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Comparing Organic Paddy Farming Continuance Intention Across Farmers' Attributes Using a Non-Parametric Approach

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Abstract

The adoption stage is not the end of the diffusion of organic paddy farming. To ensure long-term engagement, continuance intention must be assessed during the post-adoption stage. This study aims to investigate the status of continuance intention and evaluate score variance across 14 farmers' attributes. The research involved 345 organic paddy farmers in Magelang, Central Java, Indonesia. A 5-point Likert-scale questionnaire was administered to assess the respondents' continuance intention. Non-parametric tests, namely the Kruskal-Wallis and Mann-Whitney tests, were performed to examine differences in the mean ranks of the continuance intention composite scores across attribute groups. The results showed that the majority of organic farmers (66.08%) possess high continuance intention. The differences in mean ranks of continuance intention score were also revealed across the groups of 'role in farmer groups', 'renewal of organic certification status', 'farm ownership', 'organic paddy farming experience', and 'the frequency of organic certification renewal'. In addition, the mean rank score of continuance intention for 'renters' was significantly higher than that of 'landowners'. These findings suggest that farmers' attributes could be incorporated into the consideration of an actionable plan to preserve and enhance farmers' intentions.

Keywords: farmers' characteristics; intention level; organic certification; post-adoption; sustainable agriculture

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INTRODUCTION

As of 2025, organic farming, including paddy, is practiced in 190 countries, encompassing both developed and developing nations (Willer et al., 2025). Organic paddy farming supports the achievement of agricultural sustainability by preserving natural cycles (Gamage et al., 2023). In Indonesia, organic farming is mandated by Law No. 59/2024 under the National Long-Term Development Program (RPJMN) as a strategy to enhance food diversification and sustainable agriculture. To assure food safety, organic farming activities must be certified by a third-party organic certification scheme recognized by the government (Fritz et al., 2021), as stipulated in Ministerial Regulation No. 64/2013. The third-party scheme regulation is administered by the Organic Certification Body (*Lembaga Sertifikasi Organik*/LSO). Organic

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farming certification must be renewed every 3 years, accompanied by annual inspections (Irham et al., 2024).

Numerous initiatives have been implemented to advocate for organic agriculture, including organic rice cultivation. Nonetheless, the advancement of organic paddy farming in Indonesia remains limited and stagnant (Widiyanti et al., 2024). Moreover, some organic adopters exhibit a lack of sustained commitment to organic farming, indicating a regression to conventional agricultural practices due to challenges related to production, technology, and marketing (Heryadi et al., 2018; Yana et al., 2021).

Existing research focuses on adopting organic farming (Tran-Nam and Tiet, 2022; Bottazzi et al., 2023; Xia et al., 2023). However, the post-adoption phase remains largely unexplored, adoption alone is insufficient to evaluate dissemination, making continuity intention vital (Rota et al., 2021). Dissanayake et al. (2022) state that the intention to continue is more critical, profound, and comprehensive than adoption; hence, it is essential to investigate farmers' motivation to adopt and persist in organic farming practices (Fritz et al., 2021). Additionally, due to the tsunami of pesticides on Java Island (Prihandiani et al., 2021), long-term engagement in organic paddy farming is crucial to preserving both nature and human health.

While the shift toward organic farming adoption is significant, it still lacks sufficient amplification (Möhring et al., 2024). Although Gai et al. (2021), Restianto et al. (2021), and Nurhayati et al. (2026) discussed continuance intention in environmentally friendly practices, their analyses were predominantly limited to psychological determinants. In applying the post-adoption model, little did the scholars involve the farmers' attributes (e.g., socio-demographic, farm, and economic characteristics), either as treated in a dummy variable, on a continuous scale, or discussed independently, specifically in organic paddy farming.

The inclusion of farmers' attributes in previous research under the parametric tests in the agricultural domain was mainly focused on conventional farming (Abdollahzadeh et al., 2017; Karahan et al., 2023; Turker, 2024), information technology in agriculture (Mukebezi et al., 2023), cooperation (Wu et al., 2023), and a few in environmental-based programs (Gatto et al., 2019; Pagliacci et al., 2020). Whereas the existence of farmers' attributes in a broader context is also acknowledged in the training needs assessment, the solution for the challenges farmers faced (Goli et al., 2022), and the narrowing of the gap between intention and actual behavior (Liu et al., 2024). Thus, straightforward and intelligible research communication on the issue, such as non-parametric analysis, is urgently needed for stakeholders (Mumby, 2002; Nahm, 2016).

While extensive research in organic farming focused on the adoption stage (Sapbamrer and Thammachai, 2021; Tran-Nam and Tiet, 2022; Bottazzi et al., 2023; Xia et al., 2023; Li et al., 2024), the main objective of this study is to investigate the status of organic paddy farming continuance intention and the differences in continuance intention score across 14 farmers' attributes. Organic paddy farming, with its various farmers' attributes, was raised as a few concerns in the post-adoption discussion, and this study aims to fill the gap. A non-parametric perspective is expected to provide a meaningful and accessible understanding for commoners, stakeholders, and academicians to shape an actionable strategy and future research direction for maintaining and improving farmers' intention.

MATERIALS AND METHOD

Study area

The research was conducted in Magelang Regency, Central Java, Indonesia (110°13'4.008" E and -7°28'14.016" N). The region is a valley area surrounded by several mountains, including Merapi, Merbabu, Andong, Sumbing, and Menoreh, with an annual rainfall of 2,898 mm $year^{-1}$, causing the tropical monsoon climate category. The elevation ranges from 153 to 3,065 m above sea level, with the average temperature being 25 °C (Statistics Magelang Regency, 2024).

