Supply Chain Risk for the Program of Makan Bergizi Gratis at Satuan Pelayanan Pemenuhan Gizi Bantarbarang Purbalingga

Faizah Noviani[1,2], Irene Kartika Eka Wijayanti[1,3], Dindy Darmawati Putri[1,3], Akhmad Rizqul Karim[1,3], Djiemy Kusnaman[1,3]

[1]Magister Agribisnis Fakultas Pascasarjana, Universitas Jenderal Soedirman, Indonesia
[2] Program Studi Agribisnis Fakultas Sains dan Teknik, Universitas Perwira Purbalingga, Indonesia
[3]Sosial Ekonomi Pertanian, Fakultas Pertanian Pascasarjana, Universitas Jenderal Soedirman, Indonesia
Corresponding email: faizah.noviani@mhs.unsoed.ac.id

Abstract

Makan Bergizi Gratis Program (MBG) is a national priority program regulated by Perpres Number 83 of 2024 and implemented by the Badan Gizi Nasional (BGN) as a strategic intervention to address Indonesia's nutritional challenges. The program success relies heavily on reliable supply chain management to ensure continuity, nutritional quality, and food safety, however, its field implementation faces complex supply chain management challenges. Satuan Pelayanan Pemenuhan Gizi (SPPG) Bantarbarang is one of the kitchen units participating in the MBG program, located in Rembang District of Purbalingga Regency. This study aims to identify supply chain risks associated with the MBG program using the Supply Chain Operations Reference (SCOR) method. Risks were identified across the 5 (five) SCOR stages, there are plan, source, make, deliver, and return. Risk mapping was based on the activities of supply chain stakeholders involved with SPPG Bantarbarang, including suppliers, SPPG staff, program beneficiaries, and supervisors. The results indicate that production risk is the most critical risk requiring immediate attention. This risk is interconnected with others such as reliance on single supplier, leading to issues ranging from production delays to raw materials becoming unfit for consumption.

Keywords: *Supply Chain Risk*; Makan Bergizi Gratis Program; SPPG Bantarbarang; Purbalingga

I. INTRODUCTION

The development of superior human resources (HR) is Indonesia's main pillar in optimizing the demographic bonus and realizing the vision of a "Indonesia Emas" 2045. According to the report Hidayat, Wahyu *et al.*, (2025) Hiseaat, Revelation *et al.*, (2025) Indonesia is currently faced with a crucial challenge that arises in the form of *triple burden of malnutrition* that is, a condition in which malnutrition occurs (*Undernutrition*), micronutrient deficiency (*Hidden hunger*), and nutritional overload (*Overnutrition*). The government began to launch the Makan Bergizi Gratis Program (MBG) through Presidential Regulation Number 83 of 2024 implemented by the Badan Gizi Nasional (BGN) as a strategic intervention step to face the challenges of fulfilling Indonesia's nutrition. This program not only functions as a daily nutrition intervention for school-age children, pregnant women, and toddlers, but is also positioned as an instrument of local economic development through the mandatory absorption of food commodities from local producers, cooperatives, and BUMDES (Fauzia, M.E., *et al.*, 2026). The governance of the Makan Bergizi Gratis Program is also officially regulated in Presidential Regulation of the Republic of Indonesia Number 115 of 2025 which is carried out through the Satuan Pelayanan Pemenuhan Gizi (SPPG) as a technical implementation unit. This program is expected to create a positive impact on village-level agribusiness actors. SPPG plays the role of a central kitchen unit responsible for procurement, processing, and distribution of food to beneficiaries.

The success of MBG relies heavily on the reliability of supply chain management to ensure continuity, nutritional quality, and food safety, but the implementation of MBG programs in the field faces complex supply chain management challenges. A supply chain is a series of processes and activities that in the production, processing, distribution, and delivery of products reach the end consumer. Denashurya (2024) mentioned that the supply chain is not only about the physical flow of products, but also includes the flow of information and money flow. Collaboration between various supply chain actors is needed to ensure that all actors involved receive fair and timely compensation. The main risks identified in the makan bergizi gratis program include distribution and logistics barriers in areas with limited transportation access, fluctuations in daily food commodity prices, and delays in the distribution of operational funds. Long food distribution chains result in delays in delivery which can result in a decrease in the quality of food received by beneficiaries. This is in line with research Basuki et al., (2026) who said that infrastructure inequalities in various regions also resulted in disparities in the quality of services for the MBG program.

Satuan Pelayanan Pemenuhan Gizi (SPPG) Bantarbarang in Rembang District, Purbalingga Regency is one of the kitchen units that also joins the Makan Bergizi Gratis Program. SPPG Bantarbarang is located in the locus of a highland area that has a unique distribution risk profile such as slippery roads, winding roads, forests, and lack of lighting along its main road. Geographically, the Bantarbarang area, Rembang District is the second farthest area from the city center of Purbalingga Regency with a distance of about 30 kilometers. According to Orbawati et al., (2025), the condition of the Bantarbarang SPPG area greatly affects the quality of MBG program services because urban areas generally provide better facilities compared to remote areas. Limited accessibility can result in delays in supply which can ultimately affect production schedules.

Based on the results of the research survey, it was stated that SPPG Bantarbarang has collaborated with partners of the Duta Jateng Peduli Foundation, where the foundation houses many kitchens in several districts and among them there are five SPPG kitchens in Purbalingga Regency, such as Senon in Kemangkon District, Bukateja in Bukateja District, Bantarbarang in Rembang District, Kejobong in Kejobong District, and Pekuncen in Bobotsari District. This foundation makes the central cooperative located in Kejobong the one and only supplier who deliver raw materials to 5 points of their partner's kitchen locations. Judging from the geographical distance and distribution access between the location of the cooperative, the SPPG kitchen, to the beneficiaries managed by SPPG Bantarbarang, risk mapping is needed to ensure the nutritional quality of the raw materials that will be processed to the beneficiaries of the MBG program. Principle *Circular causality* included in one of the principles of System Theory which states that the existence of changes or inaccuracies in one part will affect the course of the entire system (Heryana, 2021). This theory is the basis for the importance of the accuracy of the distribution of the MBG program from the entry of raw material supply to beneficiaries with access constraints at SPPG Bantarbarang. The partnership between the Duta Jateng Peduli Foundation and the government through the MBG program can help sustainability in expanding the adoption of sustainable agribusiness. This collaboration often includes technical assistance, access to funding, and awareness campaigns. However, excessive dependence on one supplier can increase the risk of supply disruptions.

