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Article

Farmers' Knowledge Capacity Regarding Digital Communication in Response to the Use of Platforms for the Proposal and Distribution of Subsidized Fertilizers

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ABSTRACT

This study aims to determine farmers' digital communication skills and their responses to the use of this platform for the proposal and distribution of subsidized fertilizers, and the factors influencing their situation. The study was conducted in the Agricultural Extension Center (BPP) Ambulu work area, a rice-growing center in Jember Regency. The study employed a non-experimental quantitative approach with a survey research design. Data were analyzed using descriptive frequency analysis and multiple linear regression analysis. The results indicate that most farmers have high to very high levels of digital communication skills. These skills are influenced by years of farming experience, income, and interactions with extension workers. Close and frequent interactions between extension workers and farmers are essential for facilitating information exchange and strenghtening farmers' digital communication skills, particularly among farmers with limited farming experience and lower incomes.

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INTRODUCTION

Fertilizer is a key agricultural input that significantly influences agricultural production by providing essential nutrients that cannot be obtained directly from the soil. Several studies have shown that fertilizers, particularly chemical fertilizers, can significanlty increase crop yields and thereby improve profitability (Stewart et al., 2005). However, fertilizer application must be based on balanced application rates according to crop needs and soil conditions (Abebe et al., 2022; He et al., 2020).

On the other hand, chemical fertilizers also constitute a significant cost component in agricultural production and have a substantial influence on farm income and profitability. Chemical fertilizers contribute to agricultural costs as direct intermediate input costs. A clear quantitative is provided by changes in China's fertilizer policy in 2015, which resulted in 0.5 percentage-point increase in total agricultural production costs, while the share of intermediate input consumption increased by 11% overall (Li & Wu, 2021). Similarly, Gaytancıoğlu & Yılmaz (2024), in a study conducted in Turkey, reported a significant aggregate burden associated with unbalanced fertilizer use, with additional costs amounting to USD 833,135.49 across the study areas. This implies that fertilizer represents a major production cost requiring careful management. At the farm level, fertilizer costs are a major production cost requiring careful management. At the farm level, fertilizer costs are particularly important because they directly affect farm profitabilty. Several studies have shown that changes in fertilizer use can alter farmers' net income (Assefa et al., 2025; Cao et al., 2025).

Given the importance of fertilizer, various countries have implemented fertilizer subsidies to help farmers reduce production costs. Fertilizer subsidies are widespread across Asia and Africa, with varying policy designs. These include universal price subsidies, input subsidy programs, and cash transfers (Holden, 2019). Many South Asian countries have long relied on fertilizer subsidies, although their policy approaches differ. Kishore et al. (2021) found that India has eliminated subsidies for phosphate and potassium fertilizers since 2010, while Bangladesh, Nepal, and Sri Lanka temporarirly removed fertilizer subsidies before subsequently reinstating them. Similarly, countries such as Senegal have implemented input subsidy programs for more than 15 years, whereas Rwanda revised its subsidy system due to fertilizer price shocks in 2021–2022 (Ricome et al., 2024; Spielman et al., 2025).

Meanwhile, Indonesia has adopted a fertilizer subsidy policy that combined subsidy planning, regulated maximum retail prices, subsidy allocations, and a formal distribution system (Rozci & Rizkiyah, 2024) . This policy was further strengthened during the administration of President Prabowo Subianto through the issuance of Presidential Regulation 6/2025 concerning Subsidized Fertilizer Governance, which supports the government's goal of achieving food self-sufficiency. One of the main reasons underlying this policy is Indonesia's high dependence of fertilizers use, particularly urea for rice cultivation, which averages approximately 200 kg/ha (Rosidah, 2019; Wen & Ma, 2024). To support the provision of subsidized fertilizer, the government allocated up to IDR 26.68 trillion in 2024 (Carolina & Wulandari, 2024).

