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The Influence of Cooperation with Business Partners, Agricultural Technology Implementation, and Religiosity on the Welfare of Al-Mahdi Farmers in Percut Sei Tuan District

Indah Khairunnisa Sihotang[1], Mustapa Khamal Rokan[2], Muhammad Ikhsan Harahap[3]

[1,2,3]Fakultas Ekonomi dan Bisnis, Universitas Islam Negeri Sumatera Utara
Email:*ikhairunnisa013@gmail.com*; mustafarokan@uinsu.ac.id; m.ihsan.harahap@uinsu.ac.id*

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ABSTRACT

This study aims to analyze the influence of business partnerships, agricultural technology adoption, and religiosity on farmers' welfare. The research was conducted among members of the Al-Mahdi Farmer Group in Percut Sei Tuan District using a quantitative approach. Data were collected through questionnaires distributed to 52 respondents and analyzed using multiple linear regression. The results show that jointly, the three independent variables have a significant effect on farmers' welfare. Partially, the adoption of agricultural technology and religiosity have a positive and significant influence, while business partnerships do not have a significant impact. These findings indicate that improving farmers' welfare is not solely determined by technical aspects or economic cooperation, but is also strongly influenced by spiritual values and local cultural norms within farming communities. This study implies that sustainable agricultural development must integrate both technological and spiritual approaches to support holistic farmer well-being.

INTRODUCTION

As an agrarian country, Indonesia relies on the agricultural sector as the backbone of its economy and the livelihood of the majority of its population (Nugraha et al., 2022). However, despite this strategic potential, farmer welfare remains a crucial and multidimensional issue. Data from the Central Statistics Agency (BPS, 2023) shows that most households in Indonesia are poor and depend on the agricultural sector, indicating that improving farmer welfare is an urgent issue.

Farmers' welfare is a multidimensional concept that goes beyond mere material income (Huda, 2021). According to various studies, indicators of farmer welfare can

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cover various aspects. Economic aspects such as net income, asset ownership, access to capital, and cooperation with business partners that can open up market access, capital, and farming business stability (Canto et al., 2025). Social aspects involve access to education, health, participation in farmer organizations, and the quality of social relationships within the community (Isaac et al., 2024). Technological aspects also play an important role, where the application of agricultural innovations can increase the efficiency and productivity of farming businesses. Several studies have also begun to touch on spiritual or subjective dimensions that include life satisfaction, gratitude, and meaning in work (Zahroo et al., 2024). The complexity of these indicators shows that farmer welfare is a complete reflection of their material, social, and psychological conditions.

In an effort to improve farmer welfare through these various indicators, this study focuses on three main variables that are believed to play a significant role: cooperation with business partners, the application of agricultural technology, and religiosity. The selection of these three variables is based on their theoretical significance and preliminary empirical evidence from the field, which shows their potential contribution to improving various aspects of farmers' welfare. However, previous studies also show that the influence of these three variables is not always significant in every context, making this a relevant research gap to explore further.

Based on previous studies, cooperation with business partners is considered crucial because partnerships can overcome farmers' resource constraints and improve their bargaining position in the market (Erawan et al., 2024). Other studies also show a significant contribution to farmers' income and access to capital (Romadhona & Wardani, 2022; Riris, 2024). However, Yuliastri et al. (2022) found that in shallot farming, partnerships actually reduced technical efficiency, although not significantly. This shows that partnerships do not always have a positive impact depending on the context and implementation. In the Al-Mahdi Farmer Group, pre-observations showed that there was input assistance, but structured market access remained a challenge, indicating that the potential of partnerships was not yet optimal.

Agricultural technology has become a major concern in efforts to improve farmers' welfare. Technology adoption is considered important in increasing farmers'

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efficiency and productivity (Irfansyah et al., 2024). The use of technologies such as agricultural machinery and irrigation systems can increase land productivity and ultimately farmers' income (Suhendrata, 2024), and millennial farmers who adopt digital technology also experience increased work efficiency (Faried, 2024). However, several other studies show different results, such as Kencani & Irwansyah, (2024); Wati & Irwansyah, (2024) who found that technology adoption does not have a significant effect on farmers' welfare or income. In the Al-Mahdi Farmer Group, the use of technology such as drip irrigation and tractors has helped improve work efficiency, but its impact on welfare still needs to be further studied.

