

Farmer-owned enterprises (BUMP) and stakeholder salience in the urban food system of Indonesia

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Abstract. Cahyanto GD, Anantanyu S, Harisudin M. 2026. Farmer-owned enterprises (BUMP) and stakeholder salience in the urban food system of Indonesia. *Asian J Agric* 10 (1): g100182. <https://doi.org/10.13057/asianjagric/g100182>. Farmer-owned enterprises (BUMP) are legally incorporated, for-profit entities that integrate community empowerment activities with business operations to promote farmer self-reliance. This study aims to examine stakeholder interests and engagement and assess the Sustainability Index and institutional status of BUMP PT. Lumpang Semar Sejahtera (BUMP PT. LSS), Central Java, Indonesia, in supporting the urban food system. This study employs a mixed-methods approach, utilizing a case study as the data collection method. The analysis employs the Stakeholder Salience Model with the NVivo 15 software. Furthermore, the assessment of the institutional Sustainability Index and status utilizes the Multidimensional Scaling analysis tool, modified by Rap-Food System. The research results indicate that BUMP PT LSS has undergone a fairly complex institutional transformation, ranging from its objectives, form, activity orientation, organizational structure, product focus, technology use, funding sources, government support, and its position in the supply chain. The shift has transitioned from a group-based social institution to a BUMP that performs both economic functions and empowerment. Bank Indonesia Representative Office for Central Java possesses a high degree of authority, legitimacy, and urgency. Sustainability assessment indicated that the social (76.64%), economic (84.31%), and institutional (77.24%) dimensions were highly sustainable, whereas the technology and environmental dimensions (72.41%) were moderately sustainable. Leverage analysis identified infrastructure availability, land conservation, membership expansion, cooperative development, and bankable financing systems as the most influential sustainability attributes. The findings demonstrate that BUMP PT. LSS contributes to strengthening urban food governance through stakeholder collaboration, farmer empowerment, and supply-chain integration. Future interventions should prioritize technological innovation and environmental sustainability to enhance the long-term resilience of farmer-owned enterprises within urban food systems.

Keywords: BUMP, farmer-owned enterprises, food system, institutional sustainability, stakeholder salience

INTRODUCTION

The COVID-19 pandemic has triggered global food price inflation, reflecting increased volatility and ongoing pressures in markets (Food and Agriculture Organization (FAO) 2025), and disrupted the stability of food systems (Fujimori et al. 2019), including in Indonesia (Indrawati and Satriawan 2024). More than 5 billion people depend on the food system for their survival and well-being (Schneider et al. 2023). The key to ensuring social well-being, food security, and nutritional health lies in the proper functioning of the food system's ecosystem management (Caron et al. 2018). Farmers are central actors in the transition toward a sustainable food system (Santacoloma and Zarate 2021) because they are not only food providers but also influence urban production dynamics (Núñez-Ríos et al. 2020).

In Indonesia, according to data from the BPS Agricultural Census (BPS 2023), of the total 27 million farming households in Indonesia, 15 million are food crop farmers. BPS data (2024) show that the agricultural sector's contribution to Gross Domestic Product (GDP) at 11.61% in the first quarter of 2024. The significant contribution of food crop farmers to national economic growth (Harun et al. 2021; Sipayung et al. 2023)

necessitates government intervention to improve farmers' welfare (Haryanto et al. 2022). Farmers are constantly faced with the stigma of poverty (Kapari et al. 2023) due to their low incomes. One reason for farmers' low incomes is their weak bargaining position (Wijayanti and Carolina 2021; Sulastri et al. 2023).

The purpose of establishing farmer-owned Enterprises (BUMP) is to improve farmers' welfare. Additionally, BUMP was established to provide food for the community in a sustainable manner (Mardikanto and Waluyo 2012; Mardiyanto et al. 2022). Farmers' organizations such as BUMP are typically associated with rural areas. However, urban development is closely linked to sustainable agricultural management, as it relates to patterns of production and consumption (Tapia et al. 2021) as well as the simplification of value and supply chains (Hecht et al. 2019; Kusanandar et al. 2024).

BUMP PT. Lumpang Semar Sejahtera (BUMP PT. LSS), Indonesia, is a economic institution in the form of a limited liability company (PT) led by farmers and located in the city of Semarang. BUMP PT LSS plays a dual role in strengthening the economy of farmers and the food system of Semarang City (Widianarko et al. 2025). The successful practice of BUMP PT LSS's role in the transformation of Semarang City's food system lies in the organic

collaboration among various stakeholders, both from a business and an empowerment perspective.

This study offers a new integration of institutional sustainability models with stakeholders in local food systems. The study is of great interest to the BUMP PT. LSS organization, as such collaboration yields social, economic, and environmental benefits for the organization (Krishnan et al. 2020). Previously, Mardiyanto et al. (2022) stated that stakeholders do not influence the effectiveness of BUMP in empowering farmers. Additionally, Kusnandar et al. (2024) examined the role of farmer organizations within local food supply chain networks. Puspita et al. (2023) conducted a study on the institutional sustainability of farmer corporations using the MDS Rap-Corn framework, employing a sample of farmers who did not fully understand the research issues.

The food system is an integrated approach to regional food management (Widianarko et al. 2025). The study aims to (i) examine stakeholder interests and engagement and (ii) assess the Sustainability Index and status of the BUMP PT LSS institution. This is consistent with Freeman's (1984) study, which states that their support is crucial for the company's sustainability and growth. Since the interests and priorities of each stakeholder differ, the institution must develop its strategies accordingly (Tarode and Shrivastava 2022).

Despite growing recognition that BUMP strengthens farmer welfare and local food systems, existing evidence on how stakeholder relationships influence their institutional sustainability remains limited. Furthermore, empirical assessments integrating the significance of stakeholders and multidimensional sustainability are scarce. Therefore, this study addresses the following research questions: (i) Which stakeholders possess the greatest influence, legitimacy, and urgency? and (ii) What is the sustainability status of BUMP PT. LSS across social, economic, institutional, technological, and environmental dimensions? It is hypothesized that stakeholders with urgency, high power, and legitimacy play a crucial role in strengthening institutional sustainability.

MATERIALS AND METHODS

Research approach

This study evaluates a qualitative and quantitative approach, also known as mixed methods, a research approach that collects, analyzes, and combines quantitative and qualitative data within a single research framework to understand the research problem. The mixed-methods research design aims to provide a comprehensive understanding of the situation within its specific context. The data collection method used in this study is a case study, which involves examining a case in detail, intensively, deeply, and comprehensively (Creswell and Creswell 2018). The researcher chose to use the exploratory sequential design type of mixed methods, also known as the sequential design. The research was conducted in four stages, including (i) qualitative data

collection, (ii) analysis of institutional transformation and the stakeholder salience model, (iii) identification of attributes based on qualitative findings; and (iv) quantitative assessment of the identified attributes.