Although the policy is intended to benefit farmers, especially those operating small-scale farms, its implementation faces several challenges. Unequal access, excessive use of subsidized fertilizer (reaching up to 39%), and misallocation are among the most common issues reported (Ricome et al., 2024; Rozci & Rizkiyah, 2024; Tetteh et al., 2025). In Indonesia, challenges are particularly evident in the proposals and distribution processes. Carolina & Wulandari (2024) and Ricome et al., (2024) reported distribution irregularities, mismatch between fertilizer availability and demand, and the distribution of subsidized fertilizer to ineligible farmers. Furthermore, it was explained that the misuse of fertilizer subsidies in Indonesia has also been associated with corruption (Alhakim & Chai, 2023).

Deviations in the implementation of subsidized fertilizer policies reflect weaknesses in governance accountability. To detect and address these deviations effectively, information on the type, quantity, and location of subsidized fertilizer proposals and distribution must be accurately recorded and monitored. Responding to this situation requires the adoption of e-governance systems and digital platforms, which have been proven to enhance transparency, accountability, and process traceability, providing oversight and broad data access (Taiwo, 2024). Furthermore, Tahir et al. (2025) argued that digital transformation is able to integrate services to improve real-time governance accountability and data accuracy to support evidence-based decision-making.

Indonesia currently uses two digital platforms for fertilizer subsidy management: e-RDKK (electronic Definitive Group Needs Plan) for fertilizer proposals and and iPubers (Subsidized Fertilizer Implementation) for fertilizer distribution. The e-RDKK platform, operaterd by agricultural extension workers, supports the

proposal stage by recording and validating farmer data integrated with the Population Identification Number (NIK), land ownership information, cultivated commodities, and fertilizer needs based on fertilizer recommendations. This integration helps minimize data collection errors, fictitious recipients, and data duplication (Ismail et al., 2026). Meanwhile, iPubers is used during the distribution stage and is integrated with official subsidized fertilizer distributor kiosks, Farmer Cards (or digital farmer identities), and transaction recording systems (Apriadi et al., 2026). The platform helps ensure that subsidized fertilizer is distributed in accordance with Indonesia's 7 principles of accuracy, namely accuracy in quantity, price, place, time, quality, and recipient farmers (Amanda & Sasmita, 2024).

Although the digital platforms for subsidized fertilizer proposals and distribution are primarily operated by agricultural extension workers and authorized kiosks rather than farmers, farmers' understanding of these platforms remains essential. Farmers and farmer groups need sufficient digital literacy to monitor, verify, and ensure that subsidized fertilizer proposals and distribution comply with the Indonesia's seven principles of accuracy. This need is particularly important because global findings reveal that the majority of farmers have low to moderate levels of internet proficiency (Xu et al., 2026). A similar condition also occurs in Indonesia. Farmers' capacity in internet proficiency is still uneven, and only 13.4% of farmers have integrated internet-based technology into their agricultural business management (Satria et al., 2025). Furthermore, Adana et al. (2026) reported that in Yogyakarta, the province with the highest digital literacy index in Indonesia, only 53.85% of shallot farmers had adopted digital technology using basic devices such as smartphones and mobile phones. These challenges are further exacerbated by limited internet connectivity, with only 25.7% of farmers having internet access in 2018, equivalent to only 10.8% of Indonesia's approximately 13 million farmers (Saridewi & Annisa, 2025). These patterns suggests considerable scope for improving farmers' digital literacy and internet accessibility to support the effective implementation of digital fertilizer governance.

These findings indicate the existence of a substantial digital divide among farmers. Although internet access is available, relatively few farmers use digital technologies to support agricultural production and farm management effectively. Chen et al. (2024) and Wu et al. (2026) recommend the digital literacy/capability framework theory as a useful reference to increase farmers' capacity in digital knowledge, skills, attitudes, participation, and technology use. This framework defines digital literacy as the ability to access, manage, integrate, evaluate, create, and communicate information using digital tools in real-life contexts (Liu et al., 2025; Magesa et al., 2023). Furthermore, Liu et al. (2025) explained that, in agricultural context, digital literacy should encompass farmers' ability to use internet-connected devices to search for, evaluate, apply and share agricultural knowledge and technology information.