Various previous studies have indicated that religiosity, although often overlooked in conventional agricultural economic studies, plays a substantial role in the lives of farmers, especially in agrarian communities in Indonesia (Abdul, 2017). Other studies by Agung et al. (2024) and Javaid & Ashraf (2024) also show that religious values can shape a strong work ethic, increase social solidarity, influence more ethical economic decision-making, and correlate positively with farmers' life satisfaction and mental resilience.

In the context of the Al-Mahdi Farmer Group, the dimension of religiosity is quite evident in the daily practices of farmers. Farmers are not only profit-oriented. In practice, although not routinely, some farmers practice spiritual values by selling their crops below market prices or giving them away for free as a form of social solidarity. This phenomenon underscores that religiosity in the Al-Mahdi Farmers Group has great potential to significantly influence the social role and life satisfaction of farmers, as well as indirectly supporting the sustainability of their farming businesses. However, a more comprehensive measurement and understanding of how this spiritual dimension interacts with economic and technological factors, as well as its contribution to the holistic welfare of farmers in this specific context, still requires further exploration.

Based on the above description, it can be seen that although there are indications of increased activity and potential in the Al-Mahdi Farmers Group, the definitive causal mechanisms between these three variables and farmers' welfare have not been fully unraveled. Whether the observed increase in welfare is purely the result

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of cooperation and technology, or whether the encouragement of religiosity is the key driver of their persistence and success, these questions are the gaps in research and will be answered through this case study.

Therefore, the study entitled "The Influence of Cooperation with Business Partners, the Application of Agricultural Technology, and Religiosity on the Welfare of Al-Mahdi Farmers in Percut Sei Tuan Subdistrict" not only measures the partial and simultaneous effects of these three variables, but also explores how religious values interact with economic and technological factors in shaping the unique and sustainable welfare of farmers. It is hoped that this study will provide new insights into a more holistic model of farmer empowerment rooted in local values.

LITERATURE REVIEW

Partnerships are collaborative efforts involving various sectors, community organizations, and governmental and non-governmental institutions to pursue common goals in accordance with agreed principles and responsibilities (Buchori et al., 2020). In the context of agriculture, cooperation with business partners is one of the main strategies for improving farmers' welfare. According to Nusaisyah & Rahman (2024),agribusiness partnerships help farmers overcome obstacles related to capital, access to technology, and market expansion. Through partnerships, farmers receive assistance, more stable selling prices, and protection from market uncertainty . As explained by Hartono et al. (2024), the effectiveness of farming partnerships can be measured through indicators of capital guarantees, market certainty, technical guidance, and partnership performance, all of which form the basis for evaluating the extent to which partnerships can increase trust and the sustainability of relationships between farmers and partners.

Relevant research was conducted by Permatasari & Rondhi (2022), who analyzed the factors influencing rice farmers' participation in partnership programs in Indonesia. Permatasari's research results show that farmers' involvement in partnership programs has a positive effect on increasing their income. Factors such as access to technology, capital, and markets through partnerships increase farmers' productivity and income.

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However, the effectiveness of partnerships is highly dependent on their design and implementation. Several studies show that partnerships in farming do not always have a significant impact on technical efficiency, as farmers tend to depend on their partners and are less actively involved in the production process. This confirms that the success of partnerships is contextual and needs to take into account the active role of farmers, fair risk sharing, and clarity in cooperation contracts.

According to Nuryanti & Swastika (2016), agricultural technology is the application of science and engineering to improve the efficiency and productivity of natural resources. Its application by farmers is influenced by the perceived benefits, ease of use, suitability to habits, and visibility of results. Indicators of technology adoption include the type of technology used, the level of adoption, the impact on productivity, and access to information and training. Marita et al. (2021) found that modern tools such as automatic irrigation, drones, and technology-based fertilizers can increase agricultural production and ease farmers' work. Sudarwati & Nasution (2024) added that technology also opens up access to market information through digital media.

However, not all studies show positive results. Kencani & Irwansyah (2024) and Wati & Irwansyah (2024)concluded that the use of technology does not always have a direct impact on farmers' welfare or income. This can happen because farmers are not yet accustomed to using technology, lack training, or do not have sufficient support to manage the technology independently.

