Jurnal Agrisistem Seri Sosek dan Penyuluhan p-ISSN 1858-4330
Volume 21 Nomor 2, Desember 2025 e-ISSN 2776-4362
DOI: https://doi.org/10.52625/j-agr-sosekpenyuluhan.v21i2.694

Implementation of Paddy Good Handling Practices (GHP) with Farmer Support Capacity in Singaparna Sub-district

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ABSTRACT

Rice is the primary staple food in Indonesia, and one of the persistent challenges in its agricultural sector is maintaining both production quantity and quality, particularly during the post-harvest stage. To address this issue, the present study evaluates the implementation of Good Handling Practices (GHP) for rice and formulates strategies to enhance GHP adoption in alignment with the capacity and resources of rice farmers. The research was conducted from January to March 2025 in Singaparna District, Tasikmalaya Regency, involving 86 respondents selected from a population of 139 rice farmers using proportional random sampling. Data were analyzed using descriptive statistics and multiple linear regression analysis. The findings indicate that the implementation of GHP, supported by farmers' capacity, is significantly influenced by the use of appropriate GHP technologies (coefficient = 0.518) and the effectiveness of agricultural extension services (coefficient = 0.179). In contrast, institutional support showed no statistically significant effect. Together, GHP and extension services explained 73.4% of the variance in GHP implementation. Recommended strategies for improving GHP adoption include increasing access to post-harvest handling facilities, particularly rice threshing equipment, applying diverse and context-specific extension methods tailored to farmers' needs, utilizing suitable media for GHP dissemination, and strengthening both the role and frequency of agricultural extension activities. This study provides a basis for improving the application of GHP in rice farming by optimizing farmers' capacity, ultimately reducing post-harvest losses, preserving grain quality, and supporting local food security.

Keywords: Good Handling Practices, Farmers' Capacity, Rice Post Harvest, Agricultural Extension

INTRODUCTION

Paddy remains one of Indonesia's most vital food commodities and continues to play a key role in national food security. As a seasonal crop with high cultivation potential, paddy farming faces persistent challenges in maintaining both the quantity and quality of production--particularly during post-harvest handling. Inadequate practices at this stage often result in significant yield losses and diminished grain

Halaman Jurnal, https://ejournal.polbangtan-gowa.ac.id/index.php/J-Agr-Sosekpenyuluhan
Received 13 Oktober 2025
Accepted 30 Desember 2025
Published Online 24 Februari 2026
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quality, which negatively impact both food availability and farmer income (Aldillah, 2019; Hasibuan et al., 2022; Setyawati et al., 2020)

Empirical studies indicate that the implementation of Good Handling Practices (GHP) in paddy post-harvest management in Indonesia remains largely partial and uneven. Farmers continue to rely predominantly on traditional methods, with limited compliance to the ideal GHP standards. Farmer support capacity particularly in the form of agricultural extension services and institutional support such as farmer groups (Gapoktan) plays a critical role in determining the level of GHP adoption. Well-functioning Gapoktan have the potential to enhance communication, collaboration, and knowledge exchange among farmers, thereby encouraging the adoption of sustainable agricultural practices. Nevertheless, the performance of these institutions remains suboptimal, especially in marketing functions and price stabilization, which constrains their effectiveness in fully supporting GHP implementation. (Guswita et al., 2020; Huanza et al., 2025)

Research on the implementation of Good Handling Practices (GHP) in rice post-harvest management in Indonesia indicates that strengthening farmers' capacity through technology transfer and participatory training is crucial to promoting the adoption of good agricultural practices and improving rice productivity (Guswita et al., 2020). Nainggolan et al. 2025 conducted a study in Bagok Village, Central Kalimantan, which found that farmers' knowledge of rice cultivation based on Good Agricultural Practices (GAP) increased by up to 57.6%, thereby supporting more efficient and sustainable paddy land management. Setyawati et al. (2020) reported that the implementation of GHP and Good Manufacturing Practices (GMP) in rice milling facilities remains relatively low, with GHP adoption levels ranging from only 42–50%, resulting in suboptimal rice quality outcomes.