Magelang was selected as the research location because it has the largest organic paddy farming area in Indonesia, with 6,325 farmers certified under the third-party system, the recognized organic certification in Indonesia (Ministry of Agriculture, 2024). There were 1,672.61 ha of organic paddy farming in 2023 based on the Ministry of Agriculture and the Organic Certification Body's (LSO) data. Furthermore, from 2021 to 2024, Magelang was the site of the UPLAND Project, a collaborative project between the Food and Agriculture Organization (FAO) and the Islamic Development Bank (IsDB) which focused on increasing the organic paddy area by 2,000 ha (Ministry of Agriculture,

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2024). The center of organic paddy cultivation in Magelang includes the sub-districts of Sawangan, Bandongan, and Grabag (Figure 1).

Data collection and sample

Data collection was conducted between January and February 2025, initiated by face validity and a pilot survey. Face validity was established prior to the pilot survey to incorporate expert feedback. An academic and two employees from the Department of Agriculture in Magelang Regency reviewed the instrument to provide improvements. In the pilot survey, 25 farmers were interviewed to evaluate the questionnaire's effectiveness and clarity (Johanson and Brooks, 2010; Bujang et al., 2024). Based on the face validity and pilot survey results, the questionnaire was revised and refined. To calculate the actual sample, the research considered the total population of organic paddy farming in Magelang. Applying the formula from Krejcie (1970), the study calculated the sample size using Equation 1. The population proportion is assumed to be 0.5 to maximize sample size. The larger sample will be better for population representativeness and provide more accurate results (Andrade, 2020; Egbuchulem, 2023).

$$S = \frac{X^2 NP(1-P)}{d^2 (N-1) + X^2 (1-P)} \quad (1)$$

Where S = Sample size, X^2 = Chi-square for 1 degree of freedom (3.841), N = Population, P = Population proportion (0.5); number of 0.5 will provide the optimum sample size (Krejcie, 1970), d = The degree of accuracy expressed as a portion (0.05).

This study utilizes the same sample as Nurhayati et al. (2026), it addresses distinct research questions through a different analytical approach. The study conducted interviews with 345 organic rice farmers. Because the first two years of organic paddy cultivation represent a critical period during which farmers decide whether to discontinue or remain in organic farming (Brady et al., 2023), a non-probability sampling strategy was employed with inclusion criteria that required farmers (i) to hold third-party organic certification and (ii) to have cultivated organic paddy for at least 2 years. These criteria ensure that respondents possess sufficient experience to evaluate their farming performance and form a stable continuance intention. To highlight, the farmers were selected from the established organic paddy farmers' association or cooperatives in 3 sub-districts (Figure 1). To ensure they had followed the inclusion criteria, at the first stage, researchers screened them using a question related to their experiences with organic paddy farming and their current farming activity method.

Data analysis

Data on farmers' attributes and continuance intention were collected through a structured questionnaire. The questionnaire captured 2 groups of attributes, including i) socio-demographic, and ii) farm and economic

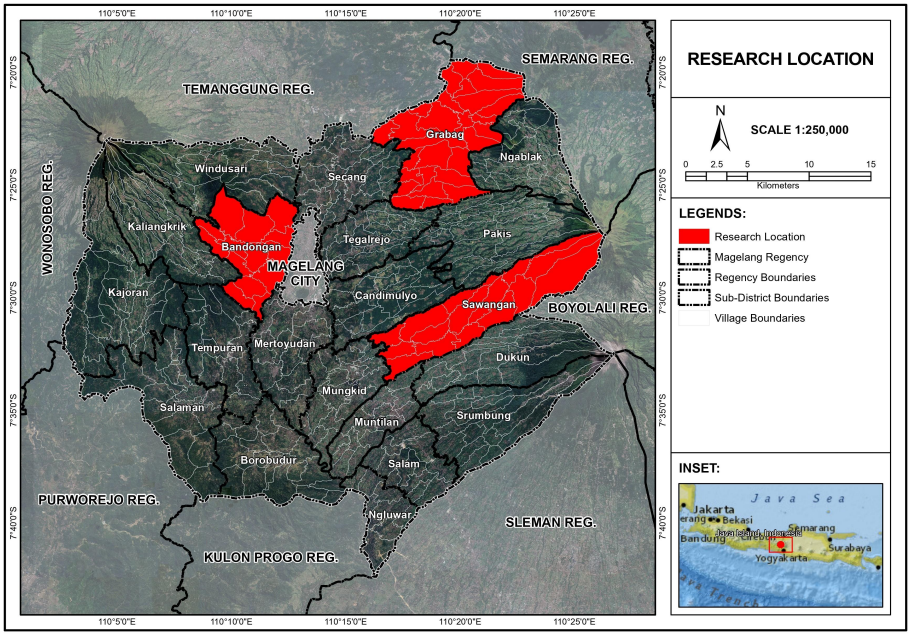

Figure 1. Map of research location

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characteristics using closed-ended items. Farmers' attributes were adapted from previous studies in the agricultural domain (Table 1); with gender, education, and age being the most common variables. Additional variables were included to reflect the organic farming context, such as organic certification status, frequency of certificate renewal, and the farmer's position within the farmers' group.

Continuance intention was measured using a 5-point Likert scale ranging from 1 (very disagree) to 5 (very agree). The 5-point Likert