This study is not the first to examine farmers' capacity to use the internet. Previous studies have primarily focused on the internet use in relation to fertilizer management practices,technology adoption, and policy responses (Ehlers et al., 2021). However, studies that examine farmers' digital capacity as a central construct for understanding responses to fertilizer subsidy policies remain limited. Research linking internet use with subsidized fertilizer policies has been conducted by Rizal & Togimin (2023); Wijaya & Kuleh (2025) and Tati et al. (2025), but these studies mainly reported that farmers have limited understanding of the e-RDKK system, that their digital literacy is largely confined to completing e-RDKK procedure, and that training can improve this basic capability. Few studies have comprehensively examined farmers' digital capacity in relation to both stages in Indonesia's digital fertilizer subsidy system, namely fertilizer proposal (e-RDKK) and fertilizer distribution (iPubers). Although these platforms are operated by agricultural extension workers and authorized fertilizer kiosks, respectively, farmers still need to understand how they function to ensure that fertilizer proposals and distribution are implemented appropriately. Furthermore, farmers' ability to use the internet or digital devices dose not develop in isolation but is influenced by household resources, business conditions , collective organizations, and consultancy support (Arangurí et al., 2025). Therefore, this study aims to examine farmers' digital communication capacity in relation to the digital platforms used for subsidized fertilizer proposals and distributions, as well as the factors influencing this capacity.

RESEARCH METHOD

The research employed a non-experimental quantitative approach with a survey research design. This design involves measuring and observing variables without any intervention, allowing them to be examined in their natural conditions based on the respondents' opinions and characteristics (Clark & Creswell, 2015). The research was conducted in the Agricultural Extension Center (BPP) Ambulu area, Jember Regency, East Java.

This location was selected because East Java has the largest rice rice planting area, accounting for 16.26% of the total national planting area (11,320,986 ha). Within the province, Jember Regency contributes 7.26% (135436.35 ha) of the provincial planting area (Central Statistics Agency, 2025). Furthermore, the BPP Ambulu area, comprising Ambulu, Wuluhan and Tempurejo Districts, accounts for 7.20% of the total rice planting area (158,727 Ha), making it one of the district's major rice-producing areas (BPS-Statistics of Jember, 2025).

The study population consisted of farmers who were members of farmer groups within the working area of the BPP Ambulu. Respondents were selected using incidental sampling, resulting in 165 participants who attended group meetings. Data were collected through field observations, structured interviews using a closed-ended questionnaire, complemented by open-ended interviews with key informants and secondary data from the Agriculture Office, the Central Statistic Agency (BPS), and other sources. Descriptive frequency analysis was used to assess farmers' digital communication capacity. Subsequently, multiple linear regression analysis was performed to identify the factors influencing farmers' capacity in using the internet. The multiple linear regression model is specified as follows.

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + \ldots\ldots\ldots + b_{12} x_{12} + e \quad (1)$$

Where:

Y	=	Farmers' knowledge capacity regarding digital communication
x_1	=	Age
X_2	=	Number of family members
X_3	=	Land area (Ha)
X_4	=	Length of time in farming
X_5	=	Length of Education
X_6	=	Income
X_7	=	Participation in Activities/Meetings/Socialization/Extension of Farmer Groups/Farmer Groups
X_8	=	Membership of Farmer Groups/Farmer Groups
X_9	=	Interaction with extension workers
x_{10}	=	Knowledge of the mechanism for proposing and distributing subsidized fertilizers
X_{11}	=	Attitude towards the use of chemical fertilizers
x_{12}	=	Awareness of the use of chemical fertilizers
a	=	Constant
b	=	Regression coefficient
e	=	error

