



The Influence Of Socio-Economic Characteristics Of Farmers On The Food Availability Of Farming Households In Warudoyong Sub-District, Sukabumi City

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Received: January 16, 2024

Revised: July 27, 2024

Accepted: September 27, 2024

Published: September 30, 2024

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DOI: [10.29303/jppipa.v10i9.6969](https://doi.org/10.29303/jppipa.v10i9.6969)

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Abstract: Food security is a global, multidimensional issue with social, economic, political and environmental interests. The purpose of this study was to determine the influence of socioeconomic characteristics of farmers on the availability of farm household food in Warudoyong Sub-district, Sukabumi City. This study used descriptive method with quantitative approach. The data collection techniques used in this research are observation, questionnaires, literature, and documentation. The results showed that the socio-economic characteristics of farmers, which include age, education, area of cultivated land, number of dependents, and farmers' income, together have a significant effect on the food availability of farming families with a contribution of 97.8%, while 2.2% is influenced by other variables outside the study. Farmers' age through education has a significant effect on food availability, but farmers' education through income does not have a significant indirect effect. Similarly, the size of cultivated land through income also has no significant effect on family food availability. The direct effect of these factors is greater than the indirect effect, so the income variable is not a significant mediator in the relationship between education and land area on food availability. The implication of this study is that the increasing age of farmers will further reduce the food availability of farming families.

Keywords: Farmer Families; Household Food Availability; Socioeconomic Characteristics.

Introduction

Food security is a multidimensional issue that is global in nature and requires various social, economic, political and environmental interests. Even political interests are often the dominant factor in the decision-making process to determine world food policy (Lang & Heasman, 2015). The realization of food security is not only a concern for poor countries, but also for developing and developed countries. (Hapsari & Rudiarto, 2017). In its development, a country's food policy will have a domino effect on other countries. Therefore, realizing sustainable food security in a country has become the main agenda in various meetings held in various countries and international institutions. As stated at the G20 meeting on June 29, 2021 in Italy, the number of people affected by hunger globally has increased since 2014. According to the

content of the G20 declaration, poverty alleviation, food security and sustainable food systems are key to ending hunger, as well as promoting social cohesion and community development. (republika.co.id (2021, October 20). (G20 foreign ministers concerned about world food security). Poverty causes low purchasing power and is one of the root causes of the increasing prevalence of food insecurity in addition to low agricultural productivity due to low access to land and production inputs, food distribution gaps and weak behavior (knowledge, attitudes and abilities) of food consumption patterns (Aminah, 2015).

One of the instruments to identify the level of vulnerability to food insecurity in the region is by looking at the Food Security and Vulnerability Atlas (FSVA). The FSVA is prepared using nine indicators that represent three aspects of food security, namely food availability, affordability and utilization. Availability

How to Cite:

Gantini, T. ., Dasipah, E. ., Nataliningsih, N., & Rahayu, N. B. (2024). The Influence Of Socio-Economic Characteristics Of Farmers On The Food Availability Of Farming Households In Warudoyong Sub-District, Sukabumi. *Jurnal Penelitian Pendidikan IPA*, 10(9), 6852-6861. <https://doi.org/10.29303/jppipa.v10i9.6969>

itself is the normative ratio per capita to the availability of rice, corn, cassava and sweet potato. Meanwhile, to portray food security in a region, the IKP (Food Security Index) is calculated based on nine indicators representing three aspects of food security, namely food availability, accessibility and utilization (Nugraheny, 2024). IKP becomes a tool in determining regional priorities and program interventions to improve the status of food security in the region (Badan Ketahanan Pangan Kementerian Pertanian, 2019).

In the 2020-2024 Strategic Plan of the Food Security Agency, food development in Indonesia still faces problems both in terms of food supply and demand. From the supply side, the various factors that influence are production and distribution. Meanwhile, from the demand side, various influencing factors include Indonesia's high population growth, food safety due to the use of hazardous materials and/or hazardous chemicals in food. On the other hand, public awareness of healthy living is increasing, increasing demand for food that is easy to process and practically requires innovative food processing, increasing demand for halal food guarantees as public confidence in the food they consume, and the triple burden of malnutrition, namely the problem of malnutrition in children under five years of age, excess nutrition (overweight and obesity), and micronutrient deficiencies which are still quite high in Indonesia (Iptek & Lipi, 2015).