Settings

This study was conducted in the city of Semarang, Central Java, Indonesia, with several locations selected based on the availability of informants. The researcher chose to conduct the study at BUMP PT. Lumpang Semar Sejahtera (BUMP PT. LSS), Semarang, is due to the involvement of key actors in its activities and stakeholders. BUMP PT. LSS was deliberately selected as a case study because it represents an institutional model within a progressive framework that integrates production, processing, distribution, and marketing. The researchers considered its unique potential due to its strategic role in supporting food system governance in the city of Semarang. This study was conducted over 12 months from January 2025 to December 2025.

Method of determining informants

The method used to select informants for qualitative data in this study employed purposive sampling, specifically targeting the founders, management, and stakeholders associated with BUMP PT LSS. Purposive sampling is a quick and effective strategy for obtaining information (Douglas 2022). Data was refined through snowball sampling of additional stakeholders deemed capable of supplementing the data to make it more comprehensive. The interview continued until absolutely no new insights, themes, or patterns emerged (Ahmed 2025). The informants who are founders and managers come from the board of directors (3 informants), management (3 informants), and employees (1 informant) of BUMP PT. LSS. Meanwhile, stakeholder informants include government stakeholders (5 informants), private/industry stakeholders (2 informants), academics (2 informants), and the general public (1 informant) (Table 1).

These informants represented internal agency staff and stakeholders, with a focus on the roles of actors within the system. The data collected during interviews 15 through 17 did not reveal any new attributes and merely confirmed previous patterns. Respondents for quantitative data used a scoring system in the form of rapid assessments based on expert judgment (Fauzi 2022). Experts were selected based on the context of the study and possess in-depth expertise and proficiency regarding the attributes being evaluated (Jimenez et al. 2021). Experts were asked to record their scores on a scoring sheet during the interviews. The experts were provided with operational definitions and standard assessment criteria for each sustainability attribute. A discussion regarding calibration was held prior to the assessment to ensure a shared understanding of the assessment indicators. The reliability of results in MDS-based approaches is influenced more by the consistency and expertise of the experts than by their number.

Therefore, a small number of carefully selected experts is considered acceptable. We conducted a Monte Carlo analysis, the results of which indicate that the clustering is stable and reliable even when the number of experts involved is limited. This explanation has been added to the revised manuscript. The following is a list of experts who conducted the scoring for the Rap-Food System MDS analysis (Tables 1 and 2).

Data collection

Qualitative and quantitative data can be derived from primary or secondary sources, depending on the research needs. According to Creswell and Creswell (2018) and Sugiyono (2019), there are six types of data collection techniques in qualitative research: access to the organization, observation, interviews, focus group discussions (FGDs), collection of documents and audiovisual materials, and adherence to ethical guidelines. Data collection techniques are determined based on research needs, which include the research question, concepts, and required data. There are eight (8) types of data collected in the research problem formulation, namely the institutional history of BUMP, the institutional transformation of BUMP, BUMP as a food producer, BUMP's support for the food system, BUMP activities involving members and management, the current status of BUMP, the BUMP company profile, and the annual report. All participants kindly gave their written informed consent before joining the study, ensuring everyone was fully informed and agreeable. This study was approved by the Ethics Committee of Sebelas Maret University, approval No. 30/UN.27.20/PT01.04/2025, and conducted in accordance with applicable ethical standards.

Data analysis technique

Qualitative data analysis techniques employ an iterative process consisting of data condensation (selection/simplification), data presentation (organization), and drawing conclusions (verification), which are carried out continuously throughout the data collection process until results are obtained (Miles et al. 2020). The analysis tool used was the Stakeholder Salience Model (Mitchell et al. 1997) with NVivo 15 as a supporting tool. The interview transcript data were analyzed using inductive thematic coding, which was then grouped into broader themes related to institutional transformation, stakeholder salience, and sustainability. The coding was evaluated through consistent, iterative discussions among the researchers (Table 3).

Furthermore, the assessment of the institutional Sustainability Index and status utilized the Multidimensional Scaling (MDS) analysis tool, modified into the Rap-Food System (Choudhary et al. 2021). The results of the multidimensional analysis are presented in a visual design resembling a kite diagram, utilizing an ordination process adapted into the Rap-Food System. The Rap-Food System is an adaptation of Rapfish, a technique for rapidly evaluating comparative sustainability (Pitcher and Preikshot 2001). The sustainability mechanisms in Rapfish can be applied to other sectors with a direct

understanding of the nature of the analysis within it, even though it was originally designed to analyze sustainability in the fisheries sector (Fauzi 2022). Assessments can be conducted in each domain using a series of attributes directly and in greater detail. Researchers have the option to include some or all of the available sustainability domains (Pitcher et al. 2013).

Attributes were assigned to each dimension based on their relevance and the complexity of the research context. These attributes relate to the institutional sustainability of BUMP PT. LSS, derived from the qualitative data of this study, with the number of attributes determined in accordance with the principle of parsimony (Table 4).

Table 1. Participant role, codes, dates, and data type contributions informants

Role/position	Informant code	Dates	Type contributions
Directors	YMZ	26 June 2025	Primary Informant
Directors	SHJ	27 June 2025	Primary Informant
Management	KBL	30 June 2025	Primary Informant
Management	SND	4 July 2025	Primary Informant
Directors	AHK	7 August 2025	Primary Informant
Employees	BIF	18 July 2025	Supporting Informant
Government	SHM	21 July 2025	Key Informant
Government	HNA	22 July 2025	Key Informant
Government	DJK	22 July 2025	Supporting Informant
Government	RNW	5 August 2025	Key Informant
Government	SNT	7 August 2025	Key Informant
General Public	WYG	11 August 2025	Supporting Informant
Private/Industry	AND	11 August 2025	Supporting Informant
Academics	SEW	24 August 2025	Key Informant
Academics	CMN	25 August 2025	Supporting Informant
Private/Industry	SKD	2 September 2025	Supporting Informant
Management	ZHR	14 September 2025	Primary Informant

Table 2. List of experts for sustainability scoring

Experts	Status
CEO of BUMP PT. Lumpang Semar Sejahtera	Institutional Leaders
Operations Director of BUMP PT. Lumpang Semar Sejahtera	Institutional Leaders
Head of the Distribution Division, Semarang City Food Security Agency	Government
Deputy Head of the Bank Indonesia Representative Office for Central Java Province	Government
CEO of BUMP PT. Wijaya Kusuma Pangan Mandiri	Private Sector/Industry
Chair of the Secretariat of the Indonesian Farmer-Owned Enterprises	Academics
“Bolo Tani” Field Facilitator	Community

RESULTS AND DISCUSSION

Transformation of farmer institution

Institutionalization is the transformation of rules, development processes, and procedures that influence a series of human interactions. Institutionalization is also defined as a process within organizations to regulate community behavior. This process is divided into three actions, including rule-making, developing best practices or adapting rules, and replacing old rules with new ones (Keman 2025). Historically, institutional development has been driven by a group of dedicated farmers in the city of Semarang since 2014. These dedicated farmers emerged from the farmers' desire to progress, leading them to voluntarily collaborate through self-help initiatives to advance agriculture in their region. The institutional transformation of farmers began with the formation of farmer groups, self-reliant rural agricultural training centers (P4S), organic agricultural extension communities (*Konsultanik*), and culminated in the establishment of Farmer-owned enterprises (BUMP). Figure 1 presents a framework/flowchart of institutional transformation.