RESULTS AND DISCUSSION

The governance of subsidized fertilizer proposals and distribution during the Prabowo Subianto administration was marked by the issuance of Presidential Regulation No.6 of 2025 on the Governance of Subsidized Fertilizers. This regulation was subsequently operationalized through Minister of Agriculture Regulation no.4 of 2025, which amended the Regulation of the Minister of Agriculture No.10 of 2022 concerning Procedures for Determining the Allocation and Highest Retail Price of Subsidized Fertilizers in the Agricultural Sector. These regulations introduced several important requirements related to farmers' knowledge of digital platforms used in the fertilizer subsidy system. To be eligible for subsidized fertilizer, farmers must be registered in the e-RDKK within the Agricultural Extension Management Information System (Simluhtan), with their registration approved by the responsible regional government agency (SKPD). The registration process requires farmers, through their farmer groups, to provide information on both prospective farmers and prospective locations, including personal identity, land area, geographic coordinates or address, land ownership status, land suitability, and types of commodities cultivated. The e-RDKK database also serves as the basis for verifying farmers' eligibility when redeeming subsidized fertilizer through the iPubers platform at authorized fertilizer kiosks. Similarly, during the distribution stage, farmers also need to ensure that fertilizer purchases comply with the quota, according to the seven principles of accuracy. Therefore, farmers' understanding of these digital platform is essential for verifying their eligibility, ensuring that fertilizer is allocated correctly, and reporting any irregularities in the proposal or distribution process.

Farmers' Knowledge Capacity for Digital Communication

A total of 168 farmers from the BPP Ambulu working area in Jember Regency, East Java, participated in this study. Table 1 summarizes the characteristics of the respondent farmers. Table 1 shows that most farmers who participated in the survey were older adults, with an average age of approximately 50 years old, while the oldest respondent was 90 years old and the youngest was 22. On average, each farming household had three dependents. In terms of landholding, the average size was 5 hectares, with the largest holding reaching 125 hectares. This finding is noteworthy considering that the maximum land area eligible for subsidized fertilizer is only 2 hectares, suggesting that a proportion of respondents may not fully qualify for the subsidy scheme. Farmers also had substantial farming experience, averaging more than 25 years, indicating that most respondents had long-term engagement in agricultural activities. However, farmers' educational attainment was relatively low, with most having completed only six years of formal education (elementary school). Monthly farm income also remained relatively low and on large disparity. The average monthly income was IDR. 2,091,000 per month, which is below the minimum wage of Jember Regency IDR. 2,838,642 permonth), as stipulated in the Decree of the Governor of East Java No. 100.3.3.1/775/KPTS/013/2024.

Farmers' knowledge of digital communication was assessed using descriptive frequency analysis. The analysis was conducted by categorizing farmers' knowledge of digital communication applications for proposing and distributing subsidized fertilizer into five levels: very low, low, medium, high, and very high. The results are shown in Table 2, while Figure 1 illustrates the user interface of the platforms.

Table 1
Respondent Description

No.	Variables	Lowest Value	The highest score	Mode	Average
1	Age (Years)	22	90	50	51.87
2	Number of Family Members (People)	1	6	3	3.22
3	Land Area (Ha)	1	125	5	30.76
4	Farming Experience (Years)	1	70	30	28.03
5	Length of Education (Years)	3	16	6	8.01
	Income (Rupiah/month)	472,000	14,489,000	2,091,000	2,432,491.52

Source: Data Processed

Table 2
Farmers' Knowledge Capacity for Digital Communication

No.	Capacity Level	Amount	Percentage
1.	Very low	9.1	9.1
2.	Low	4.2	4.2
3.	Currently	13.3	13.3
4.	Tall	48.5	48.5
5.	Very high	24.8	24.8
Total		165	100.0

