



A MODEL FOR INCREASING INTEREST IN RICE FARMING IN SOUTH NIAS REGENCY, INDONESIA

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KEYWORD

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ABSTRACT

Rice farming is a strategic sector for national food security, however, its sustainability is increasingly threatened by the declining number of farming households and low levels of interest in rice farming activities. This situation is also evident in South Nias Regency, where interest in rice farming is influenced by economic conditions, institutional support, technology adoption, government policies, and low self-confidence. This study aims to formulate a model to increase interest in rice farming. The research was conducted in March 2025. The quantitative research approach utilized the Structural Equation Modeling Partial Least Squares (SEM-PLS) method. The results indicate that economic, institutional, technological, and government policy factors significantly influence interest in rice farming, both directly and indirectly through the mediation of self-efficacy. Self-efficacy emerges as a strong mediator that amplifies the influence of these determining factors on rice farmers' interest. These findings indicate that the decline in the number of rice-farming households is driven not only by structural constraints but also by low self-efficacy among rice farmers, which hinders the sustainability of effective rice farming. Therefore, strengthening interest in rice farming requires a comprehensive strategy that integrates the development of self-efficacy, economic incentives, institutional strengthening, technological support, and coherent government policies.

INTRODUCTION

Rice farming is a key component of the national food security strategy. However, in recent years, the sustainability of rice farming in Indonesia has been increasingly threatened by a decline in interest in agricultural activities (BPS, 2023). This phenomenon is clearly evident in South Nias Regency, one of the major rice-producing regions in North Sumatra that is currently facing challenges. Farmers' low interest in the agricultural sector not only reflects changing socioeconomic preferences but also poses a serious risk to the sustainability of rice production in the region. This situation underscores the urgency of understanding the factors influencing engagement in rice farming to support sustainable agricultural development, as it is emphasized that farmers' low interest and lack of confidence in the agricultural sector are influenced by various structural barriers and negative perceptions of the sector (Žmija et al., 2020).

Farmers' lack of interest in rice farming can be attributed to various reasons. Economic factors, such as low income compared to the non-agricultural sector, are the most common reasons. The financial challenges faced by farmers who are just starting their businesses significantly impact their production efficiency and income potential (Geza et al., 2021). The profitability of family farming plays a crucial role in determining whether people will consider rice farming as a career (Salvago et al., 2019). Economic constraints such as prices and the lack of financial assistance faced by farmers are the main reasons they avoid rice farming. They believe that seeking other employment will be more stable than rice farming because, in their view, agriculture

remains the least profitable sector of employment. Communities view better financial support and economic incentives as a way to improve their technical efficiency and create a more sustainable agricultural environment, which could motivate them to enter the rice farming sector (Khanal & Regmi, 2018). Another key factor influencing interest in rice farming is the institutional support provided to rice-farming communities.

Agricultural institutions in South Nias Regency face a number of fundamental challenges. Some farmer groups are active only when they receive assistance, and the number of agricultural extension workers is also limited. Conversely, close cooperation between government agencies and civil society organizations can foster beneficial economic development in the rice farming sector; as a result, this profession will become more attractive to farming communities seeking a steady income (Arpai & Adnan, 2023). This is highlighted by the research of Bala et al. (2021) and Saleh et al. (2021), which demonstrates that farmers' access to information and financial resources is a key factor in the adoption of modern agricultural techniques, which in turn increases their productivity and profits in rice cultivation. Furthermore, South Nias Regency's agricultural policies continue to face several challenges that contribute to stagnant productivity and low farmer welfare. Current policies primarily focus on providing temporary and unsustainable assistance and have not addressed underlying issues. This situation has resulted in South Nias's agricultural policies becoming more reactive and sectoral, unsustainable, and consequently less capable of driving the transformation of rice farming into a more productive sector and less attractive to rice-farming communities.

Policies aimed at encouraging the public to engage in rice farming through specialized programs, such as training and development activities, will have a significant impact on their decision to become rice farmers (Triyono et al., 2023). Various studies have reported that the government is actively involved in providing subsidies and technical assistance, which are key factors in attracting more people to rice farming (Jansuwan & Zander, 2022). Farmers cannot be easily attracted to the agricultural sector if technological aspects are neglected, as agricultural technology in South Nias Regency remains quite limited in terms of both access and utilization. The majority of farmers still rely on traditional practices such as land preparation, planting, and harvesting, and very few use modern agricultural tools and machinery (Zhang et al., 2024). There is a relationship between the use of technology in agriculture and farmer participation in farming, indicating that the use of technology in farming attracts farmers' interest, including in rice farming (Kwakye et al., 2021). This is also supported by research findings that knowledge gaps regarding new technologies can act as barriers to the adoption of better agricultural practices, including in rice farming (Mardiharini et al., 2023).

Farmers' interest in rice farming is influenced not only by external factors such as economic conditions, institutional support, technology adoption, and government policies, but also by internal factors, one of which is self-efficacy (Haryati et al., 2024). Self-efficacy is a key psychological factor in agriculture that is reflected in various dimensions of farmer behavior, technology, and educational outcomes. Farmers' self-efficacy assessments regarding their ability to perform agricultural activities are positively associated with their enthusiasm for adopting the latest challenging environmentally friendly practices, as in the case of (Zeweld et al., 2017). Such self-efficacy gradually builds the mental capacity to engage in complex agricultural practices, where the perception of control is a strong factor influencing farmers' decisions to adopt sustainable practices (Khademi-Vidra & Bakos, 2023). Therefore, the influence of self-efficacy is not limited to aspects of individual behavior and decision-making but also plays a crucial role in the effectiveness of programs such as agricultural training and extension services, as well as educational interventions aimed at strengthening farmers' self-efficacy, which can lead to better management of agricultural enterprises (Prescott et al., 2020).

On the other hand, farmers' self-confidence in South Nias Regency is very low, as reflected in their limited belief that rice cultivation will become their primary livelihood. Many farmers doubt their ability to manage their land, secure funding, or learn new techniques, leading them to abandon farming and seek other job opportunities in urban areas (BPS, 2024).