Table 1. Farmers' attributes in the continuance intention context

Authors	Context (Model)	Farmer attributes (Data specification for analysis)	Results
Turker (2024)	Willingness to continue farm activities (regression)	Education (dummy) Income (continuous)	Not significant Not significant
Karahan et al. (2023)	Retaining young farmers in agriculture (regression)	Experience (dummy) Farmland (continuous) Age (continuous)	Not significant Significant (+) Not significant
Mukebezi et al. (2023)	Farmers' willingness to continue participating in collaborative activities of online platforms (Structural Equation Modeling)	Past experiences (Likert scale)	Direct effect: not significant Total effect: significant (+)
Wu et al. (2023)	Willingness to sustain cooperation with new farmers (regression)	Education (dummy) Income share (continuous) Serve as a village official status (dummy) Production (continuous)	Not significant Not significant Not significant Significant (+)
Pagliacci et al. (2020)	Continuation on Climate Smart Agricultural (CSA) practices (regression)	Farm size (continuous) Farm income (continuous) Education (continuous) Number of children (continuous) Full-timer farmer (dummy)	Not significant Significant (+) Not significant Significant (+) Significant (+)
Gatto et al. (2019)	Farmers' decision to continue agri-environmental scheme (regression)	Gender (dummy) Occupation/Full-timer farmers (dummy) Farm size (continuous) Farming experiences (continuous)	Significant (+) Not significant Significant (+) Significant (+)
Abdollahzadeh et al. (2017)	Discontinuance of biological control (regression)	Age (continuous) Education level (continuous) Family members (continuous) Experiences (continuous) Productivity (continuous) Annual farm income (continuous)	Not significant Not significant Not significant Not significant Significant (-) Not significant
Srisopaporn et al. (2015)	Continuation to Good Agricultural Practices (regression)	Education (continuous) Experience (dummy) Pure renters (dummy) Mixed (dummy)	Not significant Not significant Significant (+) Not significant
Karipidis and Tselempis (2014)	Intention to maintain quality certification (regression)	Gender (dummy) Family members (continuous) Education (dummy)	Significant (+) Not Significant Not significant
Amsalu and de Graaff (2007)	Continued use of stone terraces (regression)	Age (continuous) Gender (dummy) Family size (continuous) Farm size (continuous)	Not significant Not significant Significant (-) Significant (-)

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scale was used because its internal reliability increases with the scale from 3 to 5. The midpoint (scale number 3) is represented in neutral expression; however, using the midpoint depends on the researcher's preference and reasoning (Croasmun and Ostrom, 2011; Koo and Yang, 2025). Additionally, using a midpoint allows the respondents to maintain their neutrality, particularly when they are familiar with the topic (Chyung et al., 2017; Kankaraš and Capecchi, 2025).

As part of the ethical considerations, respondents were informed in advance about the research's purpose, the confidentiality of their data, and the expected duration of the interview. Participation in the study was entirely voluntary, and respondents were assured they could withdraw from the research at any point if they felt uncomfortable, without any negative consequences.

To assess the reliability of the continuance intention questionnaire, Cronbach's alpha was utilized (Tavakol and Dennick, 2011; Taber, 2018; Mo et al., 2023). Seven indicators were identified under the intention-to-continue organic paddy farming construct (Nurhayati et al., 2026). A reliability assessment using Cronbach's alpha produced a coefficient of 0.832, indicating high internal consistency (Bougie and Sekaran, 2020). The validity test confirmed that all items were valid, with the outer loading ranging from 0.632 to 0.749 (Appendix 1).

For each respondent, item responses on the continuance intention scale were averaged to derive a composite score (Allen and Seaman, 2007; Sullivan and Artino, 2013; Koo and Yang, 2025). To conclude the overall status of continuance intention, the median was deployed as the cut-off point. Composite scores greater than or equal to the median were categorized as high, while those below the median were marked with low (Munch-Hansen et al., 2008; DeCoster et al., 2011; Athay and Bickman, 2012; Iacobucci et al., 2015; López-Núñez et al., 2020). To compare the continuance intention score across farmer attributes, the data were first assessed for normality (Mishra et al., 2019). Since the distribution of the continuance-intention composite scores deviated significantly from normality, non-parametric tests were employed to examine differences across groups defined by farmers' attributes. The Kruskal-Wallis test was utilized to compare multiple groups, while the Mann-Whitney U test was applied for pairwise comparisons (Bewick et al., 2004).

RESULTS AND DISCUSSION

The continuance intention status

In Table 2, the study identified continuance intention as the 'willingness to hold the innovation in the future' (Hernández-Espallardo et al., 2013; Zhang et al., 2023), 'recommend others' (Restianto et al., 2021), 'encourage others', and 'share the positive experience as well as best practices' (Vaux et al., 2011). Using the median (4.000) as the cut-off for categorization, the result showed that 66.08% of farmers possess a high level of continuance intention.

Although the majority of farmers exhibited high continuance intention toward organic paddy farming, discrepancies between intention and actual behavior may still occur and should be anticipated. Previous research indicates that intention predicts only 18 to 23% of actual behavior within the Theory of Planned Behavior (Armitage and Conner, 2001) and around 30 to 40% in the context of physical activity (Faries, 2016). In the context of charity and utilizing

Table 2. Continuance intention indicators of organic paddy farming

Indicators*	Average score
1 … to continue practicing organic paddy farming in the future	4.220
2 … to recommend organic paddy farming to my relatives	3.838
3 … to encourage other farmers to continue organic paddy farming	3.890
4 … to share my best practices in organic paddy farming with other farmers	4.041
5 … to share my positive experiences in organic paddy farming with other farmers	4.081
6 … to be my habitual activities on farming practices	3.968
7 … to inherit my land, the inheritors will continue to do organic paddy farming	4.043
Median	4.000
High category (%)	66.08
Low category (%)	33.92

Note: *The data set (indicators) was part of the publication of Nurhayati et al. (2026)

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a longitudinal study, 37% of individuals who intended to donate did not act in accordance with their initial intentions (Nguyen et al., 2022; Zhou et al., 2023). In the agricultural scope, about 49% of farmers intended to apply subsidized crops, but only 19% translated this intention into actual behavior (Byfuglien et al., 2025).

Furthermore, Figure 2 shows the percentage of farmers' responses for each item and scale. According to Byfuglien et al. (2025), only a strong prediction (very agree) had the narrowest gap with actual behavior and could be translated into it. On average, farmer responses were concentrated in the 'agree' scale (65.38%), while 18.92% response for 'very agree' (Figure 2). This result highlights that while most farmers possess a high level of continuance intention, targeted actions are necessary to sustain this high intention and elevate lower intentions, thereby narrowing the potential gap between intention and actual behavior.