Source: Data Processed

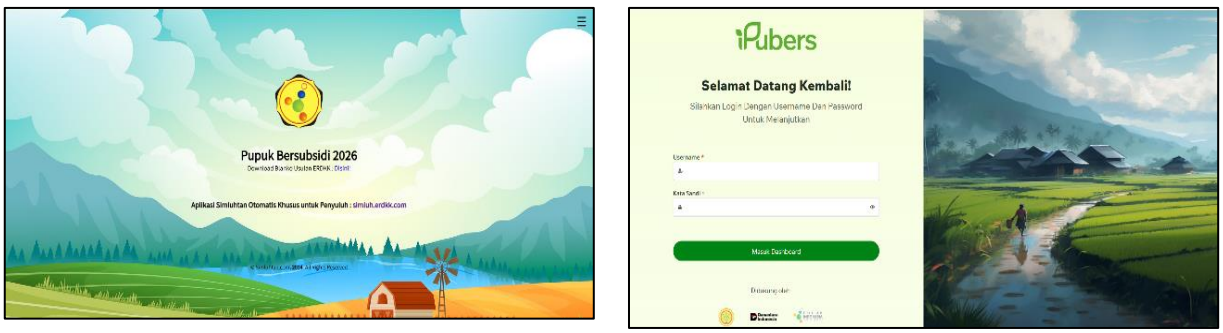


Figure 1
e-RDKK and iPubers Application Platform
Source: Data Processed

The results indicate that farmers generally possess a relatively high level of digital communication knowledge. This is indicated by most respondents being classified into the high and very high categories (73.3%). The highest scores were observed for the availability of internet signals at farmers' locations (731) and farmers' ability to operate digital devices (611). In contrast, farmers' knowledge of the digital platforms used for proposing and distributing subsidized fertilizer (e-RDKK or iPubers) was considerably lower (280). This finding is consistent with the results of field observations and interviews, which showed that although most farmers own Android smartphone with internet access, they have limited knowledge of the specific digital platforms used in the subsidized fertilizer system.

Farmers currently use smartphones primarily for communication and to access social media applications, such as WhatsApp, YouTube, and Facebook, rather than for e-Government platforms. This suggests that they are still unfamiliar with digital government such as e-RDKK and iPubers. According to Malodia et al. (2021) and Mykhalchenko (2022), e-Government refers to the use of information and communication technologies by governments and public institutions to deliver digital services, information and interactions while improving governance, transparency, and accountability. Compared with common social media applications, e-RDKK and iPubers require greater digital literacy because users must understand more complex interfaces, navigation systems, and administrative procedures. These platforms are also more easily operated and read or access clearly using a PC or laptop, especially for users with limited digital skills and older adults. This challenge is particularly relevant in the present study, where the average respondents was approximately 50 years old and the oldest respondent was 90 years old. Previous studies have similarly shown that older users often experience difficulties using e-Government services due to complex navigation, content, error-prone or ineffective feedback, and accessibility barriers, particularly when digital skills are limited (Alabdulrahman et al., 2025).

Factors Affecting Farmers' Knowledge Capacity Regarding Digital Communication

Factors influencing farmers' digital communication capacity were further analyzed based on the farmers' knowledge of digital communication. This analysis is particularly important because farmers should possess sufficient digital community knowledge to access and use e-Government platform effectively, particularly related to proposal and distribution of subsidized fertilizers. Farmers' understanding of their conditions, learning processes, and farming operations is important and will shape their understanding and use of digital-based communication (Gao et al., 2025; Peng et al., 2024; Waluyo et al., 2025). Therefore, it is important to understand what factors influencing the farmers' digital communication capacity.

The analysis used 12 independent variables covering farmer conditions and the farming system they operate. Multiple linear regression analysis was used, and the results were shown in Table 3. The results show that all independent variables (x_1 - x_{12}) collectively explain 47.5% of the variation in farmers' digital communication knowledge, while the remaining 52.5% is attributable to factors not included in the model. Likewise, the results of the simultaneous regression analysis show a significance value of 0.000, which is smaller than the probability value of 0.05. This value is supported by the calculated F value of 13.367, which is greater than the F-table of 1.816. These results indicate that all independent variables jointly have a significant effect on farmers' digital communication knowledge. The results also suggest that the selected variables adequately capture key sociodemographic characteristics and farming operational conditions that influence farmers' digital communication knowledge, consistent with previous studies highlighting these farctors as important determinants of digital technology adoption in agriculture (Alant & Bakare, 2021).