The main crucial things such as the basic characteristics of local agricultural commodities that are perishable goods demands a responsive and low-risk supply chain system. Food safety is critical in the supply chain of the MBG program which involves contamination prevention, proper handling, and ensuring that the products that reach the beneficiaries are safe for consumption (Denashurya, 2024). The problems encountered in the Satuan Pelayanan Pemenuhan Gizi Bantarbarang as one of the public service institutions that implement the MBG program really require risk mapping. Haifa *et al.*, (2019) mentions that

Supply Chain Operation Reference (SCOR) can be used to help map risks that may occur and can be mitigated. SCOR is very important to be used to minimize risks at SPPG Bantarbarang. Without systematic risk analysis, the sustainability of the program in this location is vulnerable to supply disruptions, price instability, and the risk of food contamination. Therefore, it is necessary to conduct a study entitled "Supply Chain Risk for The Program Of Makan Bergizi Gratis at Satuan Pelayanan Pemenuhan Gizi Bantarbarang" to identify risk events (*Risk event*) and risk agents (*Risk Agent*) using a scalable method.

This study aims to determine the supply chain risk of the MBG program at SPPG Bantarbarang. Makan Bergizi Gratis (MBG) program has begun to be studied by researchers but is still in the development of the literature. This is different from previous research related to supply chain management (SCM), risk, and mitigation which has been carried out but is still limited to only objects in one commodity, so this study offers a combination of agribusiness risk framework and SPPG Bantarbarang operational model which has unique characteristics as a local food procurement center as well as a public kitchen for the MBG program.

II. METHOD

This research was conducted at the Satuan Pemenuhan Gizi (SPPG) Bantarbarang, Rembang District, Purbalingga Regency. The place for this research was chosen purposively, which is a method of determining the location of the research that is carried out deliberately based on certain considerations. These considerations are seen in terms of location, possible risks that occur, and the results of the research pre-survey obtained. Pre-survey results indicated that the Bantarbarang SPPG site carries a higher level of risk compared to the four other SPPG kitchens under the auspices of the Duta Jateng Peduli Foundation and located in Purbalingga Regency. This is seen in terms of the distance between the location of the kitchen and the supplier cooperative; the road terrain is steep, slippery, winding, and lacks lighting; and the special disposal site for food waste has not been built.

This study is an observation of a case study using the *Mix Method* which consists of qualitative and quantitative descriptive. According to Hidayat (2022), case study research is a type of research that allows using various methods of data collection according to the needs and objectives intended. The data collection method in this study requires primary data and secondary data.

a) Primary data, which is collected directly from the first source by means of surveys and observations in the field. Primary data in this study are related to supply chain flows, risks, emerging risk agents, risk assessments, risk agent assessments, and mitigation assessments applied.
b) Secondary data is a written document of the relevant agency. The document is obtained from reading books, the internet, and other sources related to the title of the research and the data collected. The secondary data in this study is related to the profile of the Satuan Pelayanan Pemenuhan Gizi, supply chain flow, and emerging risk data.

The informant is taken from a party who knows the condition of the supply chain at SPPG Bantarbarang. The informant includes 1 supplier who are cooperative employees of the partners of the Duta Jateng Peduli Foundation, 9 employees of SPPG Bantarbarang, 4 representatives of beneficiaries and 1 SPPG Coordinator of Rembang District. The method used in analyzing the data in this study is by using the House of Risk (HOR). According to Safira (2021) the steps to analyze the data include:

A. Activity Mapping

This stage is a mapping of supply chain activities to identify the different forms of activities in the supply chain network of SPPG Bantarbarang and identify the relationship between activities in the supply chain network. Data processing in this study uses the House

of Risk (HOR) method to determine risks, emerging risk agents and risk mitigation strategies. HOR begins by mapping each supply chain activity in SPPG Bantarbarang. Furthermore, supply chain activities are mapped based on the SCOR model consisting of plan, source, make, deliver, and return. The purpose of this SCOR model is to make it easier to know where risks arise.

B. Risk Identify and Risk Agent

This stage aims to identify the risks handled in the research. Identification of risk events is carried out in each supply chain activity. The method used in identifying is by interviewing respondents, questions related to what risks may arise and what their impact is. This risk identification is supported by secondary data from SPPG Bantarbarang. This stage is carried out before the preparation of the questionnaire. Furthermore, the results of risk identification and risk agent identification can be obtained to find out what factors cause risk events.

C. Questionnaire Preparation

The questionnaire was compiled after the risk and risk agents were identified and followed by a risk assessment. According to Salkind in the study of Safira (2021), the questionnaire must go through a validation process before being deployed. The type of validation used is called Face validity that is, the validation process that is viewed subjectively related to the concept being measured. This validity test involves informants who are experts in their fields, in other words cross-checking with the supply chain agent. The questions presented in the questionnaire include risk assessment questionnaires, risk agent assessment questionnaires, assessment questionnaires on the relationship between risk and risk agents, and assessment questionnaires degree of difficulty from the handling strategy.

D. Analisis Risiko Rantai Pasok

Risk analysis is a process to qualitatively and quantitatively analyze the impact of risk (severity) and risk probability (occurrence) on research. Risk analysis is included in the HOR stage by conducting a risk assessment, risk agent assessment, and correlation assessment between risk and risk agent. This assessment is carried out by providing questionnaires to 1 supplier who is a partner of the Duta Jateng Peduli Foundation, 9 employees of SPPG Bantarbarang, 4 beneficiary representatives from SPPG Bantarbarang, and 1 SPPG Coordinator of Rembang District. Scale in severity risk impact level (S) at levels 1-10. Risk impact is presented in the following table.