Nationally, in the next five years, agricultural development is directed to support food security, economic growth, including paying attention to the welfare of family farmers and paying attention to the sustainability of agricultural resources. The strategies carried out to maintain food security include: increasing production and productivity of the agricultural sector, increasing the availability of national strategic food and increasing the affordability and utilization of food (Iptek & Lipi, 2015).

According to BPS data in 2021, the population of Indonesia in 2021 is 269,603,400 people and continues to increase (1.49 percent per year). This requires sufficient food supply. Especially with the amount of food consumption from rice sources which is quite high (78.2 Kg/capita/year), the challenge is getting tougher. According to BPS data in 2019, the rice field area reached 7,463,948 ha (BPS, 2021). If using the assumption that all Indonesian people consume rice and productivity is 51.27 Kg/Ha (BPS, 2020), then the need for rice for a year is 21,082,985 tons. Therefore, the government has always placed food security as one of the national development priorities in every stage of the National Medium-Term Development Plan (RPJMN) and in the era of President Jokowi's current administration, achieving food sovereignty is part of the seventh agenda of Nawa Cita

for Indonesia. A country is considered to have good food security if all residents at all times can have access to food in the amount and quality that is suitable for the prerequisites of a healthy, active and productive life (Prihatin, Hariadi, & Mudiyo, 2012).

One of the dimensions of measuring food security is food availability or supply (Ariani & Suryana, 2023; Ramadhan, Prawita, Izzudin, & Amandha, 2021). Nationally, the availability of food originating from rice can be seen from the rice paddy harvest area. Individually, food availability depends on the ability to prepare food at the family level. Several factors influence food availability in farming households, including farmer characteristics. One of the characteristics of farmer households that plays a major role in meeting household food needs is the socio-economic condition of farmers. This condition can illustrate the capacity of farmers in fulfilling their food needs. Farmers as human beings who live in society, have the freedom to interact with the surrounding environment, learn new things, and follow any existing developments, so that it will form the characteristics of farmers associated with the level of competence in farming. Farmer characteristics will reflect the behavior that describes the motivation, personal characteristics (characteristics), self-concept, values, knowledge or expertise carried by someone who performs excellently in farming. The socio-economic characteristics of farmers are relatively many and varied, however, the main ones are farmer age, education level, experience, cultivated area/primary occupation, number of farmer family members and farmer income. These characteristics can describe the ability of farmers to fulfill their food needs (Husaini, 2012).

Warudoyong Sub-district is one of seven sub-districts in Sukabumi City with potential human and natural resources. According to reports, the population in this sub-district was 58,972 people in 2020 with a ratio of 104 (Sukabumi in numbers, 2021), an area whose density ranks second (17%) after Cikole Sub-district. With 330 hectares of paddy fields and 520 farmers, it is an area with potential for agricultural development, especially rice production. According to the 2021 Agricultural Extension Program of Warudoyong Subdistrict, in 2021 the harvest area reached 593 hectares with an average productivity of 6.9 tons/ha, so that assuming the conversion of Harvested Dry Grain to rice 53, 34% (BPS), the availability of rice in 2021 amounted to 2185.1 tons.

Human resources gathered in farmer groups amounted to 17 with cultivating rice paddies covering an area of 234 hectares. Along with the population growth rate which reached 1.09 and along with the rapid conversion of land in Warudoyong Sub-district resulted in the shrinking of farmers' cultivated area. According to

the Warudoyong Sub-district Agricultural Extension Program report, in 2021 there has been a conversion of paddy fields or a reduction in the standard area of paddy fields by 21 ha. Another issue in Warudoyong Sub-district is that the poverty rate is quite high compared to other sub-districts. According to the Sukabumi City Social Service, in 2021 out of seven sub-districts, Warudoyong sub-district is one of two sub-districts with a high poverty rate.