Although the government has encouraged the use of agricultural technology through extension services, equipment assistance, and infrastructure development, its implementation in the field has not been fully optimal. Many farmers, especially those from small farmer groups, still face obstacles in understanding new technologies, limited practical training, and a lack of ongoing guidance and financial support. Given these issues, it is important to examine the extent to which the application of agricultural technology actually contributes to improving farmers' welfare, especially at the community level, such as the Al-Mahdi Farmer Group.

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Religiosity plays an important role in improving farmers' welfare, both economically and mentally. Research by Yamin (2024) shows that the application of religious values contributes to an increase in the work ethic of young farmers, which ultimately has a positive impact on their welfare. Similar findings were reported by Sari (2017), who stated that an Islamic work ethic influenced by religiosity has a positive impact on farmers' welfare. Religious values such as honesty, trustworthiness, hard work, and gratitude have been proven to increase work motivation, which in turn contributes to improving the social and economic conditions of farmers (Harahap et al., 2023).

In this context, the religiosity framework of Glock and Stark (1969) is relevant to explain the dimensions of farmers' religiosity, which not only includes worship practices but also aspects of belief, spiritual appreciation, religious knowledge, and behavioral consequences. These five dimensions of religiosity reflect the extent to which religious values are internalized in daily life, including in shaping farmers' work morality and mental resilience (Syanjaya, 2024).

However, the dimensions of religiosity are still rarely studied directly in relation to farmers' welfare in an empirical context. On that basis, this study seeks to fill this gap by examining the contribution of spiritual values to farmers' welfare from the perspective of social and work morality.

Well-being is a condition in which individuals are able to provide for their essential needs, such as consumption, clothing, housing, education, and adequate employment opportunities. Well-being is not only related to economic aspects, but also to social and psychological aspects that enable a person to live safely, peacefully, and with dignity (Saragih & Damanik, 2022). In the context of farmers, welfare reflects the fulfillment of basic rights as well as overall quality of life.

According to Syamsuri & Irsyamuddin (2019), community welfare can be seen from the extent to which basic needs are met and the community has room to develop as individuals, families, and part of a community. The fulfillment of basic needs is not the responsibility of the individual alone, but also needs to be supported by a social and institutional environment that is fair and supportive of vulnerable groups such as

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farmers. This makes welfare the result of a combination of economic conditions, social support, and a sense of empowerment in daily life.

Farmers' welfare can be improved through a combination of financial support, access to technology, and lifestyles based on ethical and moral values (Nurhayati & Nasution, 2020). Given the existing problems, this study will examine in greater depth how the three main factors of cooperation with business partners, the application of agricultural technology, and religiosity affect the welfare of farmers in the Al-Mahdi Farmer Group.

Based on the above description, religiosity plays an important role in shaping farmers' mindsets and behavior, especially when they are faced with technological developments or establishing business partnerships. Religious values, such as honesty, trustworthiness, hard work, and gratitude, form the ethical basis that guides farmers in their decision-making. When agricultural technology is introduced, a strong level of religiosity can influence how farmers accept and utilize these innovations. Technology is not only seen as a means to increase productivity, but is also assessed in terms of its compatibility with moral and spiritual principles, such as whether the technology is environmentally friendly, beneficial to society, and does not cause harm. Thus, religiosity can be an ethical filter as well as a motivation for farmers to use technology wisely (Tanko & Ismaila, 2021).

METHODS

Quantitative research was used in this study. This research was conducted at the Al-Mahdi Farmer Group, located in Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province. This research was conducted from early April to June 2025. The population in this study included all 52 members of the Al-Mahdi Farmer Group. The sampling technique used was saturated sampling, whereby the entire population was used as the research sample. Thus, the total research sample was equal to the population, namely 52 respondents. This study used primary and secondary data. Primary data was obtained directly from respondents by distributing questionnaires to 52 members of the Al-Mahdi Farmers Group. Meanwhile, secondary data was obtained from various relevant literature, such as books, journals, articles, and official data from the Central Statistics Agency (BPS) (Sriulina et al., 2025). Validity