The comparison of continuance intention across farmers' attributes

To improve the continuance intention status, the study not only adopts the common farmers' attributes to be explored, but also incorporates several identifier variables related to organic paddy farming, including 'role in farmers' groups, 'experience in organic paddy farming' (Table 3), and attributes related to 'renewal of organic certification' (Table 4). These attributes should be specifically found in the domain of organic agriculture rather than in the generic agriculture topic.

Socio-demographic attributes

Table 3 showed that the respondents were predominantly male farmers. In fact, women's participation in Indonesia's agricultural sector declined in 2020 compared to 2010, and gender equality in agriculture remains a concern (Rachmawati et al., 2025). However, this study observed no significant disparity in mean rank between males and females regarding their intention to continue organic paddy farming in Indonesia (Table 3). Based on Karipidis and Tselempis (2014) and Gatto et al. (2019), gender–treated as a dummy variable in regression models–had a significant impact on post-adoption behavior in agricultural and food programs. The results indicate that men and women differ in their intention to continue, with women more likely than men to exhibit higher continuance intention to participate in agricultural programs. Several studies also suggest that gendered roles may contribute to this pattern, as women are often expected to pay greater attention to community and family health (Bärebring et al., 2020; Subiza-Pérez et al., 2020; Darkhani, 2024). In contrast to the previous research, men and women in Indonesia exhibited a similar level of intention to continue organic paddy farming.

Given that women in this study showed continuance intention levels comparable to those of men, organic farming training programs should actively recognize and support strong participation from both groups. Actually, in Indonesia, there are no formal restrictions on men or women joining farmers' groups or participating in group activities. Maintaining equitable access to agricultural support for both genders is a way to preserve the long-term viability of organic paddy farming.

The distribution of organic farmers was relatively equal across all age ranges. In contrast to Zagata and Sutherland (2015), organic paddy farming did not identically with the

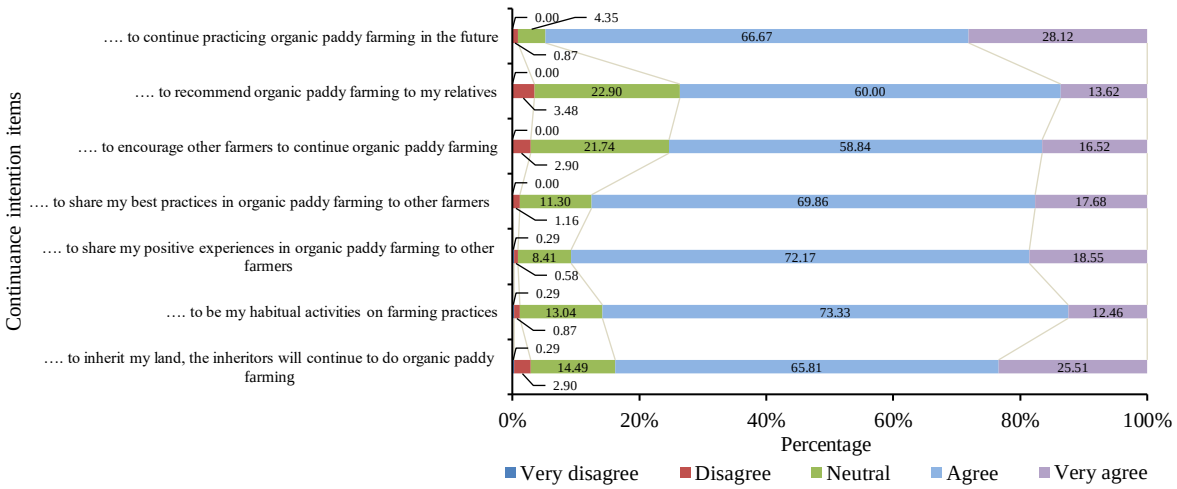

Figure 2. Respondent's response for continuance intention indicators

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'old generation'. The findings of this study also indicate no significant difference in composite average score for intention to continue organic paddy cultivation, as reflected in the very similar mean ranks across age groups (Table 3). The farmers have already experienced the substantial benefits of organic paddy farming, which may have strengthened their understanding of organic practices and reduced age-related differences. On the other hand, using the parametric test, Amsalu and de Graaff (2007) found that age played an important role during the adoption phase but did not influence long-term use. Similarly, using a regression model, Abdollahzadeh et al. (2017) reported that age had no significant effect on discontinuance intention in the case of biological control. The assumption that older farmers are resistant to agricultural innovation may therefore not hold universally, especially when they have observed tangible benefits.

In practice, this non-parametric test's results imply that since continuance intention is consistent across all age groups, the strategy to maintain organic paddy farming can shift from a focus on individual attitudes to a farm-level focus, such as building networks among farmers and multi-stakeholder collaboration (Leonnig and Nielsen, 2026). Additionally, the same vibrancy among young and old farmers toward the continuation of organic paddy farming could be a valuable resource

Table 3. Mean rank differences of continuance intention level between and among socio-demographic groups of attributes

Socio-demographic attribute	Group	Percentage (%)	Mean rank of continuance intention score	*P*-value
Gender¤	Male	85.22	168.72	0.053
	Female	14.78	197.67	
Age (years)¤	< 31	2.32	146.69	0.468
	31-40	11.30	179.19	
	41-50	24.64	174.38	
	51-60	31.59	183.34	
	> 60	30.14	160.73	
Education¤	No formal education	1.74	112.00	0.482
	Elementary school	34.20	171.29	
	Junior high school	22.32	181.62	
	Senior high school	34.49	169.58	
	Tertiary education	7.25	185.42	
Family size (persons)	1-2	19.71	167.85	0.108
	3-4	56.23	166.23	
	5-6	21.74	197.41	
	> 6	2.32	152.19	
Occupation	Full timer	71.88	169.98	0.362
	Part timer	28.12	180.73	
Farm's ownership	Landowner	55.94	153.51	0.034**
	Renter	32.75	183.66	
	Mix	11.30	176.53	
Role in farmers' group¤	Committee	28.12	190.22	0.042**
	Member	71.88	166.26	
Paddy farming experience (years)	1-10	26.38	162.40	0.312
	11-20	26.96	186.18	
	21-30	22.61	184.24	
	> 30	24.06	178.09	
Organic paddy farming experience (years)¤	2-3	21.45	139.96	0.000***
	4-6	44.06	183.28	
	7-9	21.45	208.72	
	> 9	13.04	133.87	

Note: ***1% and **5% significance level. ¤Attributes, groups, and percentages were cited from Nurhayati et al. (2026)

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for intergenerational knowledge co-creation (Tolinggi et al., 2023).