On the other hand, the stunting rate in Sukabumi City is quite high. From the data recorded by the Sukabumi City Health Office (DHO), from January to October 2021 there were around 1,200 stunted children spread across several areas. One of them is dominated by the Warudoyong area, to be precise in Benteng, Sukakarya and Warudoyong Villages. Stunting is a condition of chronic malnutrition with manifestations of growth failure (growth faltering) starting from pregnancy until the child is 2 years old (Safrina, 2020). Data from the Health Office of Sukabumi City in February 2021 with the number of targets measured was 23,651 people, it was found that the highest percentage of stunting was occupied by three villages in Warudoyong Sub-district. Three urban villages in Warudoyong Subdistrict top the list, namely Benteng Village at 20.08%, Sukakarya Village at 15.62% and Dayeuhluhur Village at 15.31%. So it is quite reasonable to examine food availability in the region, because one of the causes of stunting is limited food access. Research conducted by (Saputro & Fidayani, 2020) states that there are three variables that affect food security including the level of income, the price of rice and dummy nutritional knowledge by housewives. There are also four variables that do not affect food security including the number of family dependents, housewife education, oil prices and tempeh prices.

Research by Ogunniyi et al. (2021) found that the value of product sold, education, access to financing, and involvement in government safety net programs have a noteworthy influence on food security among maize farmers in Nigeria. This statement corroborates the findings of Abu & Soom (2016), which identified various constraints, including limited credit access, insufficient land availability, poverty, soil infertility, absence of non-farm income-generating activities, and challenges related to storage and processing. These factors were found to impede the attainment of food security in Benue state, Nigeria.

Furthermore, research conducted by Mariyani et al. (2018) stated that the factors affecting the availability of household food of farmers who are members of food

granaries in Ambarawa District are land area, household income, education level and age of farmers, where the variables of land area and age of farmers have a positive effect, while the variables of education level and household income have a negative effect on the availability of household food of rice farmers who are members of food granaries. Therefore, the researcher wanted to conduct a study with the aim to determine the effect of socio-economic characteristics of farmers on food availability of farmer households in Warudoyong Sub-district, Sukabumi City.

Method

This research uses a descriptive method with a quantitative approach. According to (Sugiyono, 2019), research with quantitative methods is a research method based on the philosophy of positivism, quantitative methods are used in research with a determined population or sample. In addition to the descriptive format, the type of research that will be used in this study is explanatory research or research directed at explaining a situation or situation (answering whether one variable is related to another variable) (Kish, 2017). In this study using the survey method, which is taking a sample of one population and using a questionnaire as the main data collection tool (Rea & Parker, 2014). The exogenous (independent) variables in this study are the socioeconomic characteristics of farmers, which include age, education, cultivated land area, number of family dependents and income. While the endogenous (dependent) variable is the food availability of farming household.

The sampling in this case used a multi-stage random sampling technique, which is a way of sampling using a combination of 2 (two) or more different sampling methods. In the first stage, samples were taken from 3 urban villages that have high poverty rates and are stunting areas. While the second stage of sampling in this study uses simple random sampling, which is a sample taken in such a way that each research unit or elementary unit of the population has the same opportunity to be selected as a sample. Simple Random Sampling, which is a method of selecting a sample size from a population where each member of the population has the same chance and all possible combinations that are selected as samples have the same chance (Sumargo, 2020). The data collection techniques used in this research are observation, questionnaires, literature, and documentation.



Figure 1. Research Procedure

Result and Discussion

Path Analysis

Path analysis is carried out to analyze the pattern of relationships between variables with the aim of knowing the direct or indirect effect of a set of independent variables (exogenous) on the dependent variable (endogenous). Before conducting path analysis, the analysis prerequisite test is first carried out, namely the normality test and the collinearity test.

Based on the results of the normality test, the asymp sig (2-tailed) value is 0.132. Fwhere the value is more than 0.05, so the residual value is normally distributed.

Table 2. Multicollinearity Test

Model	Coefficients ^a				Collinearity Statistics				
	Unstandardized Coefficients		Standardized Coefficients		t		Sig.		Tolerance
	B	Std. Error	Beta		t	Sig.			
1 (Constant)	2.206	.836			2.639	.010			
Farmer age	-.015	.020	-.018	-.747	.457		.401	2.493	
non-formal education	.006	.091	.002	.062	.951		.400	2.501	
Farmer's cultivated area	-1.478	.444	-.071	-3.329	.001		.518	1.930	
Number of family dependents	6.159	.099	.988	61.927	.000		.928	1.077	
Income	4.276E-7	.000	.038	1.781	.078		.510	1.962	

a. Dependent Variable: Household food availability

Based on the multicollinearity test, the tolerance value is greater than 0.10. So, the indication is that there are no symptoms of multicollinearity. Thus, the VIF value means that this value is smaller than 10 so that there is no multicollinearity problem.