Farmer-owned enterprises (BUMP) are legally incorporated, for-profit entities that integrate community empowerment activities with business operations to promote farmer self-reliance. BUMP is a legally incorporated farmers' economic organization funded by capital contributions in the form of shares held by the organization and/or individual farmers. The organization is not government-owned, as evidenced by the absence of any government equity investment in it. Nevertheless, under Law No. 19 of 2013, the government is required to facilitate the establishment of BUMP and provide support until it becomes self-sufficient. Formally, BUMP PT. LSS was established on 29 December, 2022, and is a limited liability company (PT) under the Decree of the Minister of Law and Human Rights of the Republic of Indonesia No. AHU-0001720.AH.01.01.TAHUN 2023. This legal status provides the legal foundation for the organization to conduct business activities, build partnerships, manage assets, and carry out business transactions formally (Table 5).

Table 3. Table of coding nodes

Node	When to code	Example
Power	Economy	"Providing CSR support in the form of warehouses, dryers, combine harvesters, and food distribution vehicles." (Bank Indonesia Representative Office for Central Java)
	Politics	"The main sponsor is the City Government's Department... the volume of orders is also substantial so that BUMP can operate." (Semarang City Food Security Department)
Legitimacy	Production/Processing	"If the government has a program, BUMP members carry it out directly." (Farmers' Group)
	Social	"Farmers' groups are part of the membership and the main suppliers within BUMP." (Farmers' Group)
	Institution	"Serving as a national mentor and facilitator in establishing BUMP across various regions." (National Secretariat of the Indonesian Farmer-Owned Enterprise)
	Politic	"Promoting institutional legalization leading to the formation of BUMP PT. Lumpang Semar Sejahtera." (Central Java Food Security Agency)
Urgency	Institution	"If they operate on their own, it seems they aren't yet capable... they need a mentor." (Farmers' Group)
	Economy	"Supporting the stabilization of food prices and regional inflation." (Bank Indonesia Representative Office, Central Java)
	Politics	"BUMP plays a role in controlling inflation in the City of Semarang." (Semarang City Regional Development Planning Agency)

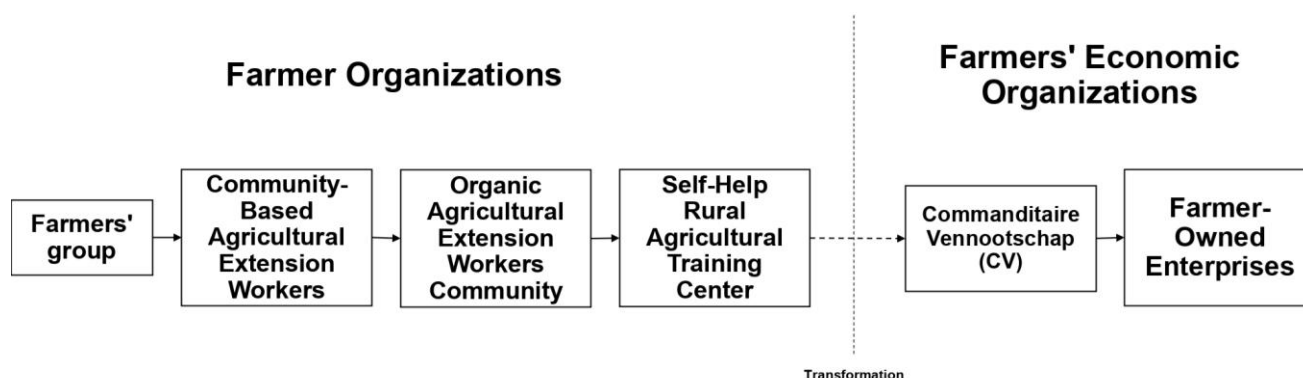


Figure 1. Institutional transformation framework/flow diagram

Table 4. The Rap-Food System attributes for assessing the institutional sustainability of BUMP PT. LSS, Semarang, Central Java, Indonesia

Attribute	Score Criteria (0-10)	Indicator definition
Social Dimension		
Culture of mutual cooperation among management	0: Conflictual; 10: Very strong	Degree of collaboration, trust, and collective commitment among management members
Balance between business and empowerment	0: Business-dominated; 10: Empowerment-based business	Ability to integrate commercial objectives with farmer empowerment
Ensuring farmers' well-being	0: None; 10: Sustainable well-being	Contribution of BUMP to farmer income, welfare, and livelihoods
Social protection and employee welfare	0: No protection; 10: Comprehensive	Availability of social security, insurance, and employee welfare programs
Farmers' succession planning	0: None; 10: Very strong	Capacity to attract and retain younger generations in agriculture
Expanding farmer membership	0: No expansion; 10: Very rapid	Growth of membership and institutional outreach
Support from agricultural extension workers	0: No mentoring; 10: Structured	Frequency and effectiveness of extension and mentoring services
Economic Dimension		
Food Provision for Semarang City	0: No contribution; 10: Very high	Contribution to urban food availability and accessibility
Controlling inflation through short supply chains	0: No impact; 10: Key instrument	Role in improving supply-chain efficiency and Prince stabilization
BUMP as Semarang's food hub	0: No role; 10: Key hub	Function as a central node in food aggregation and distribution
Agricultural business management from downstream to upstream	0: Primary production only; 10: Fully integrated	Degree of integration across the agricultural value chain
Food distribution network across Semarang	0: No network; 10: Established and sustainable	Coverage and effectiveness of food distribution channels
Access to distribution support	0: None; 10: Reliable and efficient	Availability of logistics and distribution assistance
Expansion of the business partner network	0: None; 10: Strategic partnerships	Development of market and institutional collaborations
Product diversification and downstream processing	0: Single product with no added value; 10: Strong downstream processing	Degree of value addition and product diversification
Institutional Dimension		
Strong and comprehensive legal status of the business entity	0: Not legal; 10: Strong and widely recognized	Institutional legitimacy and legal certainty
Commitment from institutional leaders	0: None; 10: Visionary	Leadership commitment to organizational development
Building a professional management team	0: Unprofessional; 10: Highly accountable	Quality of governance, administrative, and management systems
Transparent and bankable financial systems	0: Not transparent; 10: Credible and bankable	Financial accountability and access to financing
Government support for local institutions and products	0: None; 10: Sustainable cross-sectoral	Extent of government facilitation and assistance
Implementation of Government Regulation No. 81 of 2020	0: Not implemented; 10: Comprehensive implementation	Compliance with national BUMP regulations
The growth of the Merah Putih Neighborhood Cooperative (KKMP)	0: No connection; 10: Strong institutional synergy	Collaboration between BUMP and neighborhood cooperatives
A role model for farmer-led economic institutions	0: Not a reference; 10: National role model	Recognition and replication potential of the institution
Technology & Environment Dimension		
Availability of production facilities and infrastructure	0: Very limited; 10: Very sufficient and modern	Adequacy of production and postharvest facilities
Institutional digitization	0: Not digital; 10: Advanced	Adoption of digital management and information systems
Website and social media development	0: Not used; 10: Significant impact	Utilization of digital communications and promotion platforms
Implementation of organic farming and low-carbon production	0: None; 10: Almost all farmers consistently implement	Adoption of environmentally friendly production practices
Protection of sustainable rice fields	0: None; 10: Formal, robust, and sustainable	Institutional support for agricultural and conservation