On a national scale, while Hasanah et al. (2023) mentioned that, in general, farmers had a low level of education, the majority of organic farmers (64.06%) were graduates of middle school. The non-parametric analysis revealed no significant difference in the mean rank of continuance intention across education groups (Table 3). This aligns with Nguyen et al. (2020), who found no correlation between education and intention indicators. Similarly, Wu et al. (2023) reported no differences in farmers' agroecological farming knowledge across education groups. Related to causalities relation, previous research has shown that education can negatively and significantly influence the adoption of biological control in agriculture, but no effect has been found in the post-adoption (Abdollahzadeh et al., 2017). In research specifically focused on organic farming, 69% of studies indicate that education does not contribute to either adoption or subsequent stages (Läpple and Van Rensburg, 2011; Zachariou et al., 2025). Studies on continuance intention in quality certification also report that education has no major impact (Pagliacci et al., 2020).

In the context of organic paddy farming in Magelang, all farmers have participated in training on organic paddy practices organized by the farmers' association. This training serves as an informal skills-development process, independent of formal education, and likely contributes to relatively similar levels of knowledge among farmers regardless of their formal educational background. In the case of organic paddy farming, non-formal training on organic paddy farming practices remains effective. Furthermore, a continuous training program is preferable among farmers to support sustainable farming (Sáenz et al., 2024). Maintaining and improving this type of knowledge transfer would help preserve organic paddy farming practices.

The majority of farmers had a small immediate family (56.23%) (Table 3). In relation to family size, the study found no significant differences in continuance intention across family-size groups (Table 3). However, Amsalu and de Graaff (2007) using a parametric test, reported that larger households were less likely to continue utilizing stone terraces, as a higher number of dependents often diverted resources away from agricultural investment. Household size, as a simple headcount, may have limited explanatory power regarding continuance intention in organic farming. Venkatesh et al. (2003) suggest that family members influence behavior through social influence, which indicates that the quality of family support and relationships, rather than family size alone, influences behavior. In Magelang, the decision on whether to continue or discontinue is not made solely by households but by the farmers' group. However, in the context of organic paddy farming, further investigation is required using more advanced analytical tools.

As presented in Table 3, 28.12% of organic farmers were engaged in additional non-farm activities that generated household income, thereby allocating less of their productive time to organic paddy cultivation (part-time farmers). Nonetheless, there was no significant difference in the mean rank of continuance intention between full-time and part-time farmers (Table 3). This finding contrasts with Srisopaporn et al. (2015), Gatto et al. (2019), and Pagliacci et al. (2020). Represented in the dummy variable, continuance intention was reported to be higher among full-time farmers, due to their more sustained involvement in farming activities. A plausible explanation in the Magelang context is that full-time and part-time farmers possess comparable access to information and support related to organic paddy farming. Since the training sessions are typically held in the evening, part-timers could attend after completing their primary occupation. Additionally, they were mostly self-employed, with flexible working hours, allowing them to manage their fields effectively or hire seasonal labor to assist with farm management.

Farm ownerships was categorized into three groups (Table 3): landowners, referred to the farmers who manage their farm only and it is also known with owner-operator (Soule et al., 2000); land renters, referred to the farmers who do not have any field rights and they have to be tenants; and mix, referred to the farmers who acts as owner-operators as well as tenants. Most tenants provided a portion of their harvest to landowners after the harvest as payment for land rent. Descriptive results show that 32.75% of respondents were full renters (Table 3). A significant difference in the mean rank of continuance intention was observed between landowners and full renters, with a *p*-value of 0.009 (Figure 3). Other pairwise comparisons, including landowners versus mixed tenure and full renters versus mixed tenure, did not show

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significant differences in mean rank. Tenants nevertheless exhibited a higher intention to continue organic paddy farming than landowners. This finding is consistent with Srisopaporn et al. (2015), who also reported lower continuance intention among landowners compared to tenants.

One plausible explanation is that tenants feel compelled to maintain field conditions to honor their contracts, demonstrate their commitment to environmentally responsible practices, and justify their financial and labor investments in land perceived as part of a long-term agreement (Kassie and Holden, 2007; Akram et al., 2019; Leonhardt et al., 2019). This status required them to negotiate with landowners to secure tenancy arrangements and obtain the necessary contracts. In Magelang, organizational support from the farmers' association offered comparable facilitation for both renters and landowners: each group received training, subsidies, opportunities to serve on association committees, and equal access to government-subsidized organic fertilizers.

Membership in a farmers' group is mandatory, with several farmers serving on the committee (Table 3). An association in the form of a cooperative existed in a sub-district to oversee the marketing network for organic paddy farming across all farmers' groups in the sub-district. In contrast to Wu et al. (2023), organic farmers who held positions on the committees of farmers' groups showed a higher intention to continue organic paddy farming than ordinary members, with a *p*-value of 0.042 (Table 3 and Figure 4). Committee members are expected to participate actively, make substantive contributions, and align their activities with the organization's objectives. Previous research has shown that active participation in farmers' groups increases the likelihood that farmers adopt sustainable agricultural practices (Li et al., 2024). Committees, therefore, act as key catalysts in the diffusion of innovation, because information tends to circulate through influential farmers within the social network. For extension officers, focal farmers within these committees play a central role in communicating new practices and technologies (Yu and Gambrah, 2024). To ensure fairness, opportunities to serve on farmers' group committees should be distributed evenly among members, and committee positions should rotate after a specified period.