Various studies indicate that self-efficacy among farmers is a key factor in the adoption of new agricultural methods and technologies, thereby reducing the risk of hindering their potential to increase production (Adokou et al., 2024). A study also reaffirms that farmers' confidence in their abilities is closely linked to their openness to innovation (Wicaksono et al., 2024). This study differs from previous studies by integrating economic, institutional, technological, and policy factors while positioning self-efficacy as a

mediating variable to explain the mechanisms of community engagement in rice farming more comprehensively.

Therefore, it is important to examine the factors influencing the farming community's interest in rice farming in South Nias Regency. Economic factors are a primary consideration because income from agriculture is often not comparable to that of other sectors. Agricultural institutions, which have not yet functioned optimally as vehicles for empowerment, provide little tangible support to farmers. Limitations in modern technology reinforce the perception that farming is still synonymous with traditional methods that are exhausting and high-risk. On the other hand, government policies tend to be partial and short-term, thus failing to provide guarantees of sustainability or appeal to farmers (Orangi et al., 2025).

This research contributes to the development of evidence-based policy recommendations, so that it can be a foothold for local governments, especially in South Nias which is still classified as a disadvantaged area and the center to design strategies for regenerating rice farmers through increased self-efficacy and economic improvement, institutional support, technology, and policies.

METHOD

Population and Sample.

This study was conducted in North Sumatra Province's South Nias Regency. There are 35 subdistricts in the South Nias Regency. This study was conducted in March 2025. In this study the population was farmer both directly involved and not involved in the households of rice farmers in the research location with 10,410 households consisting of field rice farmers and rice paddy farmers. From this population, the sampling number was calculated using the Multi satge sampling, so that samples were obtained from 184 rice farmer.

Data collection techniques.

The data collection is observation, structured interviews, documentation and literature:

- a. Observation is carried out to see at a glance the research area, so that an overview can be obtained of the condition of the research area and actual issues in the community related to the research theme. This observation activity in the field is supported by data that has been studied through the literature study method as the beginning of collecting general data on research objects (Saunders et al, 2023).
- b. Documentation and literature study were conducted to obtain secondary data is a document search to find out the general picture of the research area such as the state of the location and the characteristics of its population. Literature search, publication data, other research reports, village potential data and from related agencies including the Agriculture and Livestock Service and BPS. The data sought are in the form of physical, village area infrastructure, socio-economic conditions of the community and so on which consist of statistical tabular data and maps related to this research.
- c. Primary data was collected using a questionnaire submitted to respondents to be answered as the main instrument for data collection in this study. This questionnaire is intended to obtain information in writing from respondents related to the purpose of the research. In the questionnaire there are questions that will be analyzed quantitatively and qualitatively. This data was obtained from direct survey activities in the field as much as possible by researchers and research assistants. Data were collected using a structured questionnaire administered through direct interviews with respondents. The use of direct interviews was necessary to ensure clarity of questions and to accommodate respondents with varying educational backgrounds in rural areas.

Data Analysis Technique.

Two models were employed in the SEM-PLS data analysis method: the measurement model (outer model) and the structural model (inner model). The structural model explains how latent variables relate to one another. The measurement model (outer model) and structural model (inner outer model) were evaluated multiple times using SEM-PLS. Convergent validity, discriminant validity, composite reliability, and Average Variance Extracted (AVE) were examined while assessing the measurement model. The R-squared (R^2) and path coefficient estimation test were used to assess the structural model (Hair, et al, 2017). In this study, the

independent variables are the economy, institutions, technology and government policies and the mediating variables are self-efficacy and the bound variable is the interest in farming.

1. Convergent validity in SEM PLS was used as one method to evaluate the measurement model (outer model). A correlation is said to fulfill convergent validity if the loading value is greater than 0.5.
2. One way to assess the measurement model (outer model) is to have discriminant validity, which requires that the measures of different constructs do not have a high correlation.
3. Another method that can be used to assess discriminant validity is to compare the square root value of the Average Variance Extracted (AVE). Discriminant validity can be achieved if the AVE value is greater than 0.5.
4. A reliability test in the SEM-PLS model was used to evaluate the measurement model (outer model). Latent variables were considered reliable if the composite reliability and Cronbach's alpha were both greater than 0.7.
5. The R-squared (R^2) test was used to assess the Goodness of Fit of a structural model by measuring the extent to which the independent latent variable affected the dependent latent variable. An R^2 value of 0.67 indicates a good model. A value between 0.33 and 0.67 indicates a moderate model, wherea a value of 0.33 indicates a weak model.
6. The significance test in the SEM-PLS model assesses the effect of exogenous latent variables on endogenous latent variables. The estimated path relationship value in the structural model was used to determine the significance of the relationship between latent variables. The significance of this value can be determined using bootstrapping (Hair et al, 2017).

A research analysis framework that describes the relationship between economic, institutional, technological, and government policy factors to interest in rice farming. Within this framework, self-efficacy is positioned as a mediating variable that strengthens the influence of these factors on interest in the the rice farming sector (Figure 1).