Note: Scores range from 0 (least sustainable condition) to 10 (most sustainable condition), attributes were derived from qualitative interviews, field observations, and institutional documents, and subsequently used in the rap-food system multidimensional sustainability assessment

Farmer capacity building is a community empowerment process aimed at enhancing the skills, knowledge, and attitudes of farmers-both individually and collectively-so they can manage their agricultural enterprises independently, productively, and sustainably. Capacity building focuses not only on improving individual capabilities but also on strengthening the institutional capacity and social systems that support community self-reliance (Mardikanto 2013). BUMP PT. LSS has undergone several forms of fairly complex institutional transformation. The shift from a social institution or group-based empowerment model to a BUMP that performs both economic and empowerment functions. This transformation is linked to a shift in orientation from a social institution to a socio-economic institution (Table 6).

BUMP PT. LSS was established through the collective initiative of six (6) farmer groups spread across two sub-districts in the city of Semarang. A shared vision to strengthen farmers' position within the agricultural economic system served as the foundation for establishing BUMP. The existence of BUMP PT. LSS does not automatically eliminate the role of farmer groups as empowerment or social institutions. The farmer groups serve as a conduit for information from BUMP PT. LSS to member farmers. The transformation into a limited liability company (PT) demonstrates an increase in institutional capacity in terms of legality, management, and governance.

Mr. SHJ, the Chief Financial Officer of BUMP PT. LSS and also one of the leaders of a farmers' group stated the following in an interview.

"In our farming group (poktan), the reason we were able to establish this is, first and foremost, because we are all farmers. Naturally, we want the agricultural products we manage to yield the best possible results, ensure smooth marketing, and be sold at more affordable prices. One way to achieve this is by forming a business entity" (Interview conducted in June 2025)

This statement was reinforced by one of the stakeholders, Mrs. SNT, Head of the Extension Division at the Semarang City Agriculture Office, who made the following remarks during an interview.

"I know that BUMP is growing-it's not just about production but also distribution, acting as an off-taker for farmers who are members of groups or cooperatives. "In my opinion, with its status as a limited liability company (PT), the legal requirements are more clearly defined and certain, which will certainly help facilitate BUMP-specifically, the farmers within BUMP-in expanding their operations." (Interview conducted on 7 August 2025)

Farmer institutional transformation was also reported by Fernando et al. (2021). The institutional transformation of PT. LSS's BUMP reflects the organization's institutionalization and adaptation process. This institutionalization progressively strengthens resource capacity, develops a more formal governance structure, and expands stakeholder engagement. These findings are consistent with institutional theory, which posits that organizations transform to gain legitimacy and ensure their survival (Meyer and Rowan 1977) by adopting formal structures and governance mechanisms that conform to

norms (DiMaggio and Powell 1983). This institutional transformation reflects collective action, in which individual farmers coordinate their resources to make decisions and achieve their desired outcomes independently.

Stakeholder typology

The development of BUMP PT. LSS in supporting Semarang City's food system is inseparable from the roles played by various parties. The involvement of various actors within the institutional network of BUMP PT. LSS demonstrates that the food system is multidimensional and requires cross-sectoral support. BUMP PT. LSS maintains very close relationships with various stakeholders who have differing interests. These diverse interests shape stakeholder collaboration in supporting Semarang City's food system. BUMP PT. LSS stakeholders generate synergistic interactions through the quadruple helix model, which drives institutional and behavioral changes within the culture of urban innovation, thereby better aligning urban innovation with community needs (Stephens 2025).

The assessment of importance based on the indicators of power, legitimacy, and urgency was conducted based on the results of interviews, field observations, and document analysis. The final score for each indicator is not derived from an average score but rather from actual conditions in the field, validated through triangulation to ensure the reliability of the results. Although it is not easy to identify stakeholder groups by both level and category, those that meet the definitive criteria do exist. The following are the stakeholders involved, along with their levels and categories (Table 7).

Overlapping functions, institutional fragmentation, and the dominance of powerful actors often hinder urban food governance in Indonesia (Irianto et al. 2022). The greater the government's emphasis on public engagement, the greater the extent of innovation that occurs (Schütz et al. 2019). Multi-stakeholder participation demonstrates that the legitimacy within urban food systems is hybrid in nature. Similarly, in rural areas, Lindawati et al. (2024) noted in their study that rural food systems mobilize local institutions to ensure year-round food availability. In contrast, research by Enderton et al. (2017) revealed that local communities within the rural food system in Northeast Iowa act as on-the-ground decision-makers and sources of knowledge.

Government: The Bank Indonesia Representative Office for Central Java and the Semarang City Food Security Agency share a high level of authority, legitimacy, and urgency. Both stakeholders have complementary interests and roles. The Bank Indonesia Representative Office for Central Java is oriented toward inflation stabilization and economic system efficiency (macro level), focusing on strengthening the capacity, innovation, and financing of BUMP PT. LSS. Meanwhile, the Semarang City Food Security Agency is oriented toward food stabilization and public services (micro-regional level), focusing on facilitating the operational and institutional aspects of BUMP PT. LSS. This interaction is collaborative in nature, with the government responding positively to the

contributions of BUMP PT. LSS through institutional development policies. This collaboration subsequently strengthens the urban food system.

Private sector/industry: BULOG (State Logistics Agency) possesses a high level of power, legitimacy, and urgency. Below it is BUMP PT. Wijaya Kusuma Pangan Mandiri has a high level of legitimacy and urgency but only moderate power. Private/industry stakeholders have a more economic and operational orientation, focusing on

business sustainability and distribution efficiency at BUMP PT. LSS. In terms of their roles, BULOG (State Logistics Agency) functions as a strategic supplier and stabilizer. Meanwhile, BUMP PT. Wijaya Kusuma Pangan Mandiri functions as a horizontal business partner that strengthens business collaboration. In addition to ensuring a sustainable supply chain, multi-stakeholder partnerships foster professionalism in the company's business operations.