In this study, 'experience' encompassed both conventional paddy farming and organic paddy farming (Table 3). Because organic paddy cultivation requires technical adjustments, researchers also considered farmers' experience specifically with this method. General paddy-farming experience covered the years before and after the transition to organic methods, whereas organic paddy experience referred only to the period during which farmers practiced organic cultivation. The mean ranks of continuance intention did not differ significantly across groups with different levels of general paddy-farming experience. For the majority of farmers in Magelang, organic paddy farming was perceived as a relatively new practice, so they emphasized exploration and learning rather than relying on their previous experience with conventional methods. Nguyen et al. (2020) and Karahan et al. (2023), using inferential statistics, reported that agricultural experience was not directly related to the specific innovation under consideration and did not significantly influence decisions to remain in an agricultural program.

Regarding farmers' experience in organic paddy farming, the difference in the mean rank of continuance intention scores between farmers with 1 to 3 years of organic paddy experience and those with more than 9 years of experience was not statistically significant (Table 3 and Figure 5). Moreover, the mean rank for continuance intention among farmers with more than 9 years of experience was lower than that of farmers with 4 to 6 and 7 to 9 years of experience. This pattern raises important questions for future research, particularly regarding whether the intention to continue stabilizes or declines after farmers have practiced organic paddy cultivation for several years, and whether their underlying motivations change over time. Policymakers should exercise caution regarding this trend. However, to support the causal effect of experience on continuance intention in organic paddy farming, further exploration is needed.

The extant literature utilizing parametric tests has found that experience in agri-scheme activities influences the continuance intention (Gatto et al., 2019). Srisopaporn et al. (2015) also found that prior engagement with an innovation strongly shapes the intention to continue. During the adoption process, experience contributes to farmers' proficiency and competence in sustainable agriculture. Once farmers have adopted a system and gained positive experience with it, they are more likely to remain committed to its long-term application (Meijer et al., 2015; Doran et al., 2020).

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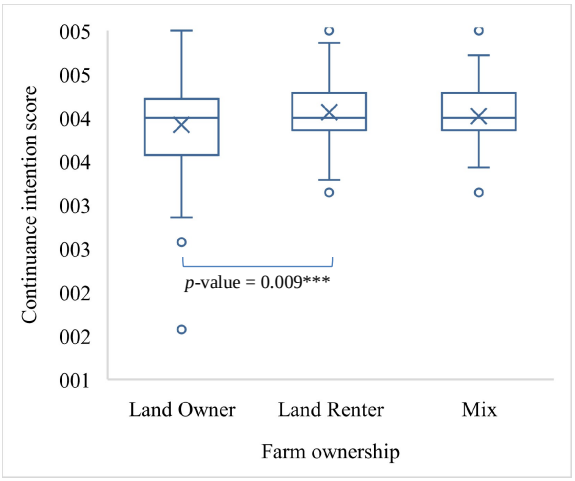

Figure 3. The difference of continuance intention level plot based on farm ownership

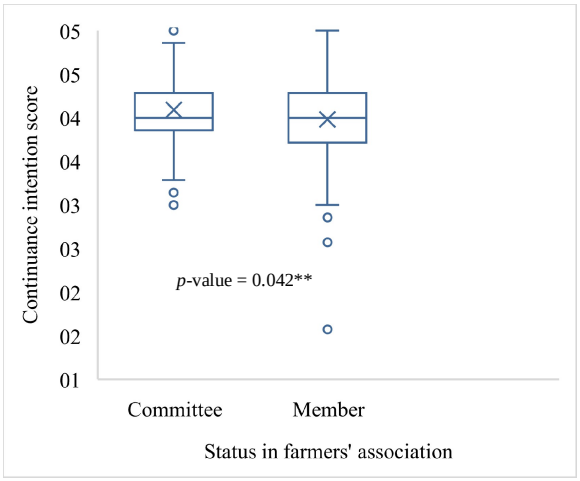

Figure 4. The difference of continuance intention level plot based on the farmers' status in the group

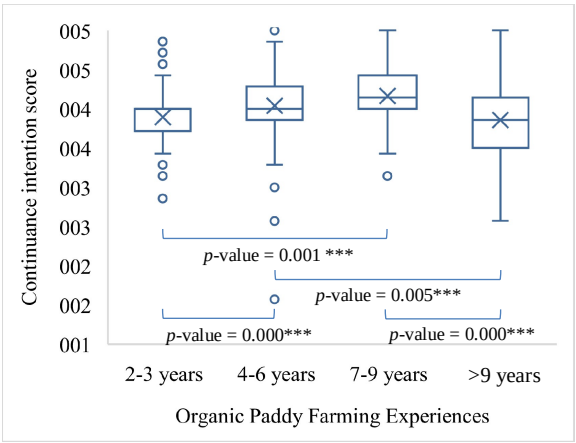

Figure 5. The difference of continuance intention level plot based on organic paddy farming experience

Note: Figures 3 and 5 were based on the Mann-Whitney pairwise test, insignificant pairwises are not portrayed; ***1% and **5% significance level

Farm and economics attributes

Statistics Indonesia employs the term *petani gurem* for farmers who cultivate less than 5,000 m² of land. The word *petani* means "farmer," and *gurem* refers to *Ornithonyssus bursa*, a type of tropical mite, metaphorically highlighting the marginal scale of these smallholders. According to Statistics Indonesia, farmers need to cultivate at least 0.65 ha of land in order to escape poverty (Susilowati and Maulana, 2012). Overall, 75.92% of farmers in Indonesia cultivate less than 5,000 m² of land, indicating that the majority can be classified as smallholder farmers (Krishnamurti et al., 2019). However, the results in Table 4 indicate no significant difference in the mean ranks of continuance intention across farm-size groups. On the other side, Pagliacci et al. (2020) using a causality test, found that farm size had no significant effect on continuance intention. Considering that most farmers in Indonesia are smallholders, this result brings a good point that farm size would not be a constraint on the development of organic paddy farming. However, the organic paddy farming joint certification program should be maintained for the sake of cost efficiency.

