the Factors Contributing to Persistent Food Safety Problems

Food safety problems in the MBG program in Palembang are not caused by a single factor but rather represent the cumulative effect of multiple interrelated factors associated with the certification process, operational implementation, and the supervision system. Based on interviews, field observations, and document review, the findings indicate that the existence of the SLHS alone has not been sufficient to ensure the consistent implementation of hygiene and sanitation practices throughout food service operations.

The findings indicate that although some service providers had fulfilled the administrative and technical requirements to obtain the SLHS, hygiene and sanitation standards were not always implemented consistently after certification. Compliance with requirements for personal protective equipment, sanitation record-keeping, environmental hygiene, and operational procedures remained highly dependent on the commitment of managers and the discipline of food handlers. These findings indicate that certification functions primarily as an initial compliance instrument, whereas maintaining food safety standards requires continuous supervision and evaluation.

In addition, operational supervision has not yet been implemented optimally across all stages of the MBG program. The limited number of sanitarians relative to the number of SPPG kitchens requiring supervision has prevented routine monitoring from covering every location. Consequently, some instances of non-compliance are identified only during periodic inspections or after reports are submitted by the community or schools.

Problems were also identified during food distribution to schools. Although distribution procedures have been established, supervision of delivery timeliness, food container conditions, vehicle cleanliness, and temperature control during transportation has not been implemented consistently across all service providers. Moreover, the distribution stage represents one of the critical points at which contamination or deterioration of food quality may occur if not adequately supervised.

At the school level, the reporting mechanism regarding the condition of meals on receipt has also not been fully integrated with the supervision systems of the Health Office and SPPGs. Schools generally report only when visible problems occur, such as damaged food or suspected food poisoning. By contrast, minor findings that may become risk factors are often not systematically documented and therefore have not yet become part of the evaluation process for improving food safety implementation.

From an institutional perspective, this study found that inter-agency coordination remains a challenge in implementing food safety supervision for the MBG program. Although each institution has established roles and authority, mechanisms for coordination, exchange of supervision data, and follow-up on recommendations have not yet been integrated. This condition results in guidance, monitoring, and evaluation processes continuing to operate in a sectoral manner, thereby limiting the effectiveness of supervision (Herdiana, 2025).

The primary cause of persistent food safety problems does not lie in the absence of regulations but rather in the suboptimal implementation of a comprehensive food safety system. The SLHS is an instrument that ensures facilities meet hygiene and sanitation requirements before commencing operations; however, certification cannot guarantee that all standards will continue to be followed without continuous supervision. Food safety should be viewed as a process that requires ongoing control rather than merely fulfilling requirements at the time of certification.

The findings also indicate that operational supervision has not fully adopted a risk-based approach. Limited supervisory resources have resulted in supervision priorities being directed toward routine inspections rather than the identification of critical points with a high risk of food contamination. In modern food safety systems, supervision should focus on stages with the greatest potential for hazards, such as food processing, distribution, and serving (Nango et al., 2025).

In addition to resource factors, cross-sectoral coordination is also a major determinant. The MBG program involves multiple institutions: the BGN, the Health Office, community health centers, SPPGs, and schools. The findings indicate that the effectiveness of supervision is highly influenced by the clarity of coordination mechanisms, information exchange, and follow-up actions on monitoring results. When each institution acts within its own authority but is not linked through an integrated supervision system, the potential for gaps in supervision increases.

Based on the synthesis of all research findings, the persistence of food safety problems in the MBG program appears to be a consequence of the lack of integration among three key components of the food safety system: hygiene and sanitation

certification, operational supervision, and continuous evaluation mechanisms. These three components continue to operate in isolation and have not yet formed a food safety governance system capable of ensuring risk control throughout the entire food service chain. Therefore, strengthening governance is required through the integration of certification, risk-based supervision, documented reporting systems, and more effective cross-sectoral coordination to ensure that the MBG program can sustainably provide food that is safe, of high quality, and fit for consumption. Such integration depends on strengthening coordination at the local level through regular coordination meetings, standardized reporting systems, clear role allocation, and continuous technical support (Prasetyo et al., 2026).