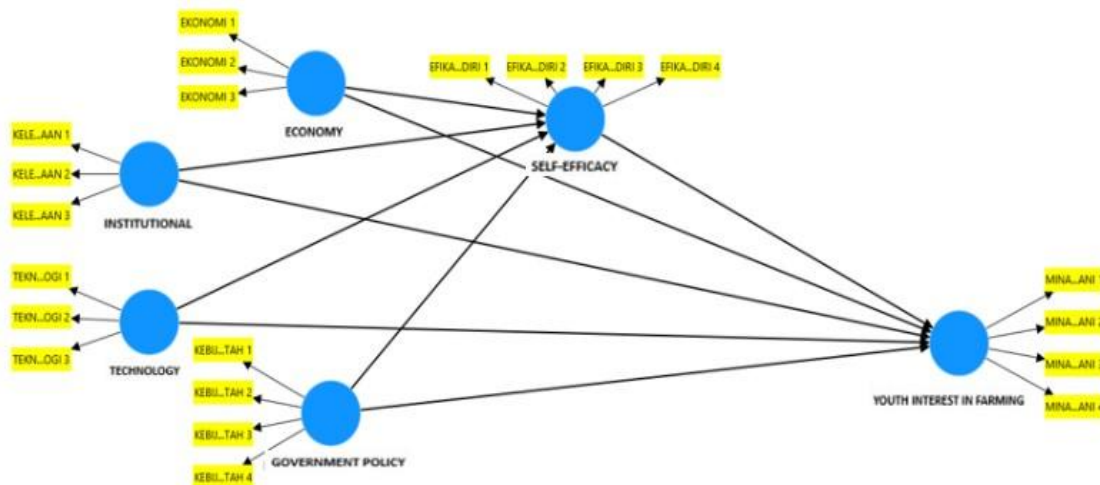


Figure 1. Research analysis framework

Source: Developed by researchers

The model in the figure consists of six latent variables that are structurally interrelated, namely: Economy, Institutions, Technology, Government Policy, Self-Efficacy, and Farmers' Interest in Rice Farming. The latent variable Economy is represented by three indicators income, marketing, and productivity which describe farmers' economic conditions. The Institutional variable also has three indicators used: government support, financial institutions, and farmer groups, which indicate institutional involvement and support in agricultural activities. The Technology variable is illustrated through three indicators: high-quality seeds/seedlings, use of machinery, and fertilizers/pesticides, which categorize the level of technology and access to it in agriculture.

The Government Policy variable consists of four indicators: subsidies, access to credit, market prices, and agricultural extension officers, which reflect government support, regulations, and programs for the

agricultural sector. Meanwhile, the Self-Efficacy variable consists of four indicators: confidence in managing agriculture, confidence in facing challenges, confidence in adopting technology, and confidence in sustaining agriculture. The final variable, Interest in Agriculture, is measured through four indicators: farmer participation, career aspirations, prestige, and positive attitudes toward rice farming, which indicate the extent of farmers' interest, motivation, and desire to enter the rice farming sector.

RESULTS

Validity and Reliability Testing for Every Indicator in the Outer Model Evaluation (Measurement Model).

a.Outer Loading Validity Test.

For each construct, there are two criteria to determine whether the outer model (measurement model) satisfies the convergent validity requirements: (1) loading must be greater than 0.7, and (2) a significant p-value (<0.05). However, loading requirements greater than 0.7 are occasionally not fulfilled, particularly for recently created questions Or not a question that was adopted from the previous researcher. As a result, loading in the range of 0.40 to 0.70 ought to be kept Hair et al, 2017). The results of the analysis carried out through the analysis of the outer loading of each indicator are shown in Figure 2 and Table 1.

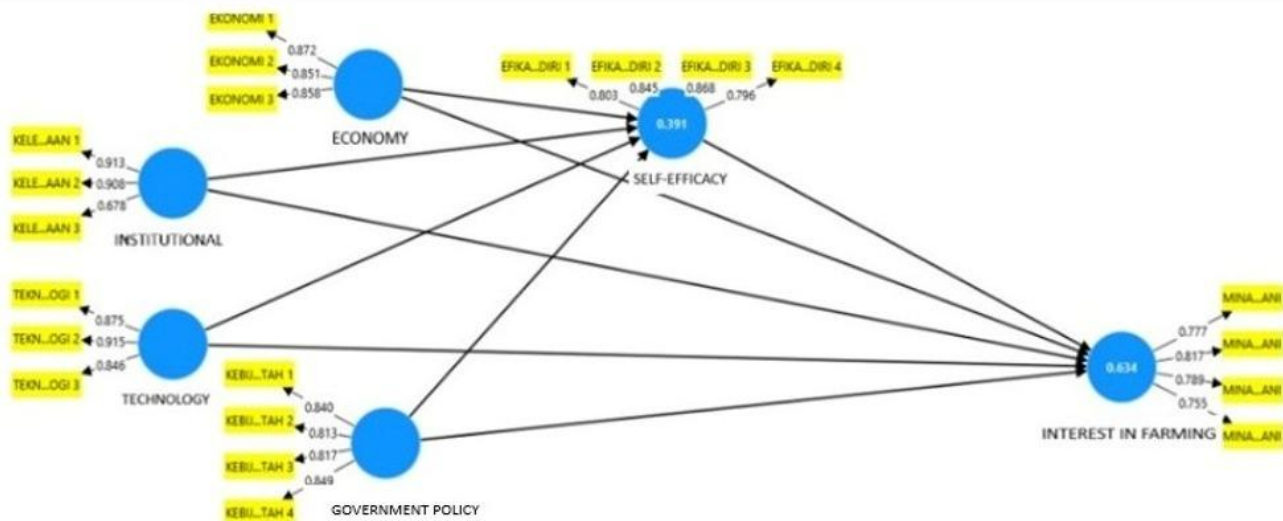


Figure 2. Path Diagram of Outer Loading

Source: Processed Primary Data, 2025

Referring to (Hair et al, 2017) that an outer loading value in each indicator in each variable is said to be valid if it has an outer loading value > 0.70 as presented in Table 1 below.

Table 1. Validity Testing based on Outer Loading on each Indicator

Indicator	Outer Loading Value						Description.
	Economic	Institutional	Technology	Government Policy	Self-efficacy	Interest in Farming	
X1.1	0,872						Valid
X1.2	0,851						Valid
X1.3	0,858						Valid
X2.1		0,913					Valid
X2.2		0,908					Valid
X2.3		0,778					Valid
X3.1			0,875				Valid
X3.2			0,915				Valid
X3.3			0,846				Valid
X4.1				0,84			Valid

X4.2	0,813	Valid
X4.3	0,817	Valid
X4.4	0,849	Valid
X5.1	0,803	Valid
X5.2	0,845	Valid
X5.3	0,868	Valid
X5.4	0,796	Valid
Y1.1	0,777	Valid
Y1.2	0,817	Valid
Y1.3	0,789	Valid
Y1.4	0,755	Valid

Source: Processed Primary Data, 2025

Based on the results of the outer loading analysis in Table 1 above, all indicators in each variable start from the economic variable (X1) : income (X1.1), marketing (X1.2) , and productivity (X1.3) ; institusional (X2) : government support (X2.1), financial institutions (X2.2), and farmer groups (X2.3) ; Technology (X3) : superior seeds/seedlings (X3.1), use of machinery (X3.2), and fertilizers/pesticides (X3.3) ; Government Policy (X4) : subsidies (X4.1), access to credit (X4.2), market prices (X4.3) and agricultural extension officer (X4.4) ; Self-Efficacy (X5) : confidence in managing farming (X5.1), confidence in facing challenges (X5.2), confidence in adopting technology (X5.3) and confidence in sustaining farming (X5.4) ;Interest in Farming (X6) : participation (X6.1), career aspirations (X6.2), prestige (X6.3), and a positive attitude toward rice farming (X6.4) all have an outer loading value of >0.70 and can be concluded that they are qualified and valid.

b. Outer Loading Reliability Test.