Table 5. Institutional development BUMP PT. LSS, Semarang, Central Java, Indonesia

Year	The Eight-Stage Process (Kotter 2012)	Changes that have occurred
2014	Establishing a sense of urgency	Consolidation of key farmer groups to form Self-Reliance Agricultural Extension Workers (PPS)
2015	Creating the guiding coalition	Declaration of the Self-Reliance Agricultural Extension Workers (PPS) and regular outreach activities in the form of door-to-door extension services
2016	Developing a vision and strategy	Joint discussions and initiatives to develop organic farming
2017	Communicating the change vision	Establishing the Organic Agricultural Extension Workers Community and declaring the "Go Organic" movement
2019	Empowering employees for broad-based action	Development of certified organic products and the establishment of a joint platform, the Self-Reliance Rural Agricultural Training Center (P4S)
2021	Generating short-term wins	Initiating a shift in mindset to establish Farmer-Owned Enterprises (BUMP) post-COVID-19 to improve farmers' welfare
2022	Consolidating gains and producing more change	Formulating the vision, mission, objectives, structure, and business plan for the establishment of BUMP
2023	Anchoring new approaches in the culture	Kickoff for business development and partnerships

Table 6. Institutional transformation of BUMP PT. LSS, Semarang, Central Java, Indonesia

Factor	Institutional Transformation of Farmers (Ministry of Agriculture Services)	Current Situation (2015-2022)	Situation Following the Establishment of BUMP (2022-present)
Institutional objectives	Business networks, business partners, and business units	Productive activities, farmer education, and producing their own products (OBS)	Increasing farmers' income and providing access to food for the community (INT, OBS)
Institutional structure	Farmers' economic institutions (BUMP, cooperatives, PT)	Farmer organizations in the form of farmer groups and self-help agricultural extension communities (DOC)	Farmers' economic institutions in the form of Farmer-Owned Enterprises (BUMP) (INT, DOC)
Activity focus	Upstream-to-downstream agribusiness operations	Agricultural social sector or upstream sector (INT)	Agricultural economy or upstream-to-downstream (INT, OBS)
Organizational structure	Complex organizational structure	Voluntary organizational system (INT)	Tasks and work are assigned according to ability, while still helping one another (INT, OBS, DOC)
Product focus	Regional-based economies of sale	Rice and rice products (INT)	Product diversification based on consumer needs (INT, OBS)
Use of technology	Mechanical technology (machinery)	Used to support production and increase product value (INT)	Integrated with digitalization to support product efficiency and effectiveness (INT, OBS)
Sources of capital	-	Farmers' pooled funds (INT)	Capital comes from bank loans, partnerships, and institutional profits (INT, DOC, OBS)
Government support	-	Semarang City Agriculture Office (INT)	Multi-stakeholder (INT, OBS)
Position in the food supply chain	-	Key actors or farmers (INT)	Food producers (INT, OBS)

Note: INT: Interviews, OBS: Field observations, DOC: Institutional documents

Table 7. Synthesis of stakeholder categories, institutional roles, sustainability contributions, and policy relevance

Stakeholders		Salience category	Institutional role	Sustainability contribution	Policy relevance
Government	Semarang City Food Security Agency	Definitive	Food distribution facilitation, market stabilization, and institutional support	Strengthens economic, social, and institutional sustainability	Supports food security, inflation control, and urban food governance
	Semarang City Agriculture Agency	Dominant	Extension services, farmer development, technical assistance	Improves social sustainability and farmer empowerment	Supports agricultural development and farmer welfare
	Central Java Provincial Food Security Agency	Dominant	Policy coordination and food-system support	Strengthens institutional sustainability	Supports regional food security planning
	Bank Indonesia Central Java Representative Office	Definitive	Capacity building, financing support, digitalization, business development	Enhances economic and technological sustainability	Supports inflation stabilization and food-system resilience
	BULOG (State Logistics Agency)	Definitive	Strategic supplier, food reserve management, market stabilization	Enhances economic sustainability and supply-chain stability	Supports national food-security objectives
Private / Industry	PT. Jateng Agri Berdikari	Dominant	Business partnerships and market expansion	Strengthens economic sustainability	Promotes agribusiness development
	BUMP PT. Wijaya Kusuma Pangan Mandiri	Definitive	Knowledge sharing and inter-BUMP collaboration	Supports institutional learning and business sustainability	Strengthens farmer-owned enterprise networks
	National Secretariat of Indonesian Farmer-Owned Enterprises	Definitive	Institutional mentoring, regulatory facilitation, and organizational development	Enhances institutional sustainability and governance quality	Supports farmer institutional transformation
Academics	Semarang State Polytechnic	Dominant	Research, training, innovation, and technical assistance	Supports technological and institutional sustainability	Facilitates innovation and evidence-based development
	Diponegoro University	Dominant			
	Farmer Group	Definitive	Primary producers, shareholders, and institutional members	Contribute directly to all sustainability dimensions	Strengthen farmer participation and collective action
Community	Pak Rahman Community	Dominant	Distribution and market linkage	Improves economic sustainability and supply-chain efficiency	Supports local food distribution systems
	LS Food Distribution Network	Dependent			
	"Bolo Tani" Facilitators	Definitive	Farmer mentoring, coordination, and capacity building	Supports social and institutional sustainability	Enhances extension effectiveness and farmer empowerment
	Rice Producers	Demanding	Agricultural production and commodity supply	Supports food availability and economic sustainability	Contributes to local food production capacity
	Consumers	Demanding	End users and market demand drivers	Influence product quality, distribution, and business viability	Supports food accessibility and market sustainability

Academics: Academics generally help transfer knowledge, technology, and regulatory guidance so that BUMP PT LSS can adapt sustainably. The National Secretariat of the Indonesian Farmer-Owned Enterprises (Seknas BUMP-Indonesia), as an educational community, possesses a higher level of authority, legitimacy, and urgency compared to nearby universities such as Diponegoro University and the Semarang State Polytechnic. Seknas BUMP-Indonesia's role in supporting BUMP PT LSS involves providing guidance in the form of assistance with the establishment process, business model direction, facilitating regulatory communication channels, and serving as a coordination and training center.

Community: Community stakeholders encompass the entire value chain from production to consumption. Their strong involvement demonstrates that BUMP PT LSS is based on a participatory and inclusive institutional model. Nevertheless, farmer groups (BUMP members) and Bolo Tani, as accompanying extension workers, hold the highest levels of power, legitimacy, and urgency. Both are primary actors and supporting actors in the development of BUMP PT LSS. Other community stakeholders, such as the Pak Rahman Community, the "LS" Food Distribution Network, and consumers, function as supporting actors, distribution intermediaries, and contributors to the long-term sustainability of the enterprise; nevertheless, BUMP PT.

LSS faces an inherent tension between its social mission and business objectives. On one hand, the enterprise seeks to improve farmer welfare by purchasing agricultural products at favorable prices; on the other hand, this strategy may reduce profit margins and constrain financial performance. Balancing farmer empowerment with commercial viability, therefore, remains a key challenge for the long-term sustainability of BUMP PT. LSS.

Research findings indicate that sustainability outcomes are linked to the formation of groups and the interactions that take place. The government plays a crucial role in providing policy support and institutional legitimacy. Meanwhile, farmers are the dominant stakeholders because they ensure the company's sustainability. These dynamics ultimately shape the sustainability of PT. LSS's BUMP initiative from economic, social, and institutional perspectives. Operationally, BUMP PT. LSS functions as a food hub that connects farmers with consumers or urban markets. As a producer, BUMP PT. LSS is able to reduce the fragmentation of farmers' production while improving the efficiency of logistics in the supply of food to the public. Food Hubs are becoming an increasingly robust strategy for local food systems by leveraging organizational structures, formalization procedures, stakeholder engagement, and institutional implementation (Carloni et al. 2025), with a focus on healthy diets, the local economy, community empowerment, and environmental sustainability (Papargyropoulou et al. 2024).