Limited farm size often makes organic certification costs burdensome for farmers; however, certification can be obtained either individually or collectively. In Magelang, organic paddy farmers adopt joint certification to increase cost efficiency (Table 4). The third-party organic certification scheme must be renewed every 3 years and serve as the primary form of organic accreditation recognized by the Indonesian government (Fritz et al., 2021).

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Most organic paddy areas in Magelang are certified by LeSOS, a Non-Governmental Organization (NGO), as a third-party. Despite these measures to support and formalize organic certification, participation in the scheme remains fluid. During each certification cycle, the number of registered farmers changes because the Internal Control System (ICS) removes farmers who do not comply with organic farming standards and admits farmers who have converted their farms to organic practices. Newly admitted farmers may obtain organic certification with the same expiration date as the current cycle, provided they have completed the required conversion period.

Because organic paddy farming is a voluntary program, farmers can withdraw whenever they are dissatisfied with its outcomes, which contributes to a high exit rate. Based on Figure 2, it indicates that most farmers 'agree' and 'very agree' with the continuing intention of organic paddy farming. However, the complexity of the renewal process suggests that distinguishing the farmers' attitudes toward organic paddy farming practices versus organic paddy farming certification should be examined in the future.

An alternative non-governmental scheme is the Participatory Guarantee System (PGS), which allows farmers to self-evaluate their organic practices (Wangsit et al., 2020); however, PGS certification has not yet been formally recognized by the Indonesian government. Farmers who had renewed their third-party organic certification showed higher levels of continuance intention ($p < 0.001$; Table 4; Figure 6), as reflected in the distribution of scores for the "Yes" group. Figure 7 illustrates the frequency of recertification among farmers. Significant differences in mean rank were found between farmers who had never renewed and those who had renewed once ($p < 0.001$), twice ($p < 0.001$), or three or more times ($p = 0.014$). There was no significant difference between the 2 rounds and ≥ 3 rounds, which may stabilize or shift attitudes towards organic paddy farming after several renewal cycles.

Familiarity with bureaucratic procedures is likely to enhance self-efficacy (Bosse et al., 2015; Abdi Tabari et al., 2025), and self-efficacy has been shown to correlate with continuance intention (Bao and Shang, 2021). The number of organic certifications rounds also reflects the length of organic paddy farming experience (Figure 5): the more frequently farmers renewed their certification, the longer they had practiced organic paddy farming. Experience-related variables in organic paddy farming are therefore particularly relevant for understanding shifts in farmers' attitudes and behaviors. In this situation, farmers' involvement in every process of organic paddy farming quality certification and the evaluation of the impact of organic farmers is meaningful for farmers (Widiyanti et al., 2024). Consistent training about how the process works is essential to increase the farmers' self-efficacy in the organic paddy farming certification process.

Table 4 also revealed that the productivity of organic paddy farming ranged from 3 to 5

Table 4. Mean rank differences of continuance intention level between and among farm-economics groups of attributes

Economics attribute	Group	Percentage (%)	Mean rank of continuance intention score	*P*-value
Farm size (m^2)¤	< 5,000	77.10	173.52	0.856
	≥ 5,000	22.90	171.24	
Renewal of organic certification¤	Yes	79.13	186.45	0.000***
	No	20.87	122.00	
Frequency of renewal organic certification (rounds)¤	Never	20.87	124.13	0.000***
	1	36.52	185.50	
	2	28.69	191.46	
	≥ 3	13.91	175.43	
Productivity (ton ha^{-1})	< 3	24.64	181.46	0.309
	3-5	55.65	165.76	
	> 5	19.71	182.87	
Income (IDR $farmer^{-1}$)	< 2,500,000	47.25	168.92	0.682
	2,500,000-5,000,000	24.06	180.51	
	> 5,000,000	28.70	173.41	

Note: ***1% significance level. ¤Attributes, groups, and percentages were cited from Nurhayati et al. (2026)

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tons ha^{-1} season^{-1}. On average, it was about 3.9 tons ha^{-1} compared to the national average paddy productivity of 5.3 tons ha^{-1}, organic yield remains significantly lower (Statistics Indonesia, 2026). Organic paddy farming often shows reduced productivity during the initial conversion period; over time, however, yields are expected to match or exceed those of conventional systems (Sujianto et al., 2024). In the Magelang case, as an established organic paddy farming area, low productivity was caused by rat invasion, implying the need for a better sustainable pest management system. Low productivity had an impact on farmers' income. Although farmers get a premium price for their yield (500 IDR kg^{-1} higher compared to the conventional system), but low productivity results in lower income (Table 4).

Although Abdollahzadeh et al. (2017) utilized regression analysis to report that productivity clearly influenced decisions to continue, this non-parametric test revealed no significant difference in the mean ranks of continuance intention across productivity groups (Table 4). Income groups also did not differ in continuance intention. Abdollahzadeh et al. (2017) also observed that income may only affect initial adoption decisions rather than shaping behavior in the post-adoption phase. However, this study suggests that in the future, a stronger variable should be explored and analyzed using a higher statistical approach.

Implication and recommendation

Finally, for policymakers and other stakeholders, current efforts to preserve organic paddy farming should be continued and improved. For general recommendations, since the relatively similar continuance intention of organic paddy farming across farmers' demographic characteristics, intergenerational knowledge co-creation is highly recommended. In this scheme, farmers from multiple generations (younger and older) share their knowledge across generations. Age and demographic background become assets and resources to form the long-term strategy (Bjursell, 2015; Maughan and Anderson, 2023).

The insignificant difference in the continuance intention score between genders suggests that gender disparity may not be a limiting factor in organic paddy farming. Although Rachmawati et al. (2025) mentioned that gender participation in agriculture was still an unresolved issue in Indonesia, at least in the case of organic paddy farming, both genders show the same level of intention. Mentorship programs, confidence-building, and skills development are crucial for supporting women's capacity to generate and implement new ideas (Darkhani, 2024).