However, the findings of the simultaneous regression results cannot be immediately accepted and therefore require further analysis through partial regression analysis. The results show that the length of farming (x_4) has a significant influence on farmers' knowledge regarding digital communication in responding to the platform for the application and distribution of subsidized fertilizer, with a significance value of 0.023 ($\leq$ 0.05). An interesting finding is that farmers with short (14-28 years) and medium (28-42 years) farming experience actually have a high capacity for digital communication knowledge. This suggests that farmers who have more recently entered farming make greater efforts to monitor the application and distribution of subsidized fertilizer. This may be because relatively new farmers are more cautious in managing farming input costs by obtaining subsidized fertilizer whenever possible. This explanation is reasonable because chemical fertilizers (the main type of fertilizer covered under subsidy policies) represent the largest cost component, accounting for approximately 20-30% of the total production costs for staple food crops (Huang et al., 2008).

Table 3
Factors Influencing Farmers' Knowledge Capacity Regarding Digital Communication in Response to Subsidized Fertilizer Proposal and Distribution Platforms

Variables		Coefficient	t-value	Significance Value
(Constant)		8,151	6,016	.000
Age	(x_1)	.009	.295	.769
Number of family members	(x_2)	.162	.962	.338
Land area (Ha)	(x_3)	.004	1,128	.261
Length of time in farming	(x_4)	-.061	-2.301 *)	.023 *)
Length of Education	(x_5)	.083	1,524	.130
Income	(x_6)	-,0002	-1.980 *)	.050 *)
Participation in Activities/Meetings/Socialization/Extension of Farmer Groups/Farmer Groups	(x_7)	.009	.437	.663
Membership of Farmer Groups/Farmer Groups	(x_8)	.015	.596	.552
Interaction with extension workers	(x_9)	.301	4.453 *)	.000 *)
Knowledge of the mechanism for proposing and distributing subsidized fertilizers	(x_{10})	.048	1,373	.172
Attitude towards the use of chemical fertilizers	(x_{11})	.002	.149	.882
Awareness of the use of chemical fertilizers	($X12$)	.013	.736	.463
Adj R^2	= 0.475			
F-value	= 13,367			
Significance	= 0.000			

*) Significant at a probability of 0.05
Source: Data Processed

The income variable (x_6) also has a significant influence on farmers' knowledge regarding digital communication in responding to the platform for the application and distribution of subsidized fertilizer. This result is indicated by a significance value of 0.050 ≤ 0.05 and a t-count value of -1.980, which is greater than the t-table of 1.975 at 95% probability. Further findings show that farmers with very low incomes (≤IDR. 327,5400) have high and very high digital communication knowledge capacity (41.2% and 20.0%, respectively). This finding is consistent with the negative coefficient value. This means that the lower the farmer's income, the higher the tendency to have greater digital communication knowledge capacity. This finding differs from that of Suh. (2024) , who revealed that high-income farmers have more opportunities to acquire and use digital communication knowledge, although income is not the sole determinant. In this study, however, farmers with lower incomes demonstrated higher levels of digital communication knowledge. This interpretation is further supported by the finding that farmers with very low incomes (≤IDR. 327,540) also mostly manage small land areas (0.21 – 0.50 hectares). This means that farmers pay attention not only to improving the efficiency of fertilizer input costs through obtaining subsidized fertilizer but also to pay attention to aspects of fairness. This condition encourages them to be more active in learning information and the digital procedures related to the application and distribution of subsidized fertilizer to obtain access to subsidy rights according to the provisions regarding the eligible land area (<2 hectares).