Table 1. Severity Assessment Scale

Value	Severity	Criteria
1	*None*	Failures are not recorded and do not affect the product or process
2	*Very Minor*	Failure has small but not obvious consequences
3	*Minor*	Failure due to minor interference but does not reduce the yield
4	*Very Low*	Failure affects the outcome of the product or process but only slightly
5	*Low*	Failure affects the results of the product or process and may lead to complaints
6	*Moderate*	Failure will affect some of the products or processes
7	*High*	Failure will show significant consumer disappointment
8	*Very High*	Defects render processes or products inoperable
9	*Extremely High*	Failure will result in a violation of the established regulations
10	*Dangerous High*	Failure will result in accidents to users or employees

Source: American Society for Quality (2024)

For the next it is followed by identifying the chances of occurrence (O) of a risk agent. Chance of emergence means the level of chance of the frequency of the emergence of a risk agent so that it gives rise to several risk events. The scale of determining the chance of occurrence (O) of a risk agent is 1-10. Risk agents are presented in the following table.

Table 2. Occurance Assement Scale

Value	Occurance	Criteria
1	*Remote*	The probability of appearing is more than 5 years
2	*Relatively Remote*	The probability of its appearance is 1 time in 3 to 5 years
3	*Very Low*	The probability of its appearance is 1 time in 1 to 3 years
4	*Low*	The probability of appearing is 1 time in 1 year
5	*Relatively Low*	The probability of its appearance is 1 time in 6 months to 1 year
6	*Moderate*	The probability of appearing is 1 time in 3 months
7	*Relatively High*	The probability of appearing is 1 time in 1 month
8	*High*	The probability of appearing is 1 time in 1 week
9	*Very High*	Probability appears every 3 days or 4 days
10	*Exceecing High*	Probability of appearing in 1 day more than 1 time

Source: American Society for Quality (2024)

The final step in determining HOR is the calculation of the Aggreagate Risk Potential (ARP) value, which is determining the priority of risk agents that need to be designed for mitigation strategies. ARP can be obtained when severity, occurrenceance, and correlation values have been obtained. Severity (S) assessment, risk agent occurrenceance (O) assessment, and correlation value between risk agent and risk. Each risk is input into the HOR table. This is done to facilitate the calculation of ARP. The HOR table is as follows.

Table 3. HOR

Bussiness Process	***Risk Event (E_i)***	***Risk Agent (A_j)***						***Severity of Risk Event (S)***
		A_1	A_2	A_3	A_4	A_5	A_6	
Plan	E_1	R_{11}	R_{12}	R_{13}				S_1
	E_2	R_{21}	R_{22}					S_2
	E_3	R_{31}						S_3
Source	E_4							S_4
	E_5							S_5
Make	E_6							S_6
	E_7							S_7
Deliver	E_8							S_8
	E_9							S_9
Return	E_{10}							S_{10}
Occurance of Agent j		O_1	O_2	O_3	O_4	O_5	O_6	
Aggregate Risk Potential j		ARP_1	ARP_2	ARP_3	ARP_4	ARP_5	ARP_6	
Priority rank of agent								

Source: Ulfah et al., (2016)

III. RESULTS AND DISCUSSIONS

A. Result

Geographically, SPPG Bantarbarang is located in the Bantarbarang Village area, Rembang District, Purbalingga Regency. The Bantarbarang Village area has an area of 1,213 Ha or 12.13 km² with a recorded population of 8,970 people. Satuan Pelayanan Pemenuhan Gizi (SPPG) is a modern kitchen infrastructure managed by partners to produce and distribute Makan Bergizi Gratis (MBG) established by the Badan Gizi Nasional (BGN). The Badan Gizi Nasional is a strategic initiative of the Indonesian government that is tasked with ensuring the fulfillment of people's nutritional needs. SPPG Bantarbarang is one of the MBG management kitchens in Purbalingga Regency. (Auditsppg, 2026)



Figure 1. Map of the location of SPPG Bantarbarang.

SPPG Bantarbarang is one of 6 kitchen units included in the Rembang District, Purbalingga Regency. This kitchen is located in a mountainous village area with steep, slippery road terrain, winding road access, and minimal lighting. SPPG Bantarbarang is the implementing kitchen of the Makan Bergizi Gratis Program (MBG) which is located in the furthest area from the center of Purbalingga Regency, which is about 30 kilometers or with a travel time of about 40 minutes to 1 hour. This kitchen has been operating since November 3, 2025 and collaborates with the Duta Jateng Peduli Foundation as a partner in its operational activities such as kitchen building owners and facility providers including kitchen transportation, operational equipment, raw material suppliers, to bailout providers. The Duta Jateng Peduli Foundation only acts as a partner to provide its operational facilities and is not allowed to intervene in the implementation of SPPG kitchens. This collaboration has been regulated in Presidential Regulation of the Republic of Indonesia Number 115 of 2024 concerning the Governance of the Implementation of the Makan Bergizi Gratis Program in Pasal 19 which states that the Satuan Pelayanan Pemenuhan Gizi (SPPG) can collaborate with legal entities in preparing SPPG facilities and infrastructure.

The implementation of SPPG Bantarbarang operational activities was carried out by 45 people consisting of 42 volunteers divided into 6 parts, namely preparation, processing, ordering, distribution, washing ompreng, field assistants (also in charge of the cleanliness and safety section), and 2 staff divided into 2 parts, namely finance and nutritionists; and 1 head of kitchen. The following is a list of the division of duties of SPPG Bantarbarang employees.