Institutional sustainability of BUMP

An organization's ability to implement its objectives and established systems is key to its sustainability (Lira et al. 2024). Business sustainability is demonstrated by how well the organization upholds its values (Ruswana et al. 2020). Each dimension consists of indicators, each of which receives a rating or score, thereby reflecting sustainability in the form of leading indicators. A scale determines each dimension's attributes. These attributes are then grouped into four dimensions: social (7 attributes), economic (8 attributes), institutional (8 attributes), and technology and environment (5 attributes).

The inter-dimensional relationships between the index and sustainability status are illustrated using a kite diagram. The analysis results yield varying BUMP Sustainability Index values for PT. LSS across dimensions, as presented in Figure 2. Of the three dimensions, those classified as "highly sustainable" are at the threshold, and none reach a value of 100.00. The difference in index values does not indicate a disparity in sustainability status, as the indices remain within the 70-85% range. The technology and environmental dimensions fall into the "moderately sustainable" category because their index values are in the 50.01-75.00 range. The technology and environmental dimensions are critical areas for intervention. In addition to having fewer attributes than other dimensions, these dimensions have the lowest index values. Figure 3 shows the operational infrastructure network of BUMP PT. LSS.

The Rap-Food System ordination results were supplemented with a Monte Carlo analysis to assess the stability of the ordination results. This analysis was

conducted 100 times across the social, economic, institutional, technological, and environmental dimensions. The stability of the sustainability indices generated in the Monte Carlo analysis is reflected by the plots clustering together. The analysis results in Table 8 show small differences between the MDS and Monte Carlo Sustainability Index values with a 97.5% confidence interval. Several parameters generated from this statistical test are sufficiently adequate to be used as a rapid assessment tool to describe the sustainability status of BUMP PT. LSS in supporting the food system.

Economic sustainability exhibits the largest discrepancy and should therefore receive additional discussion regarding uncertainty. To evaluate the reliability of the Rap-Food System assessment, additional diagnostic analyses should be reported, including MDS stress values, coefficients of determination (R^2), 95% confidence intervals, sensitivity analyses, and robustness tests. Stress and R^2 statistics provide measures of ordination quality, while confidence intervals quantify uncertainty around sustainability indices. Sensitivity analyses examining alternative weighting scenarios can determine whether sustainability classifications are affected by attribute weighting assumptions. Furthermore, robustness testing using alternative weighting schemes and repeated Monte Carlo simulations can verify the stability of leverage attributes and sustainability rankings. These diagnostics would substantially improve the transparency, reproducibility, and analytical credibility of the sustainability assessment.

Social Dimension: The social dimension is an area related to promoting social justice and preventing conflicts of interest in the sustainability of BUMP PT. LSS. The results of the sensitivity analysis (leverage) affecting the sustainability of the social dimension indicate that the attribute with the highest Root Mean Square (RMS) value on the X-axis (3.27) is expanding farmer membership, while the attribute with the lowest RMS value (1.5) is social protection and employee welfare. Expanding farmer membership within BUMP PT. LSS has not yet been implemented optimally. Several factors pose challenges, such as the large number of farmers changing professions, the institutional socialization process, and institutional interest in joining. The findings indicate that institutional sustainability is influenced by the number and capabilities of members as a source of social capital. From a governance perspective, this strengthens institutional legitimacy in carrying out social and economic functions. This is consistent with social capital theory (Putnam 2000), which supports the success of collective institutions by emphasizing trust, participation, and social networks.

Economic Dimension: The economic dimension of the sustainability of BUMP PT. LSS is the area that determines farmers' income and the interests of the community; thus, it is determined by the continuity of agricultural production. The results of the sensitivity analysis (leverage) affecting the sustainability of the economic dimension indicate that the attribute with the highest Root Mean Square (RMS) value on the X-axis is access to distribution facilitation, at 2.05. On the other hand, the attribute of BUMP as a food

hub for the City of Semarang has the lowest RMS value of 0.85. This RMS result stems from the reliance on distribution facilitation provided by the government to BUMPT. LSS is supporting the City of Semarang's food system. This indicates that distribution access is a key factor in the economic dimension influencing the role of BUMPT. LSS. Distribution facilitation acts as a mediator between high purchases of farmers' crops and the stabilization of corporate profit margins. This indicates that ensuring logistics efficiency and market stability still requires external support in managing the supply chain. Research findings support the supply chain management approach (Pujawan and Mahendrawathi 2024) in value creation and agribusiness sustainability, positioning distribution as a critical factor.

Institutional Dimension: The institutional dimension in the sustainability of the BUMPT program at PT. LSS is the area that drives institutional capacity within the food system. The results of the sensitivity analysis (leverage) indicate that the attribute influencing the sustainability of the institutional dimension with the highest Root Mean Square (RMS) value on the X-axis-3.14-is the growth of the Merah Putih neighborhood cooperatives. Additionally, the attribute with the lowest RMS value of 1.7 is government support for local institutions and products. This RMS result occurs because the Merah Putih neighborhood cooperative is a national priority program of the government that must be supported and implemented. This poses both a challenge and a threat to the existence of

BUMPT. LSS is an institution within the community. The emergence of new institutions creates opportunities for both collaboration and competition in accessing markets and securing government support. This situation requires BUMPT. LSS to strengthen its organizational capacity, improve product quality, and expand its partnership networks in order to remain relevant to development programs. This finding aligns with institutional theory (Scott 2001), which explains that to maintain legitimacy and sustainability, institutions must be able to adapt to change.