The next variable that has a significant effect is interaction with extension workers (x_9) (t-count value 4.453 < t-table (1.975 at the 95% probability level) and a significance value 0.000 ≤ 0.05, which is below the specified error level). Based on the positive regression coefficient value, this indicates that the more interaction there is between farmers and extension workers, the more likely it is to increase the capacity of farmers' knowledge regarding digital communication in response to the platform for the application and distribution of subsidized fertilizer. This interaction is primarily contributed to by the indicator of farmers' familiarity with extension workers with (score = 416), compared to the quality of interaction (score = 379) and frequency of interaction (score = 371). This point is important considering that as stated by Goeb et al. (2025), trust in the messenger (in this case, when farmers are familiar with extension workers) is the main factor determining whether information becomes knowledge. Observations and findings from open-ended interviews with farmers indicate that when a relationship has been established between farmers and extension workers, they feel less hesitant to ask questions and obtain information, even if they do not meet in person or communicate

outside of working hours. Crosstab analysis also confirmed that farmers who have a high level of interaction with extension workers also have a very high level of digital communication knowledge (11.5%). Based on the partial regression findings, the following regression model can be formulated:

$$Y = 8.151 - .061x_4 - .0002x_6 + 0.301x_9$$

Where:

Y	=	Farmers' knowledge capacity regarding digital communication
X_4	=	Length of time in farming
X_6	=	Income
X_9	=	Interaction with extension workers

The age variable (x_1) does not have a significant influence on farmers' knowledge regarding digital communication in responding to the subsidized fertilizer application and distribution platform. This result is obtained from the indication of the t-count value (0.295) which is smaller than the t-table (1.975) with a significance value of 0.769 which is above 0.05. The use of Android-based gadgets among farmers is apparently no longer limited to young people. Based on the age data, although most farmers are in their 50s, the use of Android-based gadgets is also common among older farmers. The results of further analysis using crosstabs show that the middle-aged category (50-62 years) has a moderate level of digital communication knowledge capacity. However, this age group uses digital communication media primarily for communication purposes, such as WhatsApp and video calls.

Variable x_2, or the number of dependents in the family, also had no significant effect on farmers' digital communication knowledge capacity (significance value = 0.338). The average farmer respondent had three dependents and exhibited varying levels of digital communication knowledge capacity. Family dependents, generally children, have access to gadgets for communication. In fact, based on field observations, farmers' children generally use them for social media and gaming.

Land area (x_3) also showed no significant effect on farmers' digital communication knowledge capacity, with a significance value of 0.261. In theory, land area reflects the scale of farming operations and is expected to be associated with the value of farm income obtained. However, the findings show that farmers with a very high level of digital communication knowledge capacity are predominantly (6.7%) farmers with small land holdings (0.21 - 0.50 ha). This suggests that the use of digital communication media has penetrated all levels of farmers.

The length of education (X_5) which can be proxied as a proxy for the level of education, also did not show a significant influence on farmers' digital communication knowledge capacity (significance value = 0.130). The results of further exploration using descriptive crosstab analysis showed that farmers with a very high digital communication knowledge capacity were predominantly those with higher education (high school), accounting for 6.8%. However, farmers with very low levels of education (not completed elementary school) also demonstrated digital communication knowledge capacity that were distributed across all levels of digital communication knowledge capacity. In fact, farmers with very low education (not completed elementary school) accounted for the largest proportion (27.9%) of respondents across the digital communication knowledge capacity categories.

Farmers' digital communication knowledge capacity was not significantly influenced by farmer participation in activities or meetings, socialization sessions, or extension activities conducted by farmer groups or farmer group associations (X_7) (significance value = 0.663). These results are consistent with the field conditions. This indicates that the majority of farmers (50.9%) have low participation scores in activities or meetings, socialization sessions, or extensions activities conducted by farmer groups or farmer group associations. This condition is understandable, considering that farmer participation in the farmer evaluation activities of farmer groups received a very low score (368). However, farmers' digital communication knowledge capacity regarding subsidized fertilizer policies is primarily intended to support the evaluation and advocacy related to the application and distribution of subsidized fertilizer.