Table 4. Employee Position of SPPG Bantarbarang

Departments	Number of Peopler
Kitchen Headboard	1
Finance	1
Nutritionist	1
Preparation	8
Processing	8
Classification	8

Distribution	4
Wash Ompreng	10
Field Assistant	1
Hygiene	2
Security	1
Total Quantity	**45**

Source : SPPG Bantarbarang (2026)

SPPG Bantarbarang currently serves 2,571 beneficiaries who have previously been divided by the regional coordinator and have been mapped based on the location and distance of the kitchen to the beneficiaries. The operational implementation of SPPG Bantarbarang is carried out for a full 24 hours, with a shift working hours system. This shift system is implemented so that the kitchen is always in a condition of employee supervision and ensures that every kitchen operation is fulfilled.

Table 5. Categories of Beneficiaries of MBG SPPG Bantarbarang

Serving Type	Beneficiary Categories	Number of Distributions
Small Portions	1. Toodler under 5 years; 2. BA/RA/TK students; 3. Elementary/MI Students Grades 1-3	1.338
Large Portions	4. SD/MI students in grades 4-6; 5. Junior High School Students; 6. Pregnant Women/Breastfeeding Mothers	1.185
Total Number of Portions distributed		**2.571**

Source : SPPG Bantarbarang (2026)

The distribution of portions is based on nutritional needs and the level of education that has been determined by the relevant Dinas Kesehatan. The number of beneficiaries of the MBG program from SPPG Bantarbarang is 2,571 people, with details of 1,338 small portions and 1,185 large portions of ompreng. SPPG Bantarbarang is required to provide *buffer stock* in anticipation of a shortage of raw material stock or damaged raw materials. *The buffer stock* must be exceeded by 1% of the minimum amount that must be met.

SPPG is designed not just a kitchen but a food production ecosystem that is integrated with the local supply chain. SPPG Bantarbarang supply chain activities include product flow, information flow, and financial flow (BRIDA Jateng, 2025). The series of supply chain activities that occurred at SPPG Bantarbarang can be seen in Figure 2.

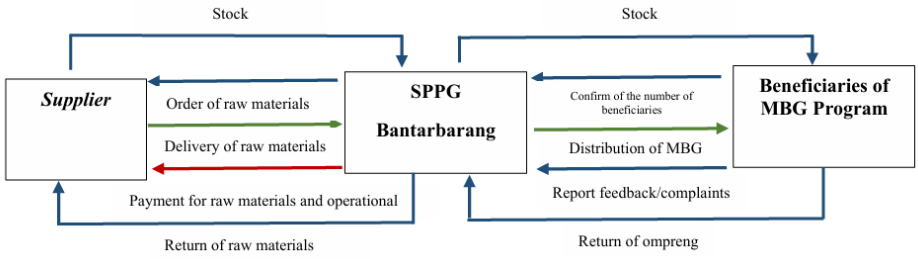

Figure 2. Supply Chain Flow of SPPG Bantarbarang

Description:

Information Flow

Financial Flow

Material Flow

Supply chain management seeks to integrate suppliers, SPPG Bantarbarang, and MBG Program beneficiaries so that MBG products can be produced and distributed in the right quantity, location, and time to minimize system costs (Safira, 2021). According to Heryana (2021) The supply chain of the MBG Program is also in line with the principles of Circular Causality or is a unit that is interconnected and if there is a change in one system, it will affect all existing systems. This happens because the MBG Program is related to agribusiness products which incidentally have characteristics that are easily damaged (perishable). The MBG program requires efforts to minimize the number of intermediaries between producers and consumers through an approach Short Food Supply Chain (SFSC) to maintain the quality of food.

Supplier

Supplier in the supply chain at SPPG Bantarbarang act as a provider of raw materials that will be processed in SPPG Bantarbarang's kitchen. SPPG Bantarbarang suppliers have several process streams, namely the flow of information including ordering raw materials from SPPG Bantarbarang and returning raw materials if there are damaged raw materials. The flow of materials on the supplier side is to receive raw material orders to SPPG Bantarbarang, then suppliers provide stock information on the availability of raw materials to SPPG Bantarbarang. Furthermore, there is a financial flow, namely payment for raw materials that are directly received from the National Nutrition Agency with approval from the head of SPPG Bantarbarang.

SPPG Bantarbarang implements a closed system supply chain pattern that only relies on permanent suppliers from its partners, namely the Duta Jateng Peduli Foundation. The implementation of this closed system has a high risk of dependence on a single supplier in accordance with the *Resource Dependence Theory* (RDT) (Hartanto, 2021). This dependence can disrupt the next supply chain activity, even though the Duta Jateng Peduli Foundation has recruited raw material sourcing from 15 traders with different commodities. Bantarbarang SPPG also has a lower bargaining power position than suppliers due to the supplier's capital strength, government policies and other SPPG demand conditions under the partners of the Duta Jateng Peduli Foundation. This is in line with Agency Theory which determines the most efficient contracts to regulate relationships *principal* (SPPG) and *agent* (suppliers) to avoid conflicts of risk, personal interest and purchasable commodity information (Kurniawansyah, et al., 2018). Results of the identification of supply chain risk events of the MBG Program in *Supplier* can be seen in Table 6.

Table 6. Identification of Risk Events in Supplier

Factors	Code	Activities	Risks	Impact
Plan	P1	Raw material inventory planning	The risk of raw material procurement activities that cannot follow special requests because *suppliers* have to send to 5 of their SPPG kitchen partners.	SPPG, which is a kitchen partner, can only prepare menus that are tailored to the *supplier'* s capabilities, causing SPPG to not be able to make a more varied menu innovation plan