BUMPT. LSS Sustainability Index

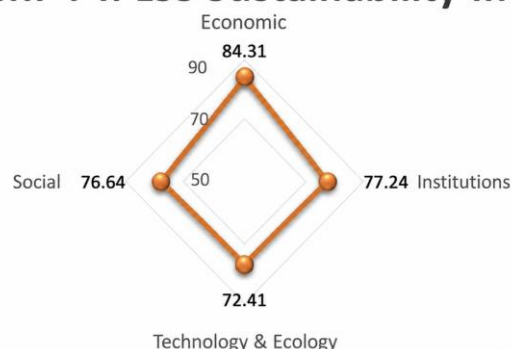


Figure 2. Sustainability Index of BUMPT. LSS, Semarang, Central Java, Indonesia

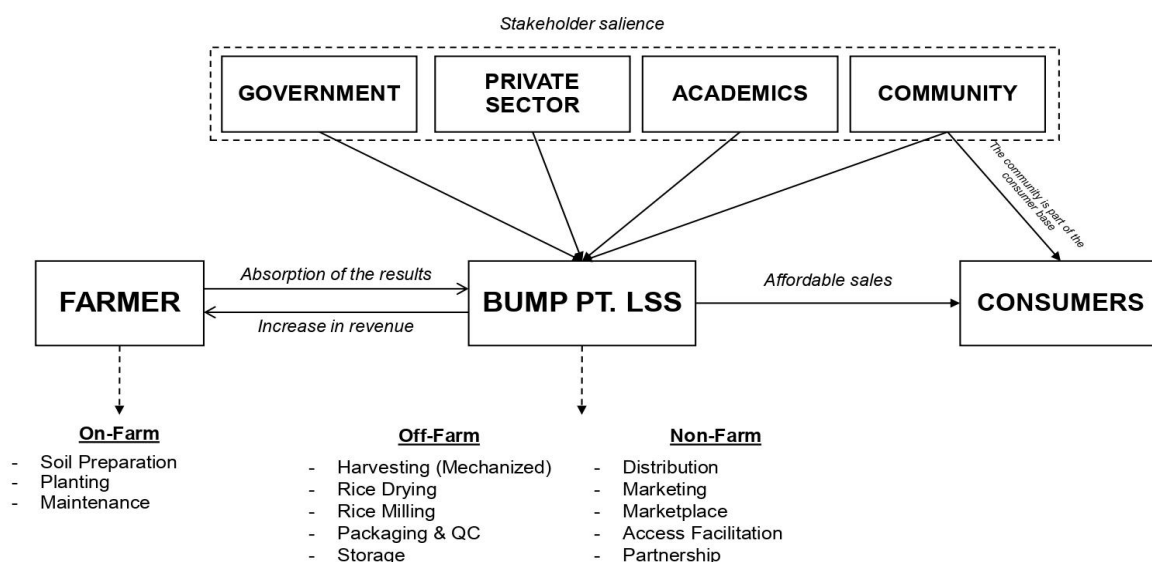


Figure 3. Conceptual operational infrastructure network of BUMPT. LSS, Semarang, Central Java, Indonesia

Table 8. Sustainability Index and status

Dimension	MDS score	Monte Carlo	Difference (MDS Score- Monte Carlo)	Relative error (%)	Status
Social	76.64%	74.03%	2.61%	3.41	Highly Sustainable
Economic	84.31%	75.89%	8.42%	9.99	Highly Sustainable
Institutions	77.24%	73.38%	3.86%	5	Highly Sustainable
Technology and Ecology	72.41%	74.88%	2.47%	3.41	Moderately Sustainable

Technology and Environmental Dimensions: The technology and environmental dimensions of PT. LSS's BUMP sustainability represents a combination of technological and environmental factors that influence institutional performance within the food system. The results of the sensitivity analysis (leverage) of the technological and environmental dimensions indicate that the attribute influencing sustainability with the highest Root Mean Square (RMS) value on the X-axis, at 5.38, is the availability of production facilities and infrastructure. Additionally, the attribute with the lowest RMS value of 2.3 is institutional digitalization. This RMS result occurs because production facilities and infrastructure are the resources that support the institution in conducting business operations and empowering the food system. Their availability impacts the effectiveness and efficiency of processes from production through to marketing. Operational effectiveness and efficiency are determined by infrastructure from upstream to downstream, making production facilities a strategic resource. Managing these facilities requires guidance from experts and the selection of the right human resources to ensure their sustainability. This finding aligns with the resource-based view (Michie

and Oughton 2024), which states that the ability to manage strategic resources influences institutional advantage and sustainability.

The results of the leverage analysis show that 14 of the 28 attributes have an RMS value > 2.0 , such as "Availability of Infrastructure" and "Access to Facilities." Attributes with an RMS < 2.0 are relatively less sensitive, meaning that changes to these attributes do not significantly alter the analysis results. Attributes such as "leadership commitment," "strong legal standing," and "implementation of laws" exhibit high values because they play a role in creating stability and strategic direction for the organization. Meanwhile, attributes such as KKMP, business empowerment, community cooperation, and membership expansion are capable of strengthening relationships between external and internal actors. Strategies for strengthening institutional sustainability and government policy interventions can be focused on these attributes. Figure 4 presents the results of the analysis of social, economic, institutional, technological, and environmental influences.

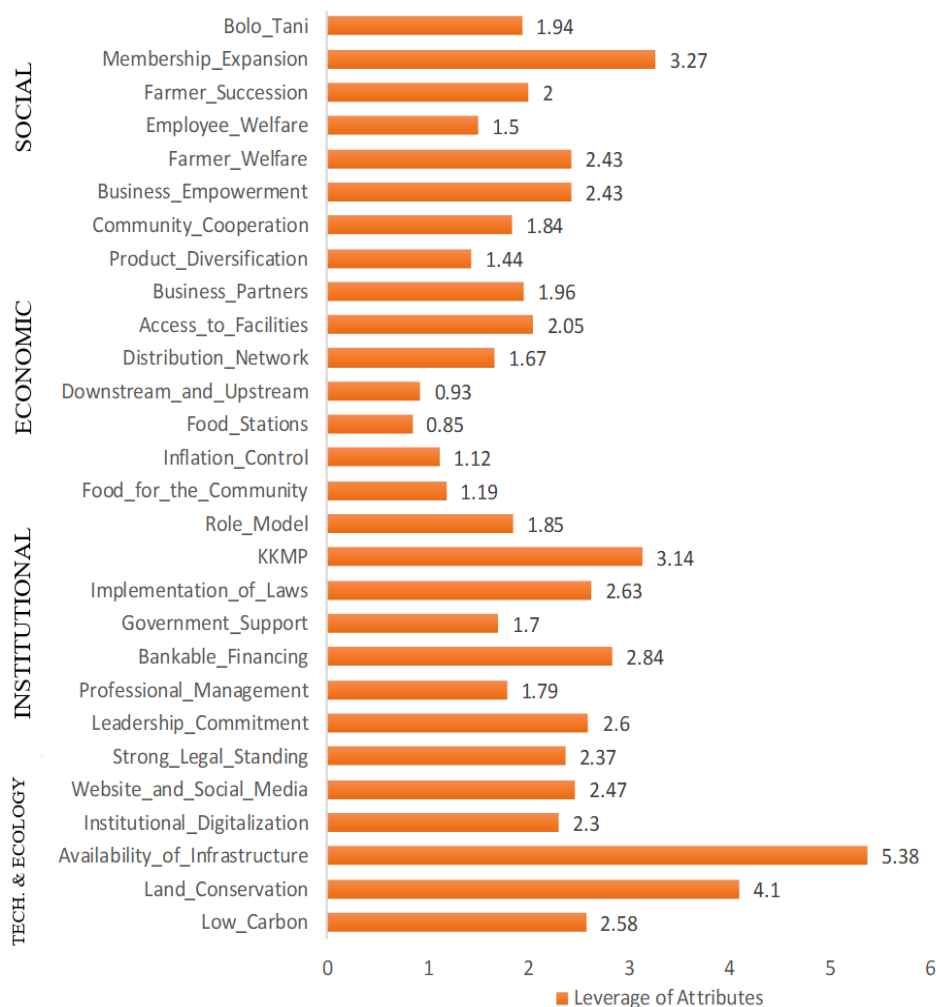


Figure 4. Results of the analysis of social, economic, institutional, technological, and environmental leverage