Moreover, Validity assessment was conducted using the average variance extracted (AVE) value and reliability based on Cronbach's alpha (CA) and composite reliability (CR). The suggested AVE threshold is above 0.5. It is clear that all AVE values exceed 0.5, indicating that they satisfy the validity criteria based on AVE. Additionally, reliability evaluation was performed using the composite reliability (CR) measure. The recommended CR threshold is ≥ 0.7 . It is evident that all CR values exceed 0.7, confirming that they fulfill the reliability standards based on CR.

Furthermore, reliability testing was performed based on Cronbach's alpha (CA). The suggested CA threshold is greater than 0.7. All CA values are 0.7, which means that they meet the reliability requirements based on Cronbach's alpha, as presented in Table 2.

Table 2. Validity Testing based on Average Variance Extracted (AVE); Reliability based on Cronbach's Alpha (CA) and Composite Reliability (CR) on Reflective Variables / Dimensions (First Order)

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Economic	0,825	0,826	0,895	0,740
Institutional	0,788	0,844	0,876	0,706
Technology	0,850	0,853	0,898	0,689
Government Policy	0,853	0,852	0,911	0,773
Self-efficacy	0,867	0,982	0,897	0,687
Interest in Farming	0,792	0,793	0,865	0,616

Source: Processed Primary Data, 2025

c. Discriminant Validity Test.

Furthermore, Discriminant validity testing was carried out with the Fornell-Larcker approach. Discriminatory validity testing with the Fornell-Larcker criteria is performed by ensuring that the square root value of each construct is greater than its correlation with other constructs. The results of the Discriminant Validity Test can be presented in Table 3.

Table 3. The results of discriminant validity testing.

	Self- efficacy	Economic	Government Policy	Institutional	Interest in Farming	Technology
Self-efficacy	0,829					
Economic	0,321	0,86				
Government Policy	0,601	0,318	0,83			
Institutional	0,469	0,632	0,656	0,84		
Interest in Farmng	0,520	0,594	0,63	0,735	0,785	
Technology	0,490	0,554	0,609	0,628	0,532	0,879

Source: Processed Primary Data, 2025

Based on the table above, the results of the discriminant validity test with the Fornell Larcker criteria show that the discriminant validity in this model has been met.

Based on the results of the discriminant validity test using the HTMT approach, it appears that each value is < 0.9 . Therefore, it can be concluded that it meets the requirements for discriminant validity based on the HTMT approach as presented in Table 4 below.

Table 4. Discriminant Validity Testing: HTMT on Variables/Dimensions

	Self- efficacy	Economic	Government Policy	Institutional	Interest in Farming	Technology
Self-efficacy						
Economic	0,27					
Government Policy	0,629	0,374				
InstitutionalI	0,409	0,815	0,773			
Interest in Farming	0,517	0,733	0,763	0,617		
Technology	0,468	0,66	0,707	0,777	0,646	

Source: Processed Primary Data, 2025

d. Outer Model Evaluation (Measurement Model) on Formative Indicators (First Order).

a. Collinearity Test based on Variance Inflation Factor (VIF).

Next, collinearity evaluation was performed. In the collinearity evaluation, we tested whether there was a strong correlation or relationship between the dimensions. The results of the analysis that have been carried out are as shown in Table 5.

Table 5. Collinearity Evaluation based on Variance Inflation Factor (VIF)

Variable	VIF
X1.1	1,941
X1.2	1,767
X1.3	1,907
X2.1	2,631
X2.2	2,451
X2.3	1,305
X3.1	2,404
X3.2	2,926
X3.3	1,788
X4.1	1,946
X4.2	1,836
X4.3	2,206
X4.4	2,389
X5.1	2,761
X5.2	2,456
X5.3	2,491
X5.4	1,235
Y1.1	1,775

Y1.2	1,897
Y1.3	1,700
Y1.4	1,609

Source: Processed Primary Data, 2025

All VIF values were below 10, indicating an absence of multicollinearity among the variables used in this study.

b. Significance Test of Effect (Boostrapping) (Hypothesis Test) (Inner Model).

Inner model analysis, which can also be called an inner relation, structural model, or substantive theory, describes how hidden factors interact with each other using important ideas from theory. Evaluation of dependent constructs was performed using the R-squared value for the inner model. The results of the analysis that have been carried out are presented in figure 3 below.