According to Statistics Indonesia (BPS, 2024), the total harvested paddy area in West Java in 2024 reached 1.47 million hectares, reflecting a decrease of 113,04 thousand hectares (7,14%) compared to the previous year. In Singaparna Sub-district, Tasikmalaya Regency, the agricultural area covers 2,482 hectares, including 918 hectares of rice fields. In 2023, the area yielded approximately 15,513 tons of dried unhusked rice (GKP), with an average productivity of 7.6 tons per hectare (BPS, 2024). Despite this potential, post-harvest losses in West Java are estimated at 10,52% (Strategic Plan of the Directorate of Food Crops Post-Harvest, 2015 to 2019), while in Singaparna, only about 45% of post-harvest handling practices are considered adequate, and these are mostly traditional and limited in application (Singaparna Program Report, 2023).

To address these issues, the Ministry of Agriculture issued Regulation No. 22/Permentan/HK.140/4/2015, which outlines Good Handling Practices (GHP) guidelines for paddy. These aim to reduce post-harvest losses, maintain product quality, and increase competitiveness and farmer income (Molenaar, 2020). However, implementation of GHP remains limited, often constrained by the low support capacity of farmers--manifested in limited knowledge, inadequate technical skills, and negative perceptions toward standardized practices (Ayu et al., 2020; Dewi et al., 2020; Myeni et al., 2019). Some farmers view the adoption of Standard Operating Procedures (SOPs) as burdensome due to increased time, labor, or cost (Befikadu, 2018; Bisheko & Rejikumar, 2023; Nakoma et al., 2025; Qu et al., 2021; Shee et al., 2019). In 2017, the Ministry of Agriculture of the Republic of Indonesia issued Regulation of the Minister of Agriculture Number 31/Permentan/PP.130/8/2017 concerning Rice Quality Classes as a follow-up to the Regulation of the Minister of Trade Number 57/M-DAG/PER/8/2017. on the Determination of the Maximum Retail Price (HET) for rice. According to the Ministry of Agriculture rice is classified into Premium and Medium quality classes based on quality parameters including moisture content, head rice percentage, broken kernels, red kernels, foreign matter, paddy grains, and degree of milling.

This resistance to innovation can be better understood using Everett M. Rogers' Innovation Adoption Theory (2003) which outlines five stages of adoption: knowledge, persuasion, decision, implementation, and confirmation. In this context, GHP is regarded as an agricultural innovation whose successful implementation depends on farmers' capacity to acquire and apply relevant knowledge, develop favorable attitudes, and execute appropriate practices. Farmer support capacity thus becomes a critical factor in the adoption process. It determines the extent to which farmers are able to internalize GHP principles and apply them effectively to improve post-harvest outcomes. Strengthening this capacity is essential for minimizing losses, ensuring grain quality, and promoting sustainable agricultural development at the local level.

Table 1. Rice Quality Classification Requirements According to the Regulation of the Minister of Agriculture No. 31/Permentan/PP.130/8/2017

Quality Component	Unit	Premium	Medium
Moisture content (max)	%	14	14
Head rice (min)	%	85	75
Broken kernels (max)	%	15	25
Small broken kernels (max)	%	0	5
Red kernels (max)	%	0	5
Yellow/damaged kernels (max)	%	0	5
Chalky kernels (max)	%	0	5
Foreign matter (max)	%	0	0.05
Paddy grains (max)	grains/100 g	0	1
Degree of milling (min)	%	95	95

Source: Ministry of Agriculture of the Republic of Indonesia (2017)

The novelty of this study lies in its specific focus on GHP implementation in Singaparna Sub-district through the lens of the Innovation Adoption Theory, emphasizing farmers' knowledge, attitudes, and skills as key components of support capacity. By integrating this theoretical framework with empirical analysis, the study aims to generate practical recommendations for improving post-harvest practices through tailored capacity-building strategies.

Based on the above rationale, this study aims to analyze the implementation of paddy GHP and formulate strategies to strengthen farmer support capacity in Singaparna Sub-district. The findings are expected to offer evidence-based insights for reducing post-harvest losses, enhancing grain quality, and supporting local food security efforts.