3.4. Development of the IFSAM

Food safety in the MBG program cannot be ensured solely through the separate application of the SLHS or operational supervision. The synthesis of interview findings, field observations, and document review indicates that these two instruments have complementary functions in establishing a food safety assurance system. The SLHS ensures the readiness of service providers before operations begin, while operational supervision ensures that the standards met at certification continue to be observed throughout the food service process.

The findings indicate that the SLHS provides assurance of system readiness, namely, the preparedness of the food service system through compliance with hygiene and sanitation requirements, the adequacy of buildings and facilities, the availability of sanitation infrastructure, operational procedures, and food handler competencies. However, holding the SLHS alone has not been sufficient to prevent operational deviations if it is not accompanied by continuous supervision. Certification represents the starting point of food safety control rather than the final objective of a food safety assurance system (Tumbol & Purnantara, 2024).

On the other hand, operational supervision serves an implementation compliance function, ensuring that all requirements fulfilled during the certification stage continue to be met consistently throughout production, distribution, and meal receipt by students. Monitoring activities, sanitation inspections, compliance evaluations, guidance, and follow-up actions based on supervision results are key instruments in maintaining the sustained implementation of food safety standards. Nevertheless, the effectiveness of supervision remains influenced by limitations in supervisory resources, cross-sectoral coordination, and reporting and follow-up mechanisms that have not yet been fully integrated.

Based on the synthesis of all research findings, this study developed the IFSAM. This model illustrates that food safety assurance in the MBG program is a system established through the integration of certification as an instrument of system readiness and operational supervision as an instrument of implementation compliance. These two components are connected through continuous monitoring processes, cross-sectoral coordination, feedback mechanisms, and corrective actions applied continuously to ensure sustainable improvement.

The IFSAM positions food safety as the outcome of a continuous control cycle. At the initial stage, service providers must fulfill all hygiene and sanitation requirements to obtain the SLHS as evidence of system readiness. After operations begin, periodic supervision is conducted throughout the entire food service chain, including food preparation at SPPGs, food distribution, and meal receipt and serving at schools. The results of supervision subsequently serve as the basis for capacity building, corrective actions, and evaluation to address any identified non-conformities. This

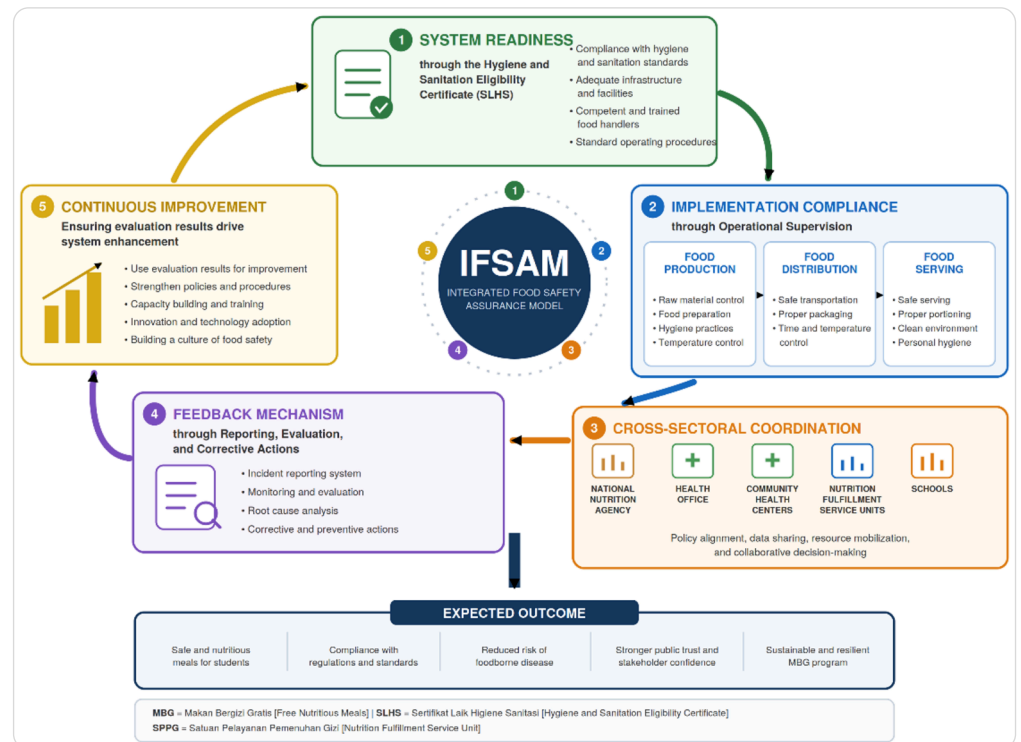


Figure 1. Integrated Food Safety Assurance Model (IFSAM) for Food Safety Governance in the Free Nutritious Meals Program

Source: Developed by the authors (2026).

cycle continues, forming a food safety assurance system that can adapt to various potential risks.