	P2	Planning the amount of raw materials for SPPG Bantarbarang	The risk of the amount of raw materials that have been determined is not in accordance with what SPPG Bantarbarang takes	SPPG kitchen partners must meet the needs of supply that is still lacking
	P3	Planning for the delivery of raw materials to SPPG Bantarbarang	Risk of delay in delivery of raw materials to SPPG Bantarbarang	Delayed production and declining quality
	P4	Raw material transportation planning	The risk of transportation mismatches used to transport raw materials is not clean and potentially contaminated with dust or bacteria	Degradation of raw material quality
Source	S1	Acceptance of raw materials	Risk of non-conformity of accepted raw materials	Declining trust of SPPG kitchen partners
	S2	Checking the quality of the raw materials received	Risk of raw materials received potentially being contaminated with other foreign objects	Disease contamination
Deliver	D2	Sending payment bills to SPPG Bantarbarang	-	-
	D3	Order note inspection	The risk of raw materials requested by SPPG Bantarbarang with raw materials to be sent is not of the same type or confused with other SPPG kitchen partners	Delayed production and declining quality
Return	SR1	Handling of defective product replacement or does not meet Bantarbarang SPPG standards	Risk of raw materials received potentially expiring	SPPG kitchen partners must meet the needs of the raw materials needed
	SR2	Receipt of payment from SPPG Bantarbarang	Risk of delays caused by funds that have not yet received from the center	The traffic jam of payment flows to supporting suppliers such as farmers, breeders, MSMEs, and others

SPPG Bantarbarang

SPPG Bantarbarang is the main supply chain activity actor of the Makan Bergizi Gratis Program (Basuki et al., 2026). SPPG Bantarbarang has several process streams, including information flow, namely the delivery of the number of MBG recipients from MBG beneficiaries, then SPPG Bantarbarang sends the willingness to send MBG stock to MBG beneficiaries. Furthermore, the material flow carried out by SPPG Bantarbarang is the delivery of MBG to MBG beneficiaries. SPPG Bantarbarang does not receive financial flows

from MBG beneficiaries, but SPPG receives satisfaction/complaint responses from MBG beneficiaries for program evaluation. The results of the identification of supply chain risk events for the MBG Program at SPPG Bantarbarang can be seen in Table 7.

Table 7. Identification of Risks Events in SPPG Bantarbarang

Factors	Code	Activities	Risks	Impact
Plan	P1	Supplier selection planning	The risk of dependency and price play caused by kitchen contractors and suppliers is one package and is already available before SPPG Bantarbarang operates	Causing dependence on 1 *supplier*
	P2	MBG production planning	The risk of MBG production does not yet have work instructions for each stage of the process	Work is not in accordance with SOPs and quality is declining
	P3	Planning for the procurement of MBG raw materials	The risk of limited menu variation innovation due to raw material suppliers who cannot meet the demand of SPPG Bantarbarang	MBG beneficiaries feel bored and protest
	P4	Production equipment and machinery maintenance planning	Risk of periodic maintenance of equipment and machinery that leads to unhygienic and unhygienic	Decrease in the quality and quantity of MBG production
Source	S1	Recruitment of SPPG Bantarbarang employees	Risk of not meeting the skill standards set by SPPG Bantarbarang	Unable to meet targets and quality degradation
			Risk of social jealousy and potential nepotism	Decline in public trust
	S2	Receiving raw materials from *suppliers*	Risk of non-conformity in the quality of raw materials received from *suppliers*	Decrease in the quality and quantity of MBG production
	S3	Check the quality of raw materials sent from suppliers	The risk of raw materials received from *suppliers* is defective, not in accordance with specifications and potentially contaminated with other foreign objects	SPPG kitchen partners must meet the needs of the raw materials needed
	S4	Record incoming and outgoing raw materials	Risk of error recording raw materials that go in and out of the SPPG Bantarbarang kitchen	Miscalculation in accountability reporting
			Potential Risks of Corruption in Raw Materials	Lack of production raw materials and waste
	S5	Handling the replacement of defective, less or non-compliant raw material products from SPPG Bantarbarang	The risk of raw materials received from *suppliers* is defective, not in accordance with specifications and potentially contaminated with other foreign objects	SPPG kitchen partners must meet the needs of the raw materials needed

	S6	Reporting of raw material usage bills	Risk of delay in reporting to the center	Delay in the distribution of funds from the government
	S7	Payment of raw materials sent *by suppliers* including the use of *petty cash*	Risk of potential corruption and miscalculation of purchasing other raw materials outside *suppliers*	Can't claim the use of *petty cash funds*
	S8	Raw material storage	Risk of improper storage of potentially contaminated raw materials	Decreased quality
	S9	Evaluation of *supplier performance*	Risk of error not evaluating *supplier performance*	Audit of the center and closure of the kitchen
Make	M1	Preparation of materials for the processing process (washing and cutting)	Risk of key ingredient intake errors and ingredient placement errors	Loss of vitamins or other ingredients from existing raw materials
	M2	Cooking process	The risk of cooking contaminated with foreign objects or other objects falling from above, such as hair and sweat of employees	Decreased quality and hygiene of the cuisine
	M3	Classification	Risk of unbalanced portion distribution and incorrect entry or missed menu variation type	Reduced nutritional content
	M4	MBG Cooking Packaging	Risk of packaging not being able to prevent bacterial contamination and spilling easily	Excessive build-up can cause spilled packaging
	M5	Production environmental conditions	The risk of an unclean working environment allows contamination with animal feces such as lizards and rats	Decrease in product quality and quantity
Deliver	D1	MBG ompreng distribution	Risk of spilled or sagging ompreng	Decrease in quality and quantity
Return	SR1	Collection of MBG ompreng from beneficiaries	Risk of spillage of used food waste to the transport car and loss/damage	Decrease in the quality of cleanliness of transport cars and decrease in the quantity of suitable ompreng
	SR2	Handling the replacement of damaged MBG products from SPPG Bantarbarang	Risk of foreign object contamination and damage to distributed products	Decreased quality and trust
	SR3	Distribution *of buffer stock* (safety stock) to employees	The risk of employee jealousy if anyone gets more and the potential for corruption	Disharmonious employees
	SR4	Washing ompreng and other cooking utensils	Risk of bacterial contamination and infectious diseases	Degradation of quality
	SR5	Production waste handling	Risk of delegating responsibility to the community around the kitchen and	Decreased trust
			Risk of environmental damage	Decreased trust

MBG Program Beneficiaries

Beneficiaries are the final series of supply chain activities of the MBG Program. The number of beneficiaries of this program has been determined based on the location and distance of the kitchen to the beneficiaries, currently SPPG Bantarbarang has 2,571 dependents. MBG Program beneficiaries from SPPG Bantarbarang only have 2 (two) process streams, namely information flow and material flow. The flow of information to beneficiaries includes providing information related to the number of beneficiaries, beneficiary conditions such as allergies and other health, providing satisfaction/complaint feedback through SIPGN, and the ompreng schedule ready to be returned. Meanwhile, the material flow to beneficiaries is the receipt of the MBG Program which is ready to be distributed from SPPG Bantarbarang. The results of the identification of supply chain risk events for the MBG Program on Beneficiaries can be seen in Table 8.