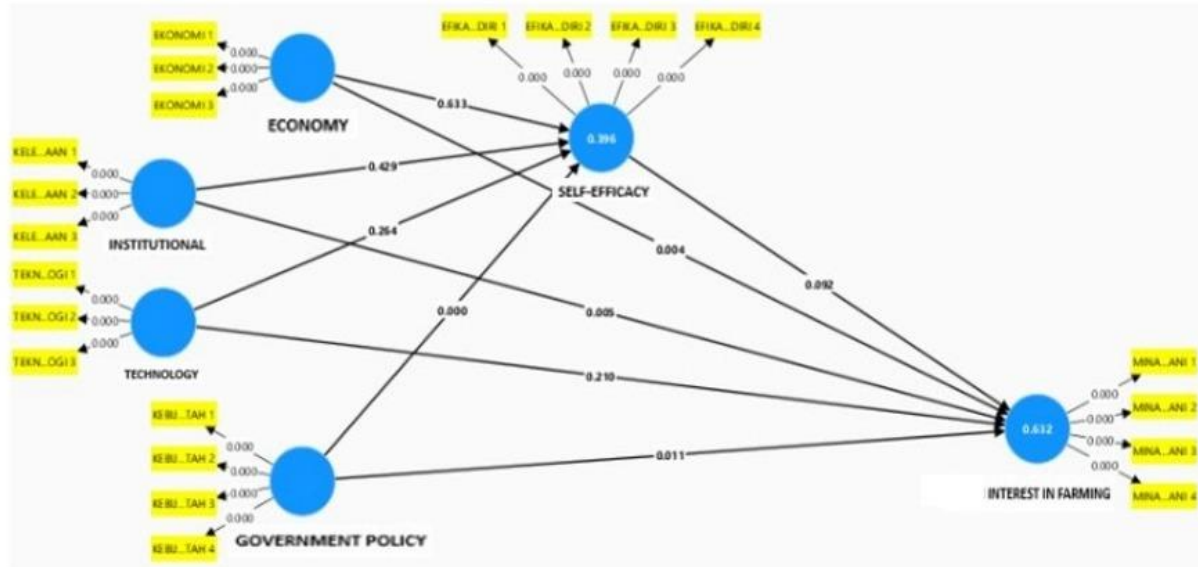


Figure 3. SEM-PLS Model Path Diagram

Source: Processed Primary Data, 2025

Furthermore, the results of the Path Coefficient Test & Significance of Direct Effect analysis are, shown in Table 6.

Table 6. Path Coefficient Test & Significance of Direct Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 -> X5	0,051	0,058	0,107	1,478	0,003
X2 -> X5	0,101	0,113	0,128	2,791	0,009
X3 -> X5	0,126	0,134	0,113	1,116	0,004
X4 -> X5	0,440	0,421	0,107	4,128	0,000
X1 -> Y	0,291	0,289	0,100	2,902	0,004
X2 -> Y	0,400	0,386	0,141	2,832	0,005
X3 -> Y	0,131	0,121	0,105	1,253	0,000
X4 -> Y	0,268	0,276	0,106	2,541	0,011
X5 -> Y	0,122	0,123	0,073	1,688	0,012

Source: Processed Primary Data, 2025

Based on the T-statistic value > 1.96 and P-value < 0.05 (Figure 3 and Table 6), all paths show a statistically significant effect, which means that all direct effect hypotheses and accepted.

c. Indirect Effect.

The mediation effect analysis in this study was conducted to test whether variable self-efficacy could mediate the relationship between variables economic (X1), Institutional (X2), Technology (X3) and

government policy (X4), toward interest in rice farming (Y). The test was conducted through indirect effect analysis using the bootstrapping method. Based on the results of, the results are obtained as presented in Table 7.

Table 7. Testing the Mediation Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 -> X5 -> Y	0,006	0,008	0,017	2,379	0,004
X4 -> X5 -> Y	0,054	0,051	0,033	3,639	0,001
X2 -> X5 -> Y	0,012	0,014	0,021	2,601	0,003
X3 -> X5 -> Y	0,015	0,015	0,017	1,981	0,008

Source: Processed Primary Data, 2025

The table 7 above resents the mediation test results for the self-efficacy variable (X5) on the relationship between the four factors (X1-X4) and interest in farming (Y). A mediation test was conducted using a *bootstrapping* approach on the *indirect effect* model using SEM-PLS. Based on the *T-statistics* value > 1.96 and *P-value* < 0.05, all mediation paths are significant, which means that the mediation hypothesis is accepted on all paths.

The analysis results show that self-efficacy plays a significant mediating role in the relationship between economic, institutional, technological, and government policy variables and interest in rice farming. This is evidenced by all indirect effects having p-values < 0.05, indicating statistical significance. These findings suggest that economic conditions, institutional support, technological development, and government policies do not only directly influence interest in farming but also operate through the enhancement of self-efficacy. Self-efficacy reflects young farmers' confidence in their ability to manage rice farming activities. As self-efficacy increases, become more confident and motivated to engage in agricultural activities. Therefore, self-efficacy can be understood as an important psychological mechanism that strengthens the influence of external factors on interest in rice farming.

DISCUSSION

X1 (Economics) → X5 (self-efficacy) → Y (Interest in rice farming): A coefficient of 0.006 and a T-statistical value of 2.379 (P-value: 0.004) show that economic factors such as income, marketing, and efficiency indirectly affect interest in rice farming through self-efficacy mediation. In the context of rice farming, these economic factors include income from rice production, marketing stability, and activities outside of rice cultivation practice. Therefore, modernization also demands changes in behavior to manage environmental risks due to the intensive use of heavy metals ((Raman et al., 2024). Higher and stable income from rice farming can strengthen the confidence (self-efficacy) of young farmers in managing rice cultivation activities such as land cultivation, planting, and harvesting. Factors such as farmer income and technology support are important determinants for young farmers involved in programs to improve their economic conditions (Poungchompu & Phuttachat, 2023). Policies that support young farmers improve their transition to professional farming; and economic industrialization positively impacts their involvement in agricultural activities (Shen et al., 2023). In particular, economic support related to rice farming, such as input subsidies, rice market access, and price guarantees, plays an important role in increasing interest in rice farming as a sustainable source of livelihood.

Support in agriculture plays a central role in young farmers' choice to stay in the agricultural sector (Nemanzemba et al., 2025). In the context of rice farming, the support includes access to irrigation systems, rice production inputs (seeds, fertilizers), and stable grain market channels. Socio-economic factors also play an important role in the choices and ambitions of young farmers. For young rice farmers, socio-economic conditions such as land ownership, rice cultivation profit rates, and access to rice markets greatly influence their motivation to stay involved in rice farming. The economies of scale of farming are the main drivers of the number of farmers who receive certain support schemes, which again reaffirms the role of economic factors in the effectiveness of policies and the sustainability of young farmers (Sroka et al., 2019). In particular, rice farms with a larger scale and financially viable rice farming tend to benefit more from support schemes, which

ultimately strengthens the self-efficacy of young farmers and encourages their continued involvement in rice farming.

X2 (institutional) → X5 (self-efficacy) → Y (Interest in rice farming): The indirect impact of institutions, especially support from cooperative institutions, financial organizations, and farmer groups on interest in rice farming is shown by a coefficient of 0.012 and a statistical T-value of 2.601 (P-value: 0.003). In the context of rice farming, institutional support includes rice farmer groups, access to services of rice farming institutions, farmer groups and partnership collaboration. Government support such as the New Farmer Development Program and the Smart Young Farmer Program that targets young farmers provide the resources and training needed to achieve success in the agricultural sector (Salvago et al., 2019). This institutional support can increase the self-efficacy of young farmers in managing rice farming. Ensuring that this institutional support is in line with the needs and desires of young farmers is essential to encourage sustainable farming practices and increase interest in rice farming as a profession (Salvago et al., 2019).