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and reliability tests were used to evaluate the feasibility of the instruments before regression analysis, and prerequisite tests covering heteroscedasticity, multicollinearity, and normality were conducted to ensure that the data met the regression requirements. The indicators used are as described by (Hartono et al., 2024), namely that the effectiveness of agricultural partnerships can be measured through indicators of capital guarantees, market certainty, technical guidance, and partnership performance, all of which form the basis for evaluating the extent to which partnerships can increase trust and the sustainability of relationships between farmers and partners. (Marita et al., 2021) found that modern tools such as automatic irrigation, drones, and technology-based fertilizers can increase agricultural production and ease the work of farmers. Religious values such as honesty, trustworthiness, hard work, and gratitude have been proven to increase work motivation, which in turn contributes to improving the social and economic conditions of farmers (Harahap et al., 2023). Well-being is a condition in which individuals are able to provide for essential needs such as consumption, clothing, housing, education, and adequate employment opportunities. Well-being is not only related to economic aspects, but also to social and psychological aspects that enable a person to live safely, peacefully, and with dignity (Saragih & Damanik, 2022). In this study, the regression analysis model was followed by a t-test to evaluate each independent variable's effect on the dependent variable, followed by an F-test to analyze the combined effect of the three independent variables on farmer welfare. Additionally, the coefficient of determination (R^2) was used to identify the extent to which the independent variables explained the dependent variable.

RESULTS

Instrument Test

Table 1. Validity Test Results

Item	Calculated R	R Table	Description
Variable X1 Cooperation with Business Partners			
X1.1	0.735	0.273	Valid
X1.2	0.790	0.273	Valid
X1.3	0.805	0.273	Valid

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X1.4	0.836	0.273	Valid
X1.5	0.773	0.273	Valid
Variable X2 Technology Use			
X2.1	0.725	0.273	Valid
X2.2	0.756	0.273	Valid
X2.3	0.671	0.273	Valid
X2.4	0.740	0.273	Valid
X2.5	0.791	0.273	Valid
Variable X3 Religiosity			
X3.1	0.618	0.273	Valid
X3.2	0.605	0.273	Valid
X3.3	0.880	0.273	Valid
X3.4	0.615	0.273	Valid
X3.5	0.753	0.273	Valid
Variable Y Farmer Welfare			
Y.1	0.536	0.273	Valid
Y.2	0.711	0.273	Valid
Y.3	0.850	0.273	Valid
Y.4	0.846	0.273	Valid
Y.5	0.597	0.273	Valid

Source: Primary data processed using SPSS ver. 25 (2025)

The validity test was used to assess whether the research instrument was feasible or not. The instrument referred to is the questionnaire items (Aisyah et al., 2023;Yafiz, 2022). The validity test in this study was conducted through the correlation between the scores of each indicator item and the total construct score. The significance criterion used was 0.05:

a) The validity of the Cooperation with Business Partners (X1) variable showed a calculated r value of 0.735 to 0.773 > table r 0.273. Therefore, it can be concluded that the 5 question items are suitable for use as a measuring tool.

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b) The validity of the Technology Use variable (X2) showed a calculated r value of 0.725 to 0.791 > table r 0.273. Therefore, it can be concluded that the 5 questions are suitable for use as a measuring tool.
c) The validity of the Religiosity variable (X3) shows a calculated r value of 0.618 to 0.735 > r table 0.273. Therefore, it can be concluded that the 5 questions are suitable for use as a measuring tool.

The validity of the Farmer Welfare (Y) variable shows a calculated r value of 0.536 to 0.597 > r table 0.273. Therefore, it can be concluded that the 5 questions are suitable for use as a measuring tool.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Question Items	Notes
X1	0.848	5	Reliable
X2	0.789	5	Reliable
X3	0.740	5	Reliable
Y	0.760	5	Reliable

Source: Primary data processed using SPSS ver. 25 (2025)

A reliability test is a way to determine whether the questionnaire used in research has a good level of consistency in measuring a variable or construct (Safrida et al., 2023; Shofia et al., 2024). In quantitative research, one of the methods often used is the *internal* consistency test, which measures how well each item in a variable is related and consistent. If the consistency value is high, the questionnaire is considered reliable and suitable for use in research (Forester et al., 2024).

a) The reliability of the Cooperation with Business Partners (X1) variable showed a reliability value of 0.848 > 0.60. The five items in the test showed good reliability, according to the results, so they were used as a measuring tool in the study.
b) The reliability of the Technology Use variable (X2) shows a reliability value of 0.789 > 0.60. The five items in the test show good reliability, according to the results, so they are used as a measuring tool in the study.

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c) The reliability of the Religiosity variable (X3) showed a reliability value of 0.740 > 0.60. Five items in the test showed good reliability, according to the results, so they were used as measuring instruments in the study.