MATERIALS AND METHODS

This study employed a quantitative approach with a causal design, aiming to examine the influence of paddy GHP technology, agricultural extension, and agricultural institutions on the implementation of GHP with farmer support capacity. The research was conducted from January to March 2025 in Singaparna Sub-district, Tasikmalaya Regency, West Java Province. The research location involved three purposively 1selected villages (Cipakat, Cikadongdong, and Cintaraja), based on the following criteria: 1) being centers of paddy cultivation, and 2) having farmers who apply post-harvest practices, and 3) active farmer group participation. These criteria aligned with the study objectives regarding the implementation of GHP with varying levels of farmer support capacity.

Based on these criteria, farmer groups that met the requirements to be included as the study population were identified in the three selected villages. The total number of respondents included in this study is presented in Table 2.

Table 2. Study Population and Sample of Farmers' Capacity in Implementing Rice Good Handling Practices (GHP)

No.	Village	Farmer Group	Number of Members	Sampel proporsional	Sampel
1	Cikunten	Cicarulang	32	32/139 × 83 = 27,95	20
2	Cikadongdong	Motekar	34	34/139 × 83 = 19,39	21
3	Cintaraja	Fajar Cintaraja	39	39/139 × 83 = 22,25 34/139 × 83 = 19,39	24 21
		Bina Muda	34		
	Total		139		86

The total population consisted of 139 paddy farmers. Using Slovin's formula with a 7% error margin, and referring to the Rubbin and Luck proportional allocation method, a sample of 86 respondents was determined. Data were collected through questionnaires, interviews, field observations, and documentation. The dependent variable (Y) was the implementation of paddy GHP with farmer support capacity, measured through three indicators: knowledge, attitudes, and skills. The independent variables were: 1) paddy GHP Technology (X_1): harvesting, threshing, drying, and storage, 2) agricultural Extension (X_2): role of extensionist, suitability of materials and media, extension methods, and extension intensity, and 3) agricultural institutions (X_3): roles of government, farmer groups, and cooperatives.

The main hypothesis tested whether GHP technology, extension services, and institutional support significantly and simultaneously influenced the implementation of paddy GHP. Data analysis included descriptive statistics and multiple linear regression analysis was employed to examine the extent to which the independent variables agricultural extension (X_1), rice Good Handling Practices (GHP) technology (X_2), and agricultural institutions (X_3) influence the dependent variable, namely rice farmers' capacity (Y). Prior to regression, ordinal data were transformed into interval scale using appropriate scoring techniques. The multiple linear regression model used was:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

where: Y = Implementation of paddy GHP with farmer support capacity, X_1 = Paddy GHP technology, X_2 = Agricultural extension, X_3 = Agricultural institutions, α = Constant, and ε = Error term. Instrument testing included validity and reliability tests. The validity test involved 30 farmers outside the main sample. Of the 120 statement items tested, 85 were valid and 35 were discarded. The reliability test showed a Cronbach's Alpha value of 0,968, indicating very high internal consistency and strong reliability for further analysis.

RESULTS AND DISCUSSION

Characteristics of Respondents

The study involved 86 respondents, consisting of 75 males and 11 females. The majority (30,2%) were aged between 62 to 81 years, while 64% had only completed elementary school. Most farmers (40,7%) had been members of farmer groups for 5 to 14 years, with farming experience ranging from 1 to 53 years. In terms of land ownership, 30,2% managed land of 0,13 to 0,25 ha.These characteristics reflect the demographic and structural conditions influencing the adoption of post-harvest innovations at the farmer level. The detailed distribution of respondent characteristics is illustrated in Figure 1.