Membership in farmer groups and farmer group associations (x_8) also had an insignificant effect on farmers' digital communication knowledge capacity (significance value 0.552). However, through membership in farmer groups, knowledge, skills, and attitudes, including digital literacy related to agriculture, can be transferred. As stated by Damanik et al. (2023) farmer groups have the main function of

organizing small farmers for collective learning activities, cooperation, and farming services and those who have obstacles if accessed individually.

The variable of knowledge regarding the mechanism of the application and distribution of subsidized fertilizer (x_{10}) did not significantly influence farmers' digital communication knowledge capacity (significance value = 0.172). Based on the results of the descriptive frequency analysis, the majority of farmers demonstrated either low or very high levels of knowledge regarding the mechanism of the application and distribution of subsidized fertilizer (28.5% each). This means that there are approximately equal numbers of farmers who are very familiar with the mechanism of subsidized fertilizer and those who are very unfamiliar with it. When explored further using crosstab analysis, the results were also confirmed. Most farmers with a very high level of knowledge regarding the mechanism of the application and distribution of subsidized fertilizer also have a very high digital communication knowledge capacity (12.1%). Farmers who do not understand the mechanism of the subsidized fertilizer policy are generally members of farmers groups but inactive.

The variables of attitude towards chemical fertilizer use (x_{11}) and awareness of chemical fertilizer use (x_{12}) both had no significant effect on farmers' digital communication knowledge capacity (significant values of 0.882 and 0.463, respectively). This is because the most popular and sought-after type of subsidized fertilizer is urea. Based on the results of the descriptive categorical analysis, most farmers have a very positive attitude towards chemical fertilizer use (33.9%). This attitude is indicated by the high score on the indicator showing that farmers only use chemical fertilizers they considered important. The chemical fertilizer most commonly considered important is urea, either used alone or combined with other types of chemical fertilizers. Generally, farmers combine urea with TSP (20%), urea with NPK (17%), or use urea alone (12%). Therefore, regardless of the combination used, urea remains the main type of fertilizer (Rifin et al., 2024). Furthermore, awareness of chemical fertilizer use among most farmers is already at a high level (32.1 %). Unfortunately, based on the indicator, farmers who do not feel regret have the highest score (780) when using subsidized chemical fertilizers (especially urea) because they believe these fertilizers can improve plant growth. This type of farmer will consistently try to apply urea, even when accessing subsidized fertilizer is difficult.

CONCLUSION

The subsidized fertilizer policy is implemented through Presidential Regulation No.6 of 2025 concerning Subsidized Fertilizer Governance, which is further implemented through the regulation of the Minister of Agriculture's Regulation No.4 of 2025 concerning the Second Amendment to the Regulation of the Minister of Agriculture No.10 of 2022 concerning Procedures for Determining the Allocation and Highest Retail Price of Subsidized Fertilizer in the Agricultural Sector. The regulation includes the use of e-Government applications in the form of e- RDKK for proposing subsidized fertilizer and iPubers for its distribution. Although farmers are not the direct operators of these applications, their digital communication knowledge capacity related to these platform is important for evaluating and advocating for fertilizer subsidy policies that adhere the seven principles of the right amount, price, place, time, quality, and recipient. The results indicate that most farmers have high or very high levels of digital communication knowledge capacity. This condition is influenced by the length of farming, income, and interaction with extension workers. The familiarity of farmers with extension workers is considered a key factor in strengthening interaction as a vehicle for sharing information and enhancing farmers' digital communication knowledge capacity, even for new farmers (those with limited farming experience) and farmers with low incomes.

AI DISCLOSURE STATEMENT

During the preparation of this manuscript, the authors used Grammarly to assist with grammar checking, language editing, translation, and improving academic English writing. All outputs generated by these tools were carefully reviewed, verified, and revised by the authors to ensure the accuracy, clarity, and appropriateness of the content. The authors take full responsibility for the integrity, originality, and final content of this manuscript.

DATA AVAILABILITY

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

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