Analysis of the influence of farmer age on food availability for farming households in Warudoyong District, Sukabumi City
 One substructural model and correlation matrix between variables

Table 3. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.101 ^a	.010	.000	7.81142

a. Predictors: (Constant), Farmer age

b. Dependent Variable: Availability of family food

Table 4. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1(Constant)	23.333	4,855			4.806	.000
Farmer age	-.081	.081	-.101		-1.000	.320

a. Dependent Variable: Availability of family food

The significance value of the farmer age variable is 0.320, greater than 0.05. This provides an interpretation that the first substructural model regression, namely farmer age, does not significantly influence the food

Table 1. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		100
Normal	Mean	.0000000
Parameters ^{a,b}	Std. Deviation	1.16413911
Most	Absolute	.079
Extreme	Positive	.079
Differences	Negative	
Test Statistic		.079
Asymp. Sig. (2-tailed)		.132 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

availability of farming households. The value of R square is 0.010, indicating that the contribution of farmer age to food availability is 1%, while the remaining 99% is influenced by other variables not included in this research.

Two substructural models and correlation matrix between variables

Table 5. R square value

Model	Model Summary ^b			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.020 ^a	.000	-.010	7.84970

a. Predictors: (Constant), non-formal education

b. Dependent Variable: Availability of family food

Table 6. Significant Values

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	17.910	3.350		5.346	.000
non-formal education	.073	.378	.020	.193	.847

a. Dependent Variable: Availability of family food

The significance value of the farmer's non-formal education variable is 0.847, greater than 0.05. This provides an interpretation that the two substructural model regressions, namely the number of farmers' non-

formal education, do not significantly influence the food availability of farming households. The R square value is 0.00, indicating that there is no contribution from the amount of farmers' non-formal education to food availability, so it is 100% influenced by other variables not included in this research.

Triple substructural model and correlation matrix between variables

Table 7. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.095 ^a	.009	-.001	7.81558

a. Predictors: (Constant), Farmer's cultivated area
 b. Dependent Variable: Availability of family food

Table 8. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1(Constant)	17.527	1.326		13.221	.000
Farmer's cultivated area	1.978	2.091	.095	.946	.346

a. Dependent Variable: Availability of family food

The significance value of the farmer's cultivated area variable is 0.346, greater than 0.05. This provides an interpretation that the third substructural model regression, namely the area cultivated by farmers, does not significantly influence the food availability of farming households. The R square value is 0.009, indicating that the contribution of farmer age to food availability is 0.9%, while the remaining 99.1% is influenced by other variables not included in this research.

Four substructural models and correlation matrix between variables

Table 9. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987 ^a	.975	.974	1.25069

a. Predictors: (Constant), Number of family dependents
 b. Dependent Variable: Availability of family food

Table 10. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1(Constant)	1.062	.311		3.412	.001
Number of family dependents	6.154	.100	.987	61.350	.000

a. Dependent Variable: Availability of family food

The significance value of the variable number of dependents in the farmer's family is 0.000, which is less than 0.05. This provides an interpretation that the fourth substructural model regression, namely the number of dependents of farmers, has a significant effect on the food availability of farming households. The value of R square is 0.975, indicating that the contribution of the number of dependents of farmers to food availability is 97.5%, while the remaining 2.5% is influenced by other variables not included in this research.

Substructural model five and correlation matrix between variables

Table 11. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.192 ^a	.037	.027	7.70475

a. Predictors: (Constant), Revenue
 b. Dependent Variable: Family food availability

Table 12. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1(Constant)	16.461	1.320		12.469	.000
Revenue	2.144E-6	.000	.192	1.939	.055

a. Dependent Variable: Family food availability

The significance value of the farmer income variable is 0.055 which is greater than 0.05. This provides an interpretation that the regression of substructural model five, namely farmer income, does not significantly affect the food availability of farming households. The magnitude of the R square value is 0.037, indicating that the contribution of the effect of farmer income on food availability is 3.7%, while the remaining 96.3% is influenced by other variables not included in this study.