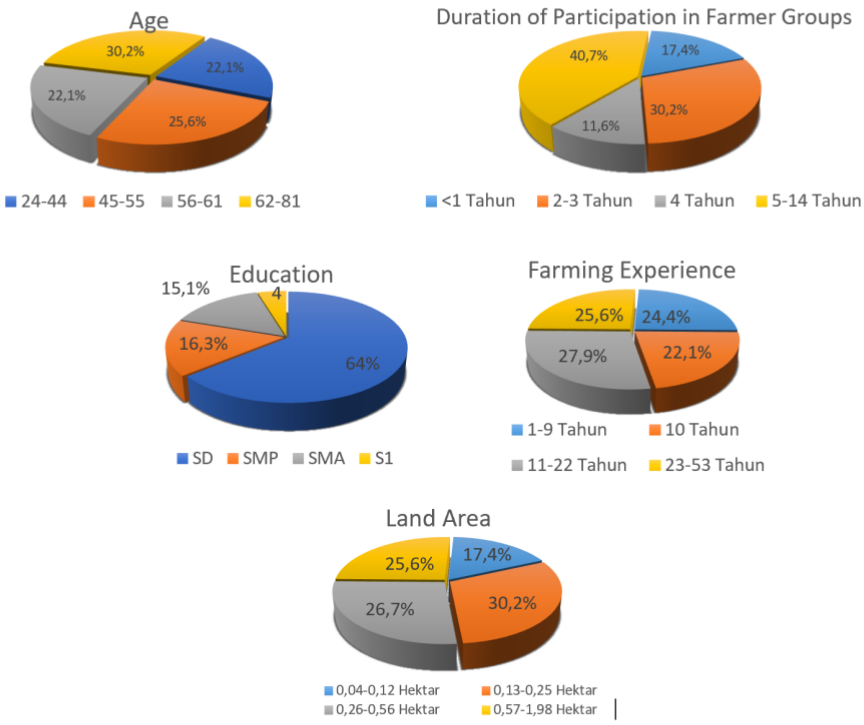

Figure 1. Respondent Characteristics. Source: Study Results (Processed by Authors in 2025)

Implementation of Paddy GHP

Paddy Good Handling Practices (GHP) cover four key stages: harvesting, threshing, drying, and storage, as outlined in Figure 2.

Figure 2. Paddy GHP Process Flow.

Descriptive analysis as swon in Table 3, showed that the highest implementation level occurred in the drying process (90,7% high category), followed by storage (77,9%), harvesting (76,7%), and threshing (41,9%).

Table 3. Descriptive Analysis Results of Paddy GHP Technology

Indicator	Percentage (%)			Number
	Low	Moderate	High	
Paddy Harvesting	0	23.3	76.7	100
Paddy Threshing	0	58.1	41.9	100
Unhusked Rice Drying	0	9.3	90.7	100
Unhusked Rice Storage	0	22.1	77.9	100
Average	0	28.2	71.8	100

Source: Study Results (Processed by Authors in 2025)

Table 3 shows that the implementation of rice GHP technology in the harvesting indicator is classified as high (76.7%). This finding indicates that the majority of farmers have understood and applied proper harvesting practices, including the determination of appropriate harvest criteria, the use of harvesting tools, and field-level harvesting techniques. However, farmers in Singaparna Sub-district still predominantly use sickles for harvesting and have not yet adopted combine harvesters. This condition is attributed to limited availability and access to modern harvesting technologies, as well as inadequate road infrastructure leading to agricultural fields, which constrains the optimal use of modern harvesting machinery (Li et al., 2024).

The application of GHP technology at the threshing stage is categorized as moderate (58.1%). At this stage, several constraints remain, particularly the continued reliance on manual threshing tools locally known as *gebotan*, due to the limited availability of modern threshing machines (Adisa et al., 2020).

Paddy drying practices fall into the high category (90.7%). During the drying stage, most farmers employ sun drying methods using tarpaulins, with grain layer thickness adjusted to comply with GHP standards. Nevertheless, mechanical dryers are not yet available at the farm level, resulting in farmers' continued dependence on solar energy as the primary drying source for harvested paddy (Romuli et al., 2020

The paddy storage stage is also classified as high (77.9%), indicating that most farmers have implemented appropriate storage practices in accordance with recommended standards. This reflects a relatively high level of farmers' awareness regarding the importance of maintaining paddy quality during the storage period (Nyabako et al., 2021).

Farmers showed good understanding of drying techniques utilizing sunlight, tarpaulins, and appropriate drying thickness, despite lacking access to mechanical dryers. For storage, practices like drying before storage, maintaining a clean environment, and monitoring moisture were commonly adopted. In contrast, threshing remained traditional, with many farmers still using manual *gebot* techniques due to limited access to power threshers and infrastructure constraints. The harvesting stage also indicated challenges, especially in the adoption of mechanical tools such as combine harvesters.

Farmer Support Capacity in GHP Implementation

Farmer support capacity was measured through indicators of knowledge, attitudes, and skills. The descriptive results are summarized in Table 4.

Table 4. Descriptive Analysis Results of Paddy GHP Implementation with Farmer Support Capacity.