Table 8. Identification of Risks Events in MBG Beneficiaries

Factors	Code	Activities	Risks	Impact
Plan	P1	Mapping of the number of beneficiaries	Risk of miscalculation and delivery errors that are not on schedule	Excess or lack of production stock
	P2	Mapping of MBG application needs tailored to the conditions of beneficiaries	Risk of misuse of the type of MBG product received by the beneficiaries	Allergies relapse and do not consume
Source	S1	MBG Acceptance	Risk of delay in receiving MBG	Degradation of quality
	S2	Check the distribution of MBG according to the amount or not	Risk of double distribution of allotments or not according to the number of beneficiaries	Excess or lack of production stock
	S3	MBG checks received are still suitable for consumption	Risk of bacterial contamination or spoiled food	Poisoning and decreased trust
Return	SR1	Return of MBG ompreng	Risk of Ompreng Damaged and Lost	Decrease in the quantity of suitable ompreng

B. Discussion

According to Situmeang (2019) Supply chain risk refers to the possibility of disruptions in the flow of materials, information, and finances, so coordination from all supply chain actors is urgently needed. This is necessary to ensure the continuity of SPPG Bantarbarang's operations.

Activity Mapping

Activity mapping on the supply chain aims to identify the forms of different activities in the supply chain network of the Bantarbarang SPPG and identify the relationship between activities in the supply chain network. In addition, the mapping of supply chain activities is used to determine the risks and risk agents that arise and design risk mitigation strategies in the supply chain of the Bantarbarang SPPG MBG Program. This study uses the SCOR approach to determine the activities of each supply chain actor. The SCOR method includes plan, source, make, deliver, and return.

Risks Identify and Risks Agents

The identification of risk events is carried out based on the results of mapping supply chain activities using the SCOR method. The risk identification process is carried out by interviewing the Head of SPPG Bantarbarang. The results of the identification of supply chain risk events for the MBG SPPG Bantarbarang Program can be seen in table 6, table 7, table 8, and table 9.

Table 9. Identification of Risks Events in SPPG Bantarbarang Supervisors

Factors	Code	Activities	Risks	Impact
Plan	P1	Planning to determine SPPG Bantarbarang kitchen cooperation partners	The risk of getting an unaccountable partner	The operations of SPPG Bantarbarang became chaotic and could not meet the demands of beneficiaries
	P2	Planning to determine *SPPG Bantarbarang kitchen* suppliers	Supplier dependency risk	High priced games
				Failure to meet all demand for raw material supply
				Supply distribution delays
	P3	Planning to determine the location of the SPPG Bantarbarang kitchen	Competition risks of MBG kitchens	The construction of the kitchen is placed in a non-strategic/perfunctory location
			Risk of menu gaps between MBG kitchens if the locations are close to MBG program beneficiaries	Misconceptions of beneficiaries of different kitchens
			Risk of distribution delays	Food contamination
	P4	Planning of administrative legal licensing for the construction of SPPG Bantarbarang kitchen	Risk of irresponsible employees	Public distrust
			Food safety risks	Food contamination
			Risk of termination of kitchen operating permits	Kitchen closure
	P5	Environmental licensing planning for the construction of SPPG Bantarbarang kitchen	Risk of non-implementation of the EIA (Environmental impact analysis)	Environmental damage
				Food contamination
			Risk of community rejection	Community protest
			Risk of termination of kitchen operating permits	Kitchen closure
	P6	SPPG Bantarbarang kitchen *layout* planning	Risk of food contamination	Poisoning
	P7	Planning for the budget allocation of the Bantarbarang SPPG kitchen	Risk of *price mark-ups* by one or between parties	High priced games
			Risk of budget and/or raw material miscalculation	State losses and budget waste
	P8	Planning the number of beneficiaries of the Bantarbarang MBG SPPG program	Risk of fighting for the number of MBG beneficiaries in the kitchen location area	Unbalanced liability of the number of beneficiaries (too few/too many)
Source	S1	Procurement of non-staff employees of SPPG Bantarbarang kitchen (qualifications, requirements)	Risk of employees not meeting the specified qualifications and conditions	Unable to meet the target
			Risk of nepotism/choosing relatives to be employed	Social jealousy

	S2	Procurement of SPPG Bantarbarang kitchen facilities (transportation, kitchen utensils, procurement of ompreng, personal protective equipment)	The risk of facilities not complying with the predetermined SOPs	Food contamination
			Risk of no/short number of facilities required	Unmet kitchen operational needs
			Risk of facility damage	Beneficiary dissatisfaction
			Risk of food contamination	Poisoning
	S3	Determination/submission of SPPG Bantarbarang kitchen SOP	Risk of non-implementation of SOPs	Food contamination
	S4	Determination of sanctions in the event of irregularities/operational errors in the Bantarbarang SPPG kitchen	Risks of budget misappropriation	State losses
			Risk of poisoning	Distrust of society
			Risk of delay in benefit distribution	Distrust of society
	S4	Determination of sanctions in the event of irregularities/operational errors in the Bantarbarang SPPG kitchen	Other operational risks (use of facilities for employees' personal interests)	Budget waste
			Other operational risks (not meeting environmental safety standards such as no landfill)	Environmental damage
				Community protest
Make	M1	Nutritional fulfillment of SPPG Bantarbarang beneficiaries	Risk of non-fulfillment of beneficiary nutrition	Distrust of society
			Risk of spoiled/spoiled food	Poisoning
			Risk of poisoning	Distrust of society
	M2	Production environment safety inspection	Risk of food contamination	Poisoning
	M3	Compliance check following the set SOPs	Risk of non-implementation of SOPs	Food contamination
Deliver	D1	Payment of the kitchen needs budget (paid in cash/transfer; through what bank and why; paid to SPPG Bantarbarang or partners; paid per time; the amount of payment is used for anything; who is responsible for paying the budget for kitchen needs)	Price *mark up* risk	State losses
			Risk of late payment	Partner distrust
			Kitchen operational risks	Failure to meet the target number
Return	R1	Receipt of the operational accountability report of the SPPG Bantarbarang kitchen	Risks of budget misappropriation	State losses
			Risks of not implementing SOPs	Food contamination
			Risk of complaints from the beneficiary community	Distrust of society
			Risk of operational shortages	Failure to meet targets
	R1	Receipt of the operational accountability report of the SPPG Bantarbarang kitchen	Risk of termination of kitchen operating permits	Kitchen closure
	R2	Refund of operational overpayments	Risk of excess supply of raw materials	Budget waste