Institutional robustness supports access to important resources, such as information, training, and credit, which are important factors in empowering young farmers to innovate and play active roles in agricultural markets (Martens et al., 2023). In the context of rice farming, these resources include training on rice cultivation techniques, access to credit for paddy production, and dissemination of information related to rice markets. Institutions enable collaboration among young farmers and other actors, resulting in socio-innovative and entrepreneurial environments. Working together builds their agricultural capacity and competence (Parga-Montoya & Cuevas-Vargas, 2023). Such collaboration can enhance young farmers' self-efficacy in managing rice farming activities. On the other hand, weak institutional structures have been recognized as obstacles to the interests of young farmers. Experiments indicate that young farmers in most developing nations are disadvantaged by suboptimal institutional support that cannot compare their financial and educational resource needs (Giuliani et al., 2017; Thephavanh et al., 2023). For example, restricted access to farm credit can discourage them from investing in required practices and technologies, and adversely affect their production levels and financial viability (Jakhar & Kait, 2021). In rice farming, limited access to credit and inputs can reduce productivity and weaken young farmers' confidence in managing paddy cultivation.

In addition, local policies and government-created institutional conditions play an important role in influencing young farmers' attitudes towards agricultural practices and the future of the agriculture sector. Efficient extension services, as the core part of agricultural institutions, guarantee knowledge and skill transfer, and farmers' behavioral change in adopting more sustainable agricultural practices (Pradiana & Maryani, 2019). In particular, extension services related to rice farming can strengthen self-efficacy and encourage participation in rice cultivation.

X3 (Technology) → X5 (self-efficacy) → Y (interest in rice farming): The 0.015 coefficient and T-statistic of 1.951 (P-value: 0.008) suggest that technologies such as better seeds, fertilizer/pesticides, and farm machinery make it easier for to be interested in rice farming through self-efficacy. In the context of rice farming, these technologies include improved rice varieties, appropriate fertilizer use for paddy fields, and machinery such as tractors and combine harvesters for rice cultivation. This is evidenced by studies that, apart from stimulating ' interest, mechanization, such as tractors and combine harvesters, has been discovered to boost labor efficiency by a maximum of 80% and reduce the cost of production by nearly 40% (Arianti et al., 2024), thereby enhancing farmers' capabilities and confidence.

Young farmers, especially those exposed to advanced technology, tend to be more efficient and productive, making agriculture a more attractive career path (Kwakye et al., 2021). Such technological adoption can strengthen young farmers' self-efficacy in managing rice farming activities. In addition, the role of Information and Communication Technology (ICT) cannot be underestimated. Evidence indicates that appropriately applied ICTs and mobile platforms in agriculture enhance involvement through provision of information on prices, weather conditions, and agricultural methods (Lantarsih et al., 2023; Mureithi, 2021.). In rice farming, access to such information is crucial for decision-making in planting and harvesting periods.

X4 (government policy) → X5 (self-efficacy) → Y (Interest in rice farming): The coefficient of 0.054 and T-statistic of 3.39 (P-value = 0.001) indicate that government policies such as subsidies, credit facilities, and market price support indirectly influence engagement in rice farming through self-efficacy. In the context

of rice farming, these policies include input subsidies for rice production, access to credit for paddy farming, and price stabilization mechanisms for rice. Government policies promoting the adoption of advanced agricultural technologies can reduce the workload of young farmers, thereby making agriculture more attractive (Karahana et al., 2023). Apart from that, s' motivation to enter the agricultural sector is often driven by external factors, particularly the opportunity to achieve economic stability through government-supported incentive schemes. Government interventions aimed at increasing the use of agricultural technologies have been reported to encourage participation in agriculture (Kwakye et al., 2021). Policy interventions, including generational renewal with targeted support, have been shown to be effective in increasing young farmers' engagement in farm operations (Gkatsikos et al., 2022). . Policies that enhance farmers' awareness of agricultural innovations also play a significant role (Xiao et al., 2019). For instance, training and communication programs aligned with government policies can improve young farmers' business practices and support their success in the sector (Refiswal et al., 2021). Such policy support can strengthen young farmers' self-efficacy in managing rice farming activities.

Besides, efforts to address the long-standing perception of agriculture as an unattractive career are also essential. The modernization of agricultural policies can help reshape farming as a technology-driven and forward-looking profession rather than one associated with outdated and labor-intensive practices (Susilowati, 2016). This perceptual shift can be further reinforced by recognizing young farmers as key agents of change and encouraging their active involvement in the community (Lantarsih et al., 2023).

CONCLUSION

This research indicates that interest in rice cultivation in South Nias Regency remains low, as evidenced by the declining number of farm households annually and the rotting process of the regeneration of farmers. The findings of SEM-PLS testing also indicate that economic conditions, institutions, technology, and government policy play a significant role in influencing the interest of in farming, directly and indirectly mediated by self-efficacy. Self-efficacy was the overall mediator that strengthened the role of the four factors, and hence, low self-esteem, reduced access to capital and technology, and social status were significant barriers for young people to use agriculture as a career choice.

Thus, the decline in the number of farming households is not only due to structural factors, but also to the 's lack of confidence in their own abilities. This study confirms that the sustainability of rice farming can only be achieved through a comprehensive strategy, including improving economic conditions, strengthening institutions, increasing access to technology, formulating sustainable government policies, and developing the self-efficacy of farm to be more confident and proud to be part of the agricultural sector.

Therefore, policy recommendations should focus on strengthening these factors in a sustainable manner. Economic support can be implemented through easier access to capital, guaranteed crop prices, and more profitable farming opportunities for young people. From the institutional aspect, strengthening farmer groups and improving agricultural extension assistance are necessary to provide with better social support and learning opportunities. In terms of technology, greater access to modern agricultural technologies that are easy to understand and suitable for young farmers' needs should be enhanced. Meanwhile, government policies should be more directed toward programs that actively involve in agricultural development. By strengthening economic, institutional, technological, and government policy factors that can enhance self-efficacy, the interest of young people in rice farming in South Nias Regency is expected to increase, thereby supporting the sustainability of rice farming in the future.