Indicator Y	Presentation (%)			Total
	Low	Medium	High	
Knowledge	0	26,7	73,3	100
Attitude	0	18,6	81,4	100
Skills	0	9,3	90,7	100
Average	0	18,2	81,8	100

Source: Study Results (Processed by the Author in 2025)

Farmers' capacity represents the dependent variable (Y), which consists of three indicators: knowledge, attitudes, and skills. Table 4 shows that farmers' knowledge is predominantly classified in the moderate category, with 59 farmers (68.6%) and 63 farmers (73.3%) falling within this category. Higher levels of farmers' knowledge are reflected in their understanding of the principles underlying each stage of rice GHP implementation (Zossou et al., 2020).

Farmers' attitudes toward the implementation of GHP are categorized as high, with 70 farmers (81.4%) demonstrating strong awareness and willingness to adopt proper post-harvest handling practices (Masamba et al., 2022). Farmers' skills in implementing GHP are also classified as high, with 78 farmers (90.7%), indicating that the majority of farmers are capable of applying post-harvest handling techniques properly and in accordance with standard operating procedures (SOPs). Adequate skills in GHP implementation play a crucial role in reducing post-harvest losses and enhancing food security (Jarman et al., 2023). These findings support Rogers' Innovation Adoption Theory, suggesting that while most farmers have reached the implementation and confirmation stages, further support is still needed to ensure consistency and sustainability.

Role of Agricultural Extension and Institutions

Extension services played a significant role in improving farmer capacity. Indicators such as role of extensionists (55.8%), suitability of materials (54.7%), and extension intensity (59.3%) were in the high category. The complete data are presented in Table 5.

Table 5. Descriptive Analysis Results of Agricultural Extension Variables

Indicators	Percentage (%)			Total
	Low	Medium	High	
Role of Extensionist	0	44,2	55,8	100
Suitability of Extension Material and Media	0	45,3	54,7	100
Appropriateness of Extension Methods	1,2	47,6	51,2	100
Extension Intensity	1,2	39,5	59,3	100
Average	0,6	44,2	55,2	100

Source: Study Results (Processed by the Author in 2025)

Farmers positively assessed the relevance of extension methods and content, especially when delivered in participatory and contextualized formats. In contrast, institutional support showed mixed results. While farmer groups were rated highly (64.0%), support from government institutions was moderate (68.6%), and cooperatives scored low (only 8.1% in high category). This implies a need for strengthening cooperative roles in facilitating technology access and post-harvest logistics. The institutional data are detailed in Table 6.

Table 6. Descriptive Analysis Results of Agricultural Institutional Variables

Indicator	Presentation (%)			Total
	Low	Medium	High	
Government	17.4	68.6	14.0	100
Farmer Groups	1.2	34.9	64.0	100
Cooperatives	55.8	36.0	8.1	100
Average	24.8	46.5	28.7	100

Source: Study Results (Processed by the Author in 2025)

Regression Analysis: Factors Affecting GHP Implementation

Multiple linear regression analysis revealed that Paddy GHP Technology (X1) had the strongest influence on GHP implementation ($\beta = 0,518$, $p < 0,001$), Agricultural Extension (X2) also had a significant effect ($\beta = 0,179$, $p < 0,001$), and Agricultural Institutions (X3) showed no significant effect ($p = 0,081$). The results are presented in Table 7.

Table 7. Multiple Linear Regression Analysis Results

No	Variable	Unstandardized coefficient B	T Count	Sig.	Description
1	R^2	0,733			
2	Constant	0,914	5,668	0,000	
3	Paddy GHP Technology (X_1)	0,518	13,380	0,000	Very significant effect
4	Agricultural Extension (X_2)	0,179	5,647	0,000	Very significant effect
5	Agricultural Institutions (X_3)	0,028	1,355	0,081	No significant effect

Source: Study Results (Processed by the Author in 2025)

The model had an R^2 value of 0,733, meaning 73,3% of the variation in GHP implementation could be explained by GHP technology and extension activities, explain 26.7% can be from any factor. These findings emphasize that technical capability and structured knowledge transfer are central to improving farmer practices. To ensure the validity of this regression model, a simultaneous significance test (F test) was also performed, as shown in Table 8.