The reliability of the Farmer Welfare (Y) variable shows a reliability value of 0.760 > 0.60. Five items in the test show good reliability, according to the results, so they are used as measuring instruments in the study.

Classical Assumption Test

Table 3. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		52
Normal Parameters[a,b]	Mean	.000000
	Std. Deviation	.95882623
Most Extreme Differences	Absolute	.078
	Positive	.078
	Negative	-.064
Test Statistic		.078
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

Source: Primary data processed using SPSS ver. 25 (2025)

Normality is used to test whether the data on the independent and dependent variables follow a normal distribution .A valid regression model should be supported by graphical and statistical tests with the following conditions:

a) A significance value greater than 0.05 indicates that the data is normally distributed.
b) A significance value less than 0.05 indicates that the data is not normally distributed. (Mardiatmoko, 2020).

The results of the normality test using Kolmogorov-Smirnov show a significance value (Sig.) greater than 0.05, namely 0.072. From the sig value obtained,

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it can be said that the Unstandardized Residual value in the regression model meets the normality test.

Table 4. Multicollinearity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	Collinearity Statistics	
		B	Std. Error	Beta	Tolerance	VIF
1	(Constant)	2.921	1.471			
	Collaboration with business partners	-.024	.058	-.032	.720	1,388
	Technology Use	.363	.080	.451	.434	2,302
	Religiosity	.524	.100	.522	.431	2,318

a. Dependent Variable: Farmer Welfare

Source: Primary data processed using SPSS ver. 25 (2025)

Tolerance and *variance inflation factor* (VIF) values are compared to test for multicollinearity. Multicollinearity is defined as *tolerance* < 0.10 or VIF > 10, while the absence of multicollinearity is defined as *tolerance* > 0.10 or VIF < 10 (Rusydi & Rusli, 2022).

Table 4 above shows the VIF values for the variables Cooperation with Business Partners 1.388, Use of Technology 2.302, and Religiosity 2.318, while the tolerance values are < 0.10. Since all variables have VIF values < 10 and tolerance > 0.10, it can be concluded that there is no multicollinearity in the three independent variables.

Table 5. Results of the Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.793	.918		1,953	.057

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	Collaboration with business partners	-.024	.036	-.106	-.653	.517
	Technology Use	.087	.050	.366	1,748	.087
	Religiosity	-.114	.063	-.382	-1.821	.075

a. Dependent Variable: ABS

Source: Primary data processed using SPSS ver. 25 (2025)

The heteroscedasticity test in this study was conducted using the Glejser method. According to the Glejser test criteria, a significance value greater than 0.05 indicates no heteroscedasticity, while a value below 0.05 indicates heteroscedasticity. The results of the study show that all independent variables obtained significance values exceeding 0.05 (Nasution et al., 2023).Thus, it can be concluded that the model is free from heteroscedasticity.

Multiple Linear Regression Analysis

This study tested ten hypotheses, comprising seven direct effect hypotheses and three mediation hypotheses. Results indicate that three hypotheses were unsupported, with a detailed provided in Table 6.

Table 6. Multiple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.921	1.471		1,986	.053
	Collaboration with business partners	-.024	.058	-.32	-.408	.685
	Technology Use	.363	.080	.451	4,532	.000
	Religiosity	.524	.100	.522	5,222	.000

a. Dependent Variable: Farmer Welfare

Source: Primary data processed using SPSS ver. 25 (2025)

From Table 6 above, it can be seen that the multiple linear regression formed is: Y=2.921−0.024+0.363+0.524

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a) The constant of 2.921 means that if the variables of Cooperation with Business Partners, Use of Technology, and Religiosity do not exist or have a value of zero, then the value of Farmer Welfare is estimated to be 2.921.

b) The regression coefficient for Cooperation with Business Partners is -0.024, indicating a negative and insignificant effect on farmer welfare (Sig. 0.685). This indicates that the existing forms of cooperation are not yet effective in supporting improvements in farmers' living standards.

c) The regression coefficient for the Technology Use variable is 0.363, meaning that if other variables remain constant, every 1-unit increase in Technology Use will increase Farmer Welfare by 0.363. This coefficient is positive and significant (Sig. = 0.000 < 0.05), which means that the higher the use of technology, the more farmers' welfare will increase significantly.

d) The regression coefficient for the Religiosity variable is 0.524, which means that if other variables remain constant, every 1-unit increase in Religiosity will increase Farmer Welfare by 0.524. This coefficient value is also positive and significant (Sig. = 0.000 < 0.05), indicating that the higher the religiosity, the higher the farmers' welfare.