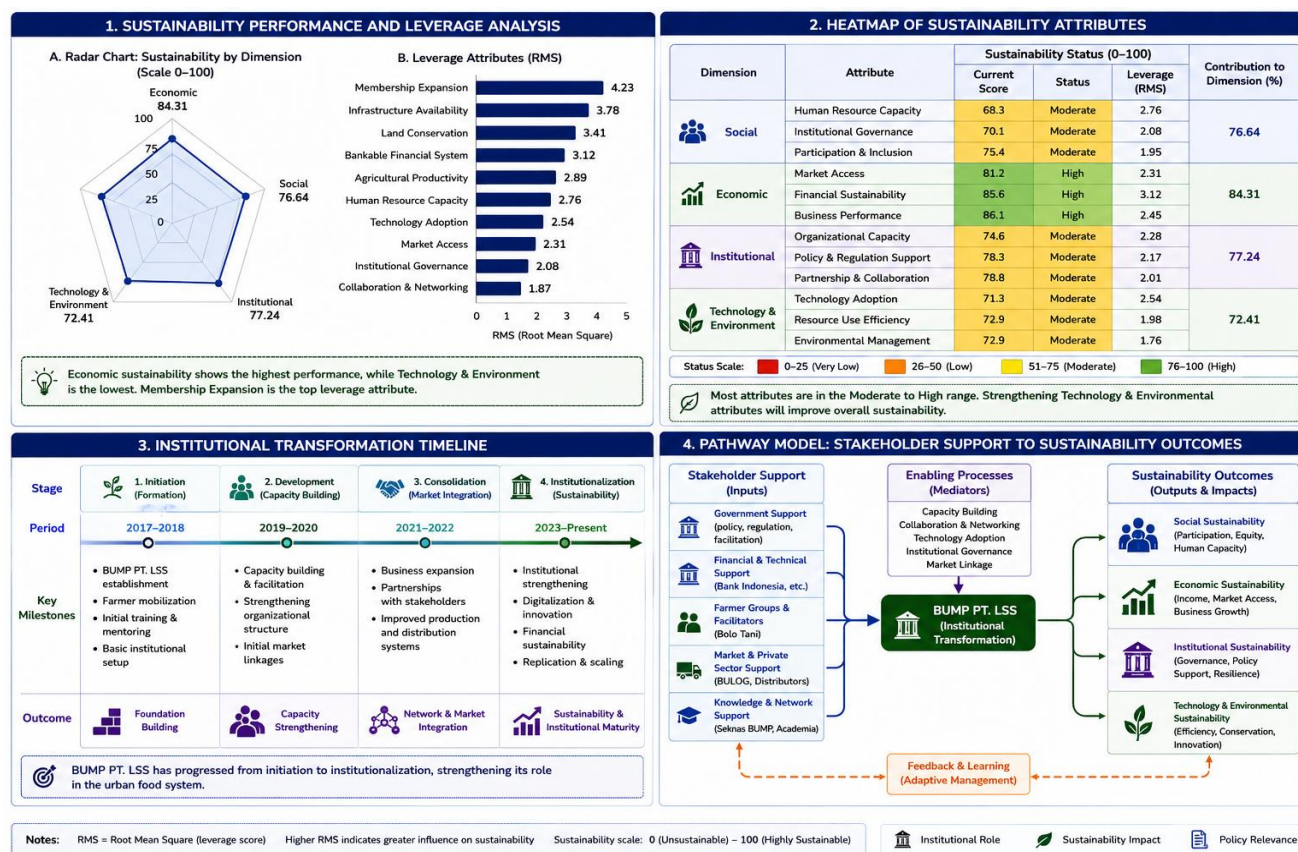


Figure 5. Integrated sustainability assessment, institutional transformation, and stakeholder support framework of BUMP PT. LSS, Semarang, Central Java, Indonesia

The institutional sustainability of BUMP PT. LSS is influenced by its financial sustainability, which stems from a combination of commercial revenue and government program support. BUMP PT. LSS's primary revenue source comes from business activities within the government-facilitated supply chain, such as low-cost food bazaars and goods procurement, albeit with low margins. On the other hand, commercial business activities generate high margins through partnerships with institutions, although the intensity of these partnerships needs to be increased. This revenue is used for operational costs, infrastructure development, and empowerment activities for members. Institutional sustainability does not depend only on the institution's ability to generate revenue independently but still relies on external support.

Figure 5 integrates four analytical components: sustainability performance, sustainability attributes, institutional transformation, and stakeholder support pathways. The radar chart and leverage analysis summarize sustainability performance across social, economic, institutional, and technology-environment dimensions while identifying key leverage attributes. The heatmap highlights priority sustainability attributes requiring improvement. The institutional transformation timeline illustrates the progression of BUMP PT. LSS from formation to institutional maturity through capacity building, market integration, and organizational strengthening. The pathway model demonstrates how

stakeholder support through policy, financing, technical assistance, market access, and knowledge transfer drives institutional transformation and ultimately enhances multidimensional sustainability within the urban food system.

In conclusion, the dominant role of BUMP PT. LSS in stabilizing urban food supply and prices is carried out dynamically in collaboration with stakeholders, including the government, the private sector/industry, academia, and the community. Differences in the levels of importance among stakeholders, in terms of power, legitimacy, and urgency, enable BUMP PT. LSS leadership is to understand the situation and determine appropriate actions, thereby fostering a healthy ecosystem. BUMP PT. LSS demonstrated a generally strong sustainability performance, with sustainability indices of 84.31% for the economic dimension, 77.24% for the institutional dimension, 76.64% for the social dimension, and 72.41% for the technology and environmental dimension. The economic dimension achieved the highest score, while technology and environmental aspects represented the primary areas requiring improvement. Stakeholder analysis identified government agencies, Bank Indonesia, farmer groups, Seknas BUMP Indonesia, Bolo Tani facilitators, and BULOG as the most influential stakeholders in supporting institutional development and food-system governance. The institutional transformation process successfully evolved from farmer groups into a formal Farmer-Owned

Enterprise (BUMP), strengthening organizational capacity, market integration, and sustainability performance within the urban food system. Additionally, the varying regional structures present a key challenge in undertaking such research. Research could also be expanded by calculating the extent of the increase in farmers' income after joining BUMP. These results show that BUMP PT. LSS is highly sustainable in the economic, institutional, and social dimensions, while the technology and environmental dimensions remain moderately sustainable and require priority improvement.

Despite these findings, the study is limited by its single-case design, reliance on expert judgment for sustainability scoring, possible subjectivity in stakeholder salience classification, and incomplete reporting of MDS reliability diagnostics such as stress values, R^2 , confidence intervals, sensitivity analysis, and robustness testing. The study also did not directly measure changes in farmers' income after joining BUMP. Future research should compare multiple BUMPs across Indonesia or Southeast Asia, apply longitudinal analysis, include farmer-income impact assessment, use social network analysis to examine stakeholder relationships, and report full MDS diagnostic statistics. These improvements would strengthen evidence on how farmer-owned enterprises contribute to sustainable urban food governance. The contribution of BUMP PT. LSS in supporting the food system is clear evidence that bottom-up institutions can serve as a driving force for the community. It is hoped that BUMP PT. LSS will be able to implement bankable accounting practices with the support of stakeholders, thereby gaining access to greater capital and increasing production to meet food supply needs in the city of Semarang. This effort is accompanied by urging the government to implement Government Regulation No. 81 of 2020 on Financing for Agricultural Businesses.

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