The IFSAM developed in this study indicates that food safety in the MBG program cannot be ensured solely through a certification approach or partial operational supervision. These two instruments have different characteristics but are complementary. The SLHS focuses on fulfilling standards before operational activities begin (ex-ante control), whereas operational supervision functions to control compliance during program implementation (ex-post control). The integration of these two instruments creates a more comprehensive control system than either would provide on its own.

The IFSAM consists of five main components: (1) system readiness through the SLHS; (2) implementation compliance through operational supervision at the production, distribution, and serving stages; (3) cross-sectoral coordination among the BGN, the Health Office, community health centers, SPPGs, and schools; (4) a feedback mechanism through reporting, evaluation, and corrective actions; and (5) continuous improvement, which ensures that each evaluation result becomes the basis for system refinement.

The integration of these five components produces a more comprehensive, systematic, and sustainable food safety assurance framework to support the success of the MBG program. These findings expand the concept of food safety assurance, which has traditionally focused on compliance with technical hygiene and sanitation requirements. The findings indicate that successful food safety implementation is also determined by the system's ability to conduct continuous monitoring, establish cross-sectoral coordination, operate rapid feedback mechanisms, and ensure that every supervision finding is followed up with documented corrective actions. Food safety is positioned as a governance process involving interactions among actors and

control mechanisms, rather than merely as the fulfillment of administrative standards.

The IFSAM also emphasizes that the implementation of the MBG program requires a continuous quality improvement approach based on monitoring and evaluation results. In this model, each supervision finding serves not only as a basis for compliance assessment but also as a source of organizational learning to improve the quality of food safety implementation in subsequent cycles. This approach enables the food safety system to develop adaptively in response to changing risks and operational challenges in the field.

4. Conclusion

The effectiveness of food safety assurance in the Makan Bergizi Gratis [Free Nutritious Meals] (MBG) program is determined not only by compliance with hygiene and sanitation standards through the Sertifikat Laik Higiene Sanitasi [Hygiene and Sanitation Eligibility Certificate] (SLHS), but also by the integration of operational supervision, cross-sectoral coordination, feedback mechanisms, and continuous improvement. These findings expand the perspective of food safety governance from a regulatory compliance-oriented approach to a dynamic and adaptive governance approach through the development of the integrated food safety assurance model (IFSAM).

This study has several limitations. First, it employed a single-case study design in Palembang; therefore, the findings cannot be generalized to all regions of Indonesia. Second, the IFSAM was developed through the synthesis of empirical findings within a single implementation context, and its transferability needs to be tested in areas where MBG implementation differs. Future studies should validate the IFSAM through expert panels using the Delphi method or other expert consensus techniques, and examine its application across regions with different MBG implementation characteristics. In addition, quantitative studies can be conducted to test the relationships among IFSAM components and assess their influence on food safety performance.

The government needs to establish a risk-based food safety supervision system that integrates SLHS inspection data, operational monitoring of Nutrition Fulfillment Service Units, food safety incident reports, and corrective and follow-up actions into a shared information system accessible to the National Nutrition Agency, the Health Office, and local governments. Furthermore, periodic evaluation mechanisms should be established, along with key performance indicators to measure service providers' compliance with food safety standards.

DECLARATIONS

AI Use Statement

The author used ChatGPT only for analysis, and final writing remain the responsibility of the authors.

Author Contributions

P.E.: conceptualization, methodology, writing-original draft; B.A.H.: data curation, formal analysis, visualization; H.S.: supervision, validation, writing-review & editing.

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Competing Interests

The author declare tat there is no conflict of interest related to the publication of this article.

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