Substructural model six and correlation matrix between variables

Table 13. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766 ^a	.586	.582	1.350

a. Predictors: (Constant), Age of farmer
 b. Dependent Variable: Non-formal education

Table 14. Significant Values

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	-1.136	.839		-1.354	.179
	Age of farmer	.165	.014	.766	11.782	.000

a. Dependent Variable: Non-formal education

Significance value of the farmer's age variable is 0.000 less than 0.05. This gives the interpretation that the regression of substructural model six, namely the age of farmers, has a significant effect on the amount of non-formal education attended by farmers. The magnitude of the R square value is 0.586, indicating that the contribution of the influence of farmer age on the amount of non-formal education is 58.6%, while the remaining 41.4% is influenced by other variables not included in this study.

Substructural model seven and correlation matrix between variables

Table 15. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.003 ^a	.000	-.010	704023.401

a. Predictors: (Constant), Non-formal education

b. Dependent Variable: Revenue

Table 16. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	979227,686	300492,075		3,259	,002
	-1099,499	33889,605	-.003	-,032	,974

a. Dependent Variable: Revenue

Significance value of the variable number of non-formal education of farmers is 0.974 greater than 0.05. This gives the interpretation that the regression of substructural model seven, namely the amount of non-formal education of farmers, does not significantly affect the income of farmers. The magnitude of the R square value is 0.000, indicating that there is no contribution of the influence of non-formal education of farmers on farmers' income, so that 100% is influenced by other variables that are not included in this study.

Model substructural delapan dan matriks korelasi antar variabel

Table 17. R square value

Model	R	R Square	Model Summary ^b	
			Adjusted R Square	Std. Error of the Estimate
1	.689 ^a	.474	.469	510494.751

a. Predictors: (Constant), Farmer's cultivated area

b. Dependent Variable: Revenue

Table 18. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	312165.815	86592.162		3.605	.000
	1284093.311	136582.567	.689	9.402	.000

a. Dependent Variable: Revenue

The significance value of the farmer's cultivated area variable is 0.000 less than 0.05. This gives the interpretation that the regression of substructural model eight, namely the farmer's cultivated area, has a significant effect on farmer income. The magnitude of the R square value is 0.474, indicating that the contribution of the influence of the farmer's cultivated area on farmer income is 47.4%, while the remaining 52.6% is influenced by other variables not included in this study.

Substructural model nine and correlation matrix between variables

Table 19. R square value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.989 ^a	.978	.977	1.19470

a. Predictors: (Constant), Income, Non-formal education, Number of family dependents, Farmer's cultivated area, Farmer's age

b. Dependent Variable: Family food availability

Table. 20 Anova

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	5906.673	5	1181.335	827.667	.000 ^b
	Residual	134.167	94	1.427		
	Total	6040.840	99			

a. Dependent Variable: Family food availability

b. Predictors: (Constant), Income, Non-formal education, Number of family dependents, Farmer's cultivated area, Farmer's age

Table 21. Significant Values

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.206	.836		2.639	.010
Age of farmer	-.015	.020	-.018	-.747	.457
Non-formal education	.006	.091	.002	.062	.951
Farmer's cultivated area	-1.478	.444	-.071	-3.329	.001
Number of family dependents	6.159	.099	.988	61.927	.000
Income	4.276E-7	.000	.038	1.781	.078

a. Dependent Variable: Family food availability

The calculation results from the Coefficients table can show that the path coefficient of farmer age (X1) on the availability of farm family food (Y) is -0.18, farmer education (X2) on the availability of farm family food (Y) is -0.002, farmer cultivated area (X3) on the availability of farm family food (Y) is -0.71, the number of farmer dependents (X4) on the availability of farm family food (Y) is 0.988, farmer income (X5) on the availability of farm family food (Y) is 0.38,

Significance value of 0.000 is smaller than 0.05 so that simultaneously these variables have a significant effect on the food availability of farm families. The magnitude of F count is 827.667 greater than f count (2.31), so that H1 is accepted that the variable age of farmers, farmer education, cultivated area, number of dependents and farmer income together affect the availability of food for farm families. The value of R square is 0.978. This shows that the contribution of the influence of the social and economic characteristics of farmers on the availability of food for farming households is 97.8%, while the remaining 2.2% is influenced by other variables not included in the study.