Focusing on self-efficacy is important because it plays a key mediator that strengthens the influence of economic, institutional, technological, and policy factors on interest in rice farming. The low self-efficacy reflects the limited confidence of in their ability to manage rice farming, thereby reducing the interest of as a generation of farmer actors to be involved in the rice farming sector even though support is available. Therefore, strategic efforts are needed that focus on increasing self-efficacy through practical training, providing role models for successful young farmers, strengthening the role of extension workers, and increasing access to agricultural technology and information.

REFERENCES

- Adokou, F. A., Dzansi, D. Y., & Onojaefe, D. P. (2024). Ghanaian Farmers' Personal Trait and Agricultural Technology Adoption: Consumer Behaviour Perspectives. *International Journal of Applied Research in Business and Management*, 5(1). <https://doi.org/10.51137/ijarbm.2024.5.1.15>
- Arpai, L. O., & Adnan, R. S. (2023). Institutional Embeddedness in Economic Rice Farmer: A Case Study in Duriaasi Village, Southeast Sulawesi. *International Journal of Social Science and Human Research*, 6(12). <https://doi.org/10.47191/ijsshr/v6-i12-100>
- Bala, Magaji, & Turaki, M. A. (2021). Socio-Economic And Institutional Factors Influencing Acceptance Of Nerica 1 Rice Production Technologies Among Farmers In Gombe State, Nigeria. *Journal of Agripreneurship and Sustainable Development (JASD)*, 4(2).
- BPS. (2023). Hasil Pencacahan Lengkap Sensus Pertanian 2023 Tahap II Edition 2 Kabupaten Nias Selatan.
- BPS. (2024). Hasil Pencacahan Lengkap Sensus Pertanian 2024 Tahap I Edition 1 Kabupaten Nias Selatan.
- Geza, W., Ngidi, M., Ojo, T., Adetoro, A. A., Slotow, R., & Mabhaudhi, T. (2021). participation in agriculture: A scoping review. In *Sustainability (Switzerland)* (Vol. 13, Number 16). MDPI. <https://doi.org/10.3390/su13169120>
- Giuliani, A., Mengel, S., Paisley, C., Perkins, N., Flink, I., Oliveros, O., & Wongtschowski, M. (2017). Realities, perceptions, challenges and aspirations of rural in dryland agriculture in the Midelt Province, Morocco. *Sustainability (Switzerland)*, 9(6). <https://doi.org/10.3390/su9060871>
- Gkatsikos, A., Natos, D., Staboulis, C., Mattas, K., Tsagris, M., & Polymeros, A. (2022). An Impact Assessment of the Young Farmers Scheme Policy on Regional Growth in Greece. *Sustainability (Switzerland)*, 14(5). <https://doi.org/10.3390/su14052882>
- Hair, J. F. ., Hult, G. T. M. ., Ringle, C. M. ., & Sarstedt, Marko. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage.
- Jakhar, B., & Kait, R. (2021). Indebtedness Among Farmers in Haryana State, India. *Economic and Regional Studies / Studia Ekonomiczne i Regionalne*, 14(3), 373–384. <https://doi.org/10.2478/ers-2021-0026>
- Jansuwan, P., & Zander, K. K. (2022). Multifunctional farming as successful pathway for the next generation of Thai farmers. *PLoS ONE*, 17(4 April). <https://doi.org/10.1371/journal.pone.0267351>
- Karahan, M., Abay, C., & Ito, R. (2023). Determining Factors of Retaining Young Farmers in Agriculture: A Case study in Turkey and Japan. *Agris On-Line Papers in Economics and Informatics*, 15(2), 41–54. <https://doi.org/10.7160/aol.2023.150204>
- Khademi-Vidra, A., & Bakos, I. M. (2023). The Impact of Sustainable Education Practices on Food Consumption Behaviours – An Experimental Study of Agrarian School's Students in Hungary. *European Journal of Contemporary Education*, 12(2), 462–479. <https://doi.org/10.13187/ejced.2023.2.462>
- Khanal, A. R., & Regmi, M. (2018). Financial constraints and production efficiency: A case from rice growers in drought prone areas of Indonesia. *Agricultural Finance Review*, 78(1), 25–40. <https://doi.org/10.1108/AFR-07-2016-0068>
- Kwakye, B. D., Brenya, R., Cudjoe, D. A., Sampene, A. K., & Agyeman, F. O. (2021). Agriculture Technology as a Tool to Influence Farming in Ghana. *Open Journal of Applied Sciences*, 11(08), 885–898. <https://doi.org/10.4236/ojapps.2021.118065>
- Lantarsih, R., Fajri, U. N., Hariadi, U., & Perdana, P. (2023). Farmers' Interest in Land Utilization for the Development of Melon Farming with the Drip System: Case Study in Gunung Kidul Regency, Indonesia (pp. 56–65). https://doi.org/10.2991/978-94-6463-160-9_7
- Mardiharini, M., Jamal, E., Rohaeni, E. S., Indrawanto, C., Indraningsih, K. S., Gunawan, E., Ramadhan, R. P., Fahmid, I. M., Wardana, P., & Ariningsih, E. (2023). Indonesian rice farmers' perceptions of different sources of information and their effect on farmer capability. *Open Agriculture*, 8(1). <https://doi.org/10.1515/opag-2022-0200>
- Martens, K., Rogga, S., Hardner, U., & Piorr, A. (2023). Examining proximity factors in public-private collaboration models for sustainable agri-food system transformation: a comparative study of two rural communities. *Frontiers in Sustainable Food Systems*, 7. <https://doi.org/10.3389/fsufs.2023.1248124>