Hypothesis Testing

Table 7. Simultaneous Test Results (F Test)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.094	3	60,031	61,457	.000[b]
	Residual	46,887	48	.977		
	Total	226,981	51			

a. Dependent Variable: Farmer Welfare

b. Predictors: (Constant), Religiosity, Cooperation with business partners, Use of Technology

Source: Primary data processed using SPSS ver. 25 (2025)

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Based on Table 7 above, the calculated F value is 61.457 with a significance level of 0.000. Since the significance value is less than 0.05, it can be concluded that the model is statistically significant, so it can be concluded that: The three independent variables, namely Cooperation with Business Partners (X1), Use of Technology (X2), and Religiosity (X3), simultaneously have a significant effect on the dependent variable of Farmer Welfare (Y).

Table 8. Partial Test Results (T-test)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.921	1.471		1,986	.053
	Collaboration with business partners	-.024	.058	-.032	-.408	.685
	Technology Use	.363	.080	.451	4,532	.000
	Religiosity	.524	.100	.522	5,222	.000

a. Dependent Variable: Farmer Welfare

Source: Primary data processed using SPSS ver. 25 (2025)

a) Variable of Cooperation with Business Partners

The test results show that this variable has a significance value of 0.685 (> 0.05) with a t-value of -0.408. Based on the testing criteria, because the significance value exceeds 0.05, it can be concluded that the Cooperation with Business Partners variable does not have a significant effect on Farmer Welfare partially.

b) Technology Use Variable

The analysis results show a significance value of 0.000 (< 0.05) with a t-value of 4.532. This confirms that Technology Use has a significant effect on Farmer Welfare when tested partially.

c) Religiosity Variable

The statistical test results show that this variable has a significance value of 0.000 (< 0.05) with a t-value of 5.222. This finding confirms that Religiosity has a significant effect on Farmer Welfare when tested partially.

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Table 9. Determination Coefficient Results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.891[a]	.793	.781	.988

a. Predictors: (Constant), Religiosity, Cooperation with business partners, Use of Technology

b. Dependent Variable: Farmer Welfare

Source: Primary data processed using SPSS ver. 25 (2025)

Based on the Model Summary Table, it is known that the coefficient of determination or R Square value is 0.793. The figure 79.3% means that the variables Cooperation with Business Partners (X1), Use of Technology (X2), and Religiosity (X3) simultaneously explain 79.3% of the variation in the dependent variable Farmer Welfare (Y). Meanwhile, the remaining 20.7% is explained by other factors not included in this regression model, such as economic conditions, government policies, commodity prices, or other social factors.

DISCUSSION

This study aims to determine the effect of Cooperation with Business Partners (X1), Application of Agricultural Technology (X2), and Religiosity (X3) on Farmer Welfare (Y) in the Al-Mahdi Farmer Group, Percut Sei Tuan District. Based on the results of multiple linear regression analysis, it is known that simultaneously, the three independent variables have a significant effect on farmer welfare. This is evidenced by the F test results which obtained a significance value of 0.000 < 0.05. This means that together, cooperation, technology, and religiosity have a real contribution in explaining the level of farmer welfare. However, when viewed partially through the t-test, only two variables were proven to have a significant effect, namely the Application of Agricultural Technology and Religiosity, while Cooperation with Business Partners did not have a significant effect.

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The Influence of Cooperation with Business Partners

The analysis results show that the variable of cooperation with business partners has a significance value of 0.685 > 0.05 and a regression coefficient of -0.024, which means that it does not have a significant effect on farmers' welfare. This negative coefficient value reflects the tendency that increased cooperation is not always followed by an increase in farmers' welfare.

This finding indicates that the form of cooperation that occurs in the Al-Mahdi Farmer Group is not yet optimal in improving farmer welfare. Based on field observations, existing cooperation is still limited to providing production assistance such as fertilizers or agricultural tools, without intensive assistance in terms of marketing crops or farm management, and without broad market access, meaning that this cooperation has not had a real impact on economic and social welfare.