The risk event assessment is carried out after the problem identification stage at the supplier, SPPG Bantarbarang, beneficiaries, and SPPG Bantarbarang supervisors. The results of problem identification can be used as material for the preparation of a questionnaire for risk event assessment in each supply chain activity. The risk event assessment questionnaire is used to determine the level of impact (severity) caused to each supply chain activity actor of the MBG SPPG Bantarbarang Program. The results of the supplier risk event assessment show that the risk event that has the highest severity value is the risk of transportation insuitability used to transport raw materials that are not clean and potentially contaminated with dust or bacteria (E4).

The results of the SPPG Bantarbarang risk assessment showed that there were 6 (six) risk events that had the highest severity value of 8. The first risk (E31, E34) is the risk of raw materials received from defective suppliers, not in accordance with specifications and potentially contaminated with other foreign objects. This is due to the extreme road terrain, with the terrain conditions from the location of the partner cooperative to the Bantarbarang SPPG kitchen that are winding, up and down, lack of lighting, and slippery road conditions, making the risk of E31 and E34 one of the risks with the highest level of risk. Furthermore, there is a risk of potential corruption of raw materials (E33), which is caused by the absence of periodic field audits. SPPI Purbalingga Regency, which is a forum for coordination between SPPG heads in Purbalingga Regency, only reviewed the operation of SPPG Bantarbarang 1 time, namely when the kitchen began operating. Meanwhile, KPPG Sleman, which is in charge of running SPPG kitchens in the provincial area, has never directly reviewed the operation of SPPG kitchens under its auspices, where one of these kitchens is SPPG Bantarbarang.

The results of the assessment of beneficiary risk events include 2 (two) risk events that have the highest severity value of 4. The risk of bacterial contamination or stale/rotten food (E41) is one of the risks with the highest severity value at the level of MBG Program beneficiaries. The next risk is the risk of damaged and lost ompreng (E78) due to the shrinkage of the ompreng function and the negligence of beneficiaries and the inaccuracy of employees in taking ompreng. Damaged ompreng usually occurs in beneficiaries at the Posyandu level and PAUD/KB/RA education units because the majority of recipients are children under five and do not understand responsibilities.

The results of the risk assessment of SPPG Bantarbarang supervisors have 2 (two) risk events that have a value Severity the highest value of 10 or maximum. The risk of getting an irresponsible partner (E11) can occur because SPPG Bantarbarang only depends on 1 supplier from its partner, namely the Central Java Peduli Duta Foundation. This is in accordance with the Resource Dependence Theory (RDT) where supply chain partners will often depend on each other and can cause the operation of SPPG Bantarbarang to be chaotic (Hartanto, 2021). Furthermore, the risk of food contamination (E22) which is considered to have a risk with a value of Severity and potentially cause poisoning.

Questionnaire Preparation

Testing the validity of the questionnaire was carried out using the face validity. According to Safira (2021), face validity it is an activity of asking informants to correctly read a certain event with subjective assessment. This validation process is assisted by the Head of SPPG Bantarbarang on the basis of reporting the activities of each supply chain actor of the MBG Program. This test aims to adjust the risk event questionnaire, risk agent and correlation between risk events and risk agents that have been prepared according to the conditions that occur in the activities of the supply chain actors of the MBG Program. If validation has been carried out on all questionnaires, then an assessment can be carried out on a questionnaire with a predetermined assessment range.

Supply Chain Risk Analysis

The Aggregate Risk Potential (ARP) assessment is used to determine the risk agent that needs action by looking at the highest ARP value. The calculation of the ARP value is obtained from the results of the risk event assessment questionnaire (severity), risk agent (occurance), and correlation value (correlation) between risk events and risk agents. The risk agent that has the highest ARP value is the fault of workers in cleaning the workplace (A62) with an ARP value of 448. This is because the occurrenceance value is 8 and causes risk events in the form of the risk of unclean work environments that allow food contamination (E58). The risk event has a high correlation value of 8. This happens to the actors of supply chain activities of the SPPG Bantarbarang.

The risk agent that has the lowest value occurs in the supply chain activity actors of the supplier and supervisor. The lowest risk agent that occurs on the supervisor's side is budget waste (A55). This can only happen because it causes risk events, namely other operational risks in the use of facilities for the personal benefit of employees (A52). The supervisor of SPPG Bantarbarang is represented by the Coordinator of SPPG Rembang District, where his operational activities are separate from the operations of SPPG Bantarbarang, so the possibility of risk is very low.

The lowest risk agent that occurs on the supplier side is the inaccuracy of workers in cross-checking raw material stocks (A74). This can happen because it causes risk events in the form of risks of raw materials received with the potential to expire (E70). The supplier's operations do not have a major effect on the operation of SPPG Bantarbarang because the supplier is the responsibility of the partner, namely the Central Java Peduli Duta Foundation. On the other hand, the inspection of raw materials will be processed strictly not only on the supplier' s side, but also on the SPPG Bantarbarang. The SPPG has the right to reject raw materials that have the potential to expire and return them to the partner. The use of petty cash can also be a solution in anticipating workers who are not careful to crosscheck raw material stocks.