- Mureithi, A. M. (n.d.). International Journal of Current Science Research and Review Sustainable Agricultural Practices among Rural in Kenya: A Study of Attitudes and Behaviours. <https://doi.org/10.47191/ijcsrr/V6-i6-51>
- Nemanzamba, E. N., Maziya, M., & Mathaulula, M. A. (2025). Factors Influencing Participation in Agriculture in Thulamela Local Municipality, Limpopo Province, South Africa. *Journal of Agribusiness and Rural Development*, 76(2), 187–196. [HTTPS://DOI.ORG/10.17306/J.JARD.2025.00012R1](https://doi.org/10.17306/J.JARD.2025.00012R1)
- Orangi, P. N., Nomura, H., & Nyambok, L. O. (2025). Nurturing self-efficacy through inclusivity and support systems: Improving livelihoods of vulnerable farmers via SHEP approach in Kenya. *Scientific African*, 29, e02871. [HTTPS://DOI.ORG/10.1016/J.SCIAF.2025.E02871](https://doi.org/10.1016/J.SCIAF.2025.E02871)
- Parga-Montoya, N., & Cuevas-Vargas, H. (2023). The influence of network ties on entrepreneurial orientation in Mexican farmers: An institutional perspective. *Revista de Administracao Mackenzie*, 24(2). <https://doi.org/10.1590/1678-6971/eRAMR230163.en>
- Poungchompu, S., & Phuttachat, P. (2023). Impact of Participation in Young Smart Farmer Program on Smallholder Farmers' Income: A Propensity Score Matching Analysis. *Research on World Agricultural Economy*, 4(4). <https://doi.org/10.36956/rwae.v4i4.916>
- Pradiana, W., & Maryani, A. (2019). Capacity Strengthening of Extension Institutional in District Level for Farmer Regeneration In Sukabumi Regency. *International Journal of Multicultural and Multireligious Understanding*, 6(5), 427. <https://doi.org/10.18415/ijmmu.v6i5.1084>
- Prescott, M. P., Cleary, R., Bonanno, A., Costanigro, M., Jablonski, B. B. R., & Long, A. B. (2020). Farm to School Activities and Student Outcomes: A Systematic Review. In *Advances in Nutrition* (Vol. 11, Number 2, pp. 357–374). Oxford University Press. <https://doi.org/10.1093/advances/nmz094>
- Raman, R., Das, P., Mandal, S., Vijayan, V., AR, A., & Nedungadi, P. (2024). The impact of Gen Z's pro-environmental behavior on sustainable development goals through tree planting. *Sustainable Futures*, 8. <https://doi.org/10.1016/j.sftr.2024.100251>
- Refiswal, Julianti, E., Supriana, T., & Iskandarini. (2021). Influence of internal and external factors for agripreneurship development in Sumatra Region. *Yuzuncu Yil University Journal of Agricultural Sciences*, 31(3), 551–560. <https://doi.org/10.29133/yyutbd.836181>
- Ruiz Salvago, M., Phiboon, K., Faysse, N., & Nguyen, T. P. L. (2019). Young people's willingness to farm under present and improved conditions in Thailand. *Outlook on Agriculture*, 48(4), 282–291. [HTTPS://DOI.ORG/10.1177/0030727019880189](https://doi.org/10.1177/0030727019880189)
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2023). *Research Methods for Business Students*. (9th ed.) Pearson. <https://www.pearson.com/en-gb/subject-catalog/p/research-methods-for-business-students/P200000010080/9781292402727>
- Saleh, Dr. I. A., Wetik, Dr. I. J. D., & Se.Me, P. (2021). The Effect Of Institutional And Cultivation Innovations On The Performance Of Rice Estate Communities In Purbalingga District, Malang District, And Musi Banyuasin District . *International Journal of Social Science and Economic Research*, 6(7), 1986–1997. <https://doi.org/10.46609/ijsser.2021.v06i07.001>
- Shen, X., Yang, Q., Qiu, T., & Ao, R. (2023). Off-Farm Employment, Outsourced Machinery Services, and Farmers' Ratoon Rice Production Behavior: Evidence from Rice Farmers in Central China. *Agriculture (Switzerland)*, 13(10). <https://doi.org/10.3390/agriculture13101881>
- Sroka, W., Dudek, M., Wojewodzic, T., & Król, K. (2019). Generational changes in agriculture: The influence of farm characteristics and socio-economic factors. *Agriculture (Switzerland)*, 9(12). [HTTPS://DOI.ORG/10.3390/AGRICULTURE9120264](https://doi.org/10.3390/AGRICULTURE9120264)
- Thephavanh, M., Philp, J. N. M., Nuberg, I., Denton, M., & Larson, S. (2023). Perceptions of the Institutional and Support Environment amongst Young Agricultural Entrepreneurs in Laos. *Sustainability (Switzerland)*, 15(5). <https://doi.org/10.3390/su15054219>
- Triyono, Anggi Wiradhani, F., Nur Mila, A., & Nur Habibi, L. (2023). Millennial Generation s Perception on Organic Rice Farming Sustainability in Yogyakarta, Indonesia. *E3S Web of Conferences*, 444. <https://doi.org/10.1051/e3sconf/202344402049>

- Wicaksono, K. P., Kusuma, B. A., Permanasari, P. N., D.P, D. A., Dewi, R. W. K., Ramadhani, M., & Rohman, Ach. A. (2024). The Willingness of Farmers to Adopt Innovations from Farmer-Owned Enterprises (BUMP). *HABITAT*, 35(1), 31–39. <https://doi.org/10.21776/ub.habitat.2024.035.1.4>
- Xiao, D., Niu, H., Fan, L., Zhao, S., & Yan, H. (2019). Farmers' satisfaction and its influencing factors in the policy of economic compensation for cultivated land protection: A case study in Chengdu, China. *Sustainability (Switzerland)*, 11(20). <https://doi.org/10.3390/su11205787>
- Zeweld, W., Van Huylenbroeck, G., Tesfay, G., & Speelman, S. (2017). Smallholder farmers' behavioural intentions towards sustainable agricultural practices. *Journal of Environmental Management*, 187, 71–81. <https://doi.org/10.1016/j.jenvman.2016.11.014>
- Zhang, X., Yang, Q., Al Mamun, A., Masukujjaman, M., & Masud, M. M. (2024). Acceptance of new agricultural technology among small rural farmers. *Humanities and Social Sciences Communications*, 11(1). <https://doi.org/10.1057/s41599-024-04163-2>
- Žmija, K., Fortes, A., Tia, M. N., Šūmane, S., Ayambila, S. N., Žmija, D., Satoła, Ł., & Sutherland, L. A. (2020). Small farming and generational renewal in the context of food security challenges. *Global Food Security*, 26. <https://doi.org/10.1016/j.gfs.2020.100412>