This shows that the effectiveness of partnerships is contextual and highly dependent on the quality of relationships, transparency, and balance of roles between farmers and partners. Similar findings were also revealed by Prasetyo et al. (2022), who found that melon farmer partnerships in Tuban did not have a significant impact on welfare due to unequal relationships and a lack of transparency.

The Impact of Agricultural Technology on Farmer Welfare

The regression results show that the application of agricultural technology has a positive and significant effect on farmers' welfare, with a significance value of 0.000 < 0.05 and a regression coefficient of 0.363. This means that every increase in the use of agricultural technology will have a positive impact on improving farmers' welfare. In the context of the Al-Mahdi Farmer Group, technologies such as tractors, irrigation hoses, and fertilizer sprayers have helped improve farmers' work efficiency and reduce the physical burden of labor. This directly contributes to increased productivity, labor cost savings, and faster harvest times. Technology also allows farmers to manage larger areas of land with more efficient resources.

These findings are in line with Suhendrata's (2024) ,researchwhich shows that the adoption of agricultural tools and machinery can increase crop yields by up to 30% while reducing farmers' working hours. Similarly, Gunawan et al. (2025)found that the

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use of *rice transplanters* helps reduce production costs and increase farmers' income.

The Influence of Religiosity on Farmers' Welfare

The religiosity variable also has a positive and significant effect on farmer welfare, with a significance value of 0.000 < 0.05 and a regression coefficient of 0.524, making it the variable with the greatest contribution to improving welfare.

This shows that religious values such as honesty, gratitude, responsibility, and togetherness embraced by farmers in the Al-Mahdi Farmer Group also encourage work ethic, perseverance, and patience in facing agricultural challenges. In fact, in some cases, farmers are willing to sell their crops below market prices or give their crops to others for free as a form of worship and solidarity. Practices like this foster feelings of happiness, peace, and meaning, which are part of subjective well-being.

Research by Nurmansyah (2019)also shows that the work ethic of Muslim farmers, which is influenced by religious values such as intention, morals, knowledge, and practice, has a positive relationship with farmers' welfare. This indicates that religiosity plays a role in shaping farmers' motivation and perseverance in running sustainable farming businesses (Imsar, 2023).

These results show that agricultural development should not only be oriented towards technical or financial aspects, but also needs to consider spiritual and local cultural dimensions. Internalized religiosity can be a major driving force in shaping farmers who are resilient, honest, and socially responsible. From an Islamic perspective, welfare is not only understood as material achievement, but also includes the fulfillment of spiritual needs such as maintaining religion, soul, and reason.

CONCLUSION

The variable of cooperation with business partners did not have a significant effect on farmers' welfare. Although in theory partnerships have great potential to improve market access, capital, and increase farmers' capacity, in reality the forms of cooperation established in the field are still limited and have little direct impact. The lack of assistance, the absence of a clear distribution system, and the low level of farmer involvement in decision-making mean that this cooperation has not been able to improve farmers' living standards as a whole.

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The variable of agricultural technology application has a positive effect on farmers' welfare. The technologies used by farmers, such as mechanical tools and simple irrigation systems, have been proven to help improve work efficiency, accelerate land cultivation, and increase crop yields. This contributes to increased income and reduced physical workload for farmers, which ultimately improves their overall living conditions.

The variable of religiosity is one of the most powerful factors influencing farmers' welfare. Spiritual values such as honesty, gratitude, and social awareness form the moral foundation that drives work ethic and solidarity among farmers. Religiosity also provides inner peace, meaning in work, and a sense of satisfaction and gratitude for the results obtained, thereby contributing to a more comprehensive well-being that encompasses economic, social, and psychological aspects.

Simultaneously, cooperation with business partners, the application of technology, and religiosity contribute to improving farmers' welfare. Although not all variables show a strong individual influence, the existence of these three factors complement each other and form an important foundation in the process of improving farmers' quality of life. This study confirms that farmers' welfare is not only determined by economic aspects, but is also influenced by technological support and the social and spiritual values embraced in daily life. Improving farmers' welfare can be achieved through the integration of religiosity, technology, and business partnerships. Religiousness serves as an ethical foundation in the use of agricultural technology, while the government needs to facilitate training and fair and transparent partnership regulations. With the support of market infrastructure and distribution digitalization, the synergy of these three factors will strengthen productivity while ensuring sustainable farmer welfare.

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