IV. CONCLUSION

The most risky supply chain risk in the implementation of the Makan Bergizi Gratis Program at the Satuan Pelayanan Pemenuhan Gizi Bantarbarang Purbalingga it is found in supply chain activity actors at SPPG Bantarbarang. This risk is worker error in cleaning the workplace (A62) and resulting in the risk of an unclean work environment that allows food contamination (E58). The calculation of the Aggregate Risk Potential (ARP) value shows a value of 448. These results mean that the risk agents who need to be given priority action are in the Bantarbarang SPPG environment because activities at SPPG Bantarbarang are the main activities of all other supply chain actors.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my advisor, whose expertise and constructive feedback were incaluable in shaping this research. I also extend my heartfelt thanks to all the respondents and participants who generously didicated their time and shared their insights for this study. Special thanks are due to Head of SPPG Bantarbarang for providing this research permission.

REFERENCES

American Society for Quality. (2024). What is FMEA? Failure Mode & Effects Analysis. Asq.Org. https://asq.org/quality-resources/fmea?srsltid=afmboordxzamencgxwjzaoyae3xgkstsc0mqo1m0kg9yg_-ubta05rmd

Basuki, R. M., Muharrom, N. W., & Kusuma, N. A. (2026). Implementasi Program Makan Bergizi Gratis : Evaluasi Pelaksanaan dan Tantangan Operasional. 1413–1423. Jurnal Ilmu Sosial dan Hukum. https://doi.org/10.61104/alz.v4i1.3208

BRIDA Jateng, P. (2025). Peran Produsen Lokal Dalam MBG : Apakah Sekedar Penonton ? 3(5). jatengprov.go.id

Denashurya, N. I. (2024). Rantai Pasok Agribisnis. Nas Media Pustaka. https://www.researchgate.net/publication/387684970_Rantai_Pasok_Agribisnis

Fauzia, Marliana Eka; Halimah, Zulfaisya Nur; Hapsari, Y. I. (2026). Analisis Implementasi Program Makan Bergizi Gratis (MBG) Dalam Mewujudkan Kesejahteraan Masyarakat di Kabupaten Tulungangung. 10, 182–193. Jurnal Ilmu Sosial Ilmu Politik Universitas Jambi. https://doi.org/10.22437/jisipunja.v10i1.53925

Haifa, A., Nadhira, K., Oktiarso, T., & Harsoyo, T. D. (2019). Manajemen Risiko Rantai Pasok Produk Sayuran Menggunakan Metode Supply Chain Operation Reference dan Model House Of Risk. 2, 101–117. Jurnal Teknologi, Informasi dan Industri. https://doi.org/10.33479/kurawal.v2i2.260

Hartanto, S. (2021). Ketidakpastian dan Komplektisitas Rantai Pasok dalam Kinerja Operasional yang Berkelanjutan. 6(April), 129–143. Jurnal Ekonomi Akuntansi.

Heryana, A. (2021). Teori dan Jenis Sistem. April, 1–38. https://www.researchgate.net/profile/Ade-Heryana/publication/354161367_Teori_dan_Jenis_Sistem/links/612877d60360302a005f4f66/Teori-dan-Jenis-Sistem.pdf

Hidayat, A. P. (2022). Peran Keunggulan Kompetitif Pada Pengaruh Praktik Manajemen Rantai Pasokan Terhadap Kinerja Organisasi. 16(2), 234–246. Jurnal Manajemen. https://doi.org/10.24127/jm.v16i2.989

Hidayat, Wahyu; Prasetiyo, Anjas; Safitri, Karyani; Murnawan, Rizky Nugraha; Azzahwa, S. (2025). Laporan Analisis Regulasi Program Makan Bergizi Gratis Tahun 2025. 1–72. Komisi Pemberantasan Korupsi. https://cms.kpk.go.id/storage/9975/ANALISIS-REGULASI-PROGRAM-MAKAN-BERGIZI-GRATIS-TAHUN-2025.pdf

Kurniawansyah, D; Kurnianto, S; Rizqi, F. A. (2018). Teori Agency dalam Pemikiran Organisasi - Pendekatan Positivist dan Principle Agent. 3(2), 435–446. Jurnal Riset Akuntansi. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=eori+Agency+dalam+Pemikiran+Organisasi+-+Pendekatan+Positivist+dan+Principle+Agent&btnG=

Orbawati, E. B., Mukti, A., Aufa, R., Karunia, I., & Ikhtiara, S. (2025). Policy to Practice Gap dalam Program Makan Bergizi Gratis : Studi SWOT di Magelang. 10(4), 797–810. Jurnal Pemerintahan dan Politik. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Policy+to+Practice+Gap+dalam+Program+Makan+Bergizi+Gratis%E2%80%AF%3A+Studi+SWOT+di+Magelang&btnG=

Peraturan Presiden Republik Indonesia Nomor 83 Tahun 2024

Peraturan Presiden Republik Indonesia Nomor 115 Tahun 2025

Safira, R. D. (2021). Mitigasi Risiko Kehalalan dan Keamanan Rantai Pasok Produk Roti Menggunakan Metode House Of Risk (HOR) di Shafira Bakery, Malang. Repository Universitas Brawijaya. https://repository.ub.ac.id/id/eprint/185680/1/RAVENA%20DIVA%20SAFIRA.pdf

Situmeang, L. M. (2019). Analisis dan Strategi Mitigasi Risiko Rantai Pasok Beras Semi Organik.

Repository Universitas Brawijaya.

Ulfah, M., Syamsul, M., Sukardi, S., & Raharja, S. (2016). Analisis dan Perbaikan Manajemen Risiko Rantai Pasok Gula Rafinasi dengan Pendekatan House of Risk. 26(1), 87–103. Food and Agriculture Organization of the United States. https://agris.fao.org/search/en/providers/122323/records/6851764a53e52c13fc76d29a