Table 8. Results of Simultaneous Significance Test (F Test)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0,983	3	0,328	75,166	0,001[b]
	Residual	0,358	82	0,004		
	Total	1,341	85			

Source: Study Results (Processed by the Author in 2025)

Strategic Priorities for Enhancing GHP Implementation

Based on the findings, priority strategies include: 1) improving access to post-harvest equipment, especially power threshers, 2) diversifying extension methods tailored to local farmer characteristics, 3) enhancing the role and intensity of extensionists to sustain behavioral change, and 4) strengthening farmer organizations to support continuous learning and access to innovation. These strategies align with the study's goal to formulate recommendations to improve post-harvest practices and reduce yield losses. The overall strategy model is visualized in Figure 3.

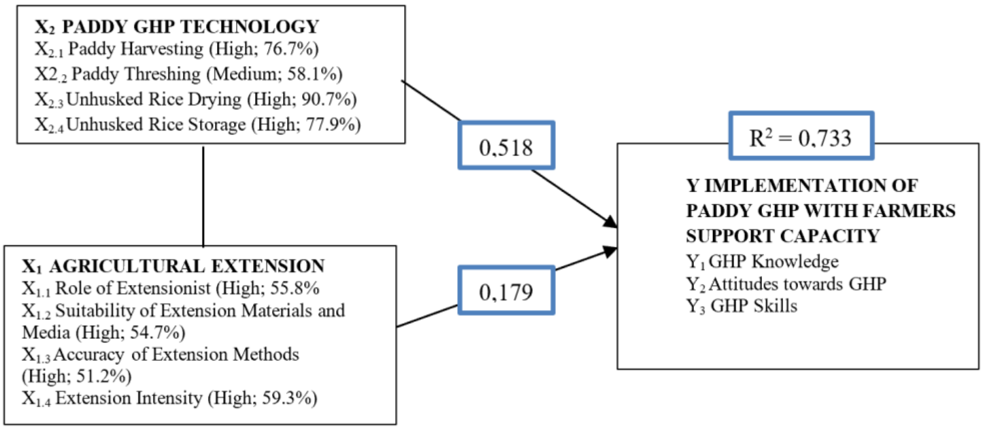

Figure 3. Strategy Model for Enhancing Paddy GHP Implementation with Farmer Support Capacity. Source: Study Results (2025).

CONCLUSIONS AND IMPLICATIONS

This study concludes that the implementation of Good Handling Practices (GHP) for paddy in Singaparna Sub-district is significantly influenced by two key factors: the application of GHP-related technology and the effectiveness of agricultural extension services. The multiple linear regression analysis revealed that GHP technology has the strongest effect ($\beta = 0{,}518$), followed by agricultural extension ($\beta = 0{,}179$), while agricultural institutions showed no significant influence. Together, these variables account for 73.3% of the variance in the implementation of paddy GHP with farmer support capacity. Among the post-harvest handling stages, drying received the highest implementation score, followed by storage, threshing, and harvesting. The limited access to modern equipment, particularly for harvesting and threshing, was identified as a major barrier to optimization. In terms of farmer capacity, most respondents demonstrated high levels of knowledge, attitude, and skills in implementing GHP, indicating a strong foundation for scaling up best practices. To strengthen the adoption of paddy GHP, strategic interventions are needed. These include improving the availability of appropriate post-harvest facilities (especially for threshing), enhancing the role and intensity of extension services, and tailoring extension methods and materials to the specific needs of farmers. By addressing these areas, the effectiveness of GHP implementation can be increased, contributing to reduced post-harvest losses, improved grain quality, and enhanced food security at the local level.

The implications of strategies to further enhance GHP adoption include improving the availability of post-harvest handling tools (especially threshing equipment), applying varied and context-specific extension methods, delivering GHP-related extension using appropriate media, and strengthening both the role and frequency of extension services. To further advance the adoption of GHP for rice, supported by farmers' capacity, improving post-harvest infrastructure is critical to ensure adequate post-harvest infrastructure, provide specialized GHP training for agricultural extension agents, and implement regular, participatory extension programs. Additionally, to gain a more comprehensive understanding of GHP implementation in Indonesia, further research is needed to explore the remaining 26.6% of influencing factors not covered in this study and expand the research scope to include regency and provincial levels.

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