Training sessions, classes, and input subsidies must be equally accessible to both genders, given their equivalent commitment to organic paddy farming. Continuous organic paddy training can be effective in reducing educational knowledge gaps, suggesting that improvements in training methods, schedules, and materials would be beneficial. To start, a set of training evaluations to capture the farmers' needs can be arranged in the future. In managing the farmers' group, assistance might be needed. A basic organizational process, such as committee

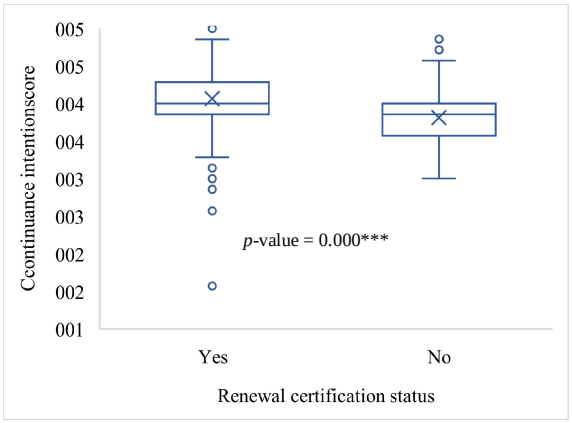

Figure 6. The difference of continuance intention level plot based on renewal certification status

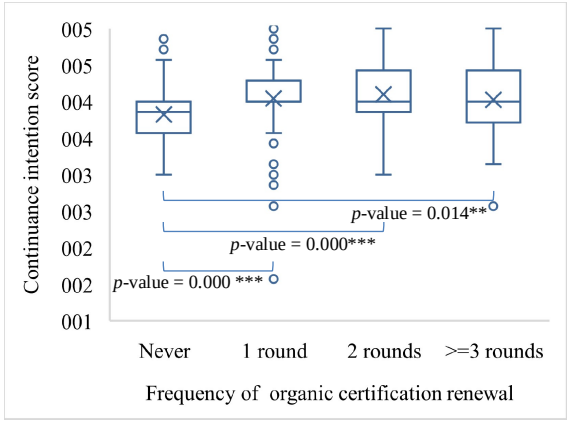

Figure 7. The difference of continuance intention level plot based on the frequency of organic certification renewal

Note: Figure 7 was based on Mann-Whitney pairwise test, insignificant pairwises are not portrayed; ***1% and **5% significance level

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rotation, should be recommended to the groups. Farmers' involvement in the bureaucratic process of organic certification might improve their familiarity with quality control.

Policymakers should be cautious about the attitude shifting during organic paddy farming after years of practice. Sensitivity to capture the farmers' dissatisfaction with organic paddy farming performance or association management is the key to continuous improvement. Mzoughi (2014) found that both earlier organic farming adopters (more than 3 years) and current adopters (less than 3 years) showed a positive association between organic adoption and life satisfaction. Earlier adopters reported higher life satisfaction than conventional farmers, whereas current adopters did not differ significantly from conventional farmers. As organic paddy farming becomes established as a long-term practice, these non-economic drivers are likely to become increasingly salient. Nurhayati et al. (2026) reported that intrinsic motives, including perceived benefit, satisfaction, and perceived enjoyment, had a direct effect on continuance intention in organic paddy farming. Additionally, farmers often articulate a long-term vision of improved ecological conditions alongside continued productivity as key motivations for engaging in organic farming (Han et al., 2021). It implies that considering both farmers' attributes and mental statements will be beneficial for formulating strategies.

In the post-adoption stage, this study shows that several context-specific attributes might play an important role. Although, Bhattacherjee (2001) argued that demographic characteristics may be influential only during the adoption phase, but in the case of organic paddy farming, this study identifies a set of "identifier or marker" attributes, namely role in farmers' group, organic certification renewal status, the frequency of certification renewal, and length of experience in organic paddy farming, that display significant differences in continuance intention score across groups.

For the academician, this implies that, rather than only relying on common farmers' characteristics (e.g., gender, age, education), it is essential to identify the variables relevant to the case. The results of this non-parametric analysis provide a compelling case for identifying and incorporating these 'marker attributes' into future research. Specifically, variables such as organizational roles, certification history, and organic-specific experience should be integrated into broader explorations or more complex structural models of continuance intention. Moving beyond general demographics allows for a more nuanced understanding of the post-adoption phase, ensuring that theoretical frameworks are better aligned with the practical realities of long-term organic farming commitment.

In addition, combining the farmers' attributes with psychological variables in a continuance intention model will be insightful. A parametric approach should be applied in the future to explain the interaction between farmers' attributes alone or combined with other motives. In addition, researchers would also highlight the limitations of the study: since the respondents came from an established organic paddy farming community, it cannot be simply generalized to the larger area. The findings are best interpreted as applying to a selected group of established certified organic farmers in one regency. In the future, research on replication across various farmers' background experiences is anticipated.

CONCLUSIONS

In the majority, farmers had a strong intention to continue organic paddy farming; indeed, it should be maintained. The results guide government representatives, such as extension officers, in advising farmers to secure their intentions. Committee rotation in farmers' groups could be a good suggestion to improve farmers' intention to continue. Furthermore, maintaining equitable access to training and input subsidies for all genders and farmer status (e.g., owners, renters) is expected to enhance farmers' engagement in organic paddy farming practices. Improving the training method, schedule, and materials to enhance their acceptability and suitability across genders, ages, and educational backgrounds will also be worthwhile. Increasing farmers' familiarity with the organic certification process and bureaucracy could be achieved by involving them in the internal control process for certification. Since there was no difference in continuity intention across farm-size groups, joint organic certification should be facilitated to reduce the cost constraint for smallholder farmers. To sum up, because researchers did not find any differences in continuance intention score across most demographic characteristics, this suggests that intergenerational knowledge co-creation is highly likely to be applied.

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However, the shifting attitude during practices should be cautioned against.

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