The effect of age on food availability of farm families through farmer education

It is known that the direct effect of farmer age on food availability of farm families is -0.101 while the indirect effect of farmer age through education is $0.766 \times 0.020 = 0.0153$. The direct effect is smaller than the indirect effect, thus concluding that farmer age through education has a significant effect on the availability of food for farming families. Education provides farmers with new knowledge and skills. The knowledge gained can help farmers improve their agricultural productivity, such as through new, more efficient techniques or more profitable crop diversification (Iqbal, Qarni, & Harahap, 2023). With adequate education, farmers can more easily adapt to environmental or market changes, such as climate change or shifts in consumer demand for certain agricultural products (Purwanti, 2020). The ability to anticipate and adapt to

these changes can help maintain the continuity of food production and availability.

The influence of farmer age on farm family food availability through education is not only reflected in increased productivity and efficiency in farming, but also through key aspects such as increased adaptability to environmental and market changes, better access to the latest agricultural technology and information, and the ability to make smarter investment decisions. With increased education levels, farmers tend to be better able to integrate innovative and sustainable farming practices, increasing resilience to market fluctuations and unpredictable climate change (Anggraini, Sinaga, Loso, Heirina, & Vajri, 2024). Investments in farmer education not only impact current food availability, but also have significant potential to strengthen long-term food security and improve the overall welfare of farming families (Arif, Isdijoso, Fatah, & Tamyis, 2020).

The total direct and indirect effect of farmer's age on food availability of farm families is $-0.101 + 0.0153 = -0.0857$. This means that the age of farmers negatively affects the availability of food for farming families. That the increasing age of farmers will further reduce the availability of food for farming families. This can be caused by deteriorating health conditions with age, which affects farmers' ability to work in the field effectively (Abidin, 2021). This can have a direct impact on agricultural production and food availability.

This research is in line with Mariyani et al. (2018) research which states that the factors affecting food availability of farmer households of food barn members in Ambarawa District are land area, household income, education level and farmer age, where the variables of land area and farmer age have a positive effect.

The effect of education on food availability of farm families through farmer income

It is known that the direct effect of farmer education on food availability of farm families is 0.020 while the indirect effect of farmer education through income is $-0.003 \times 0.192 = -0.000576$. The direct effect is greater than the indirect effect, thus concluding that indirectly farmer

education through income has no significant effect on the availability of food for farm families.

Good education can help farmers understand more efficient farming techniques and effective management practices (Tapi & Makabori, 2024). This can increase farm productivity, which in turn can produce more agricultural produce for self-consumption or sale, increase farm family income, and ultimately increase food availability. Educated farmers are usually better able to understand market requirements, manage market risks, and capitalize on market opportunities (Elizabeth, 2019). They can broaden their market reach, increase their bargaining power in price negotiations, and optimize farm produce sales management. This can increase family income, thereby improving the ability to purchase food and meet food needs.

While education can yield long-term benefits, farming families' economic and social challenges may limit their ability to apply this knowledge to enhance food availability (Prayitno, Hasyim, Subagiyo, Dinanti, & Roziqin, 2022). The results showed that farmer education indirectly through income had no significant effect on the food availability of farmer families. This finding is in line with research conducted by Damayanti & Khoirudin (2016) which states that income and education have a positive effect on food security.

The effect of farmer's cultivated area on the food availability of farming families through farmer's income

It is known that the direct effect of the farmer's cultivated area on the food availability of the farmer's family is 0.95 while the indirect effect of farmer education through income is $0.689 \times 0.192 = 0.132288$. The direct effect is greater than the indirect effect, so it can be concluded that indirectly the area of arable land through farmers' income does not significantly affect the availability of food for farmers' families.

According to Marhaeni & Yuliarmi (2018) land area has a positive correlation with income and food availability. However, these results are highly dependent on farmers' ability to manage their land. When land management is less than optimal, for example in terms of improper fertilization or inefficient irrigation, land productivity can be hampered (Heryani & Rejekiningrum, 2019). As a result, even though the land area is large, the resulting yields may not be optimal. In addition, soil quality is also a crucial factor. Infertile or degraded soil can significantly reduce land productivity, even if the land is large (Nursyamsi, Mulyani, & Las, 2014). Natural factors such as climate change or natural disasters can also affect, which are difficult to predict. This can lead to a decrease in food production and availability.

The results showed that indirectly the area of cultivation through farmers' income did not significantly affect the food availability of farming families. This research is not in line with Prasetyani (2023) research which states that land area has an influence on the food security of rice farming households in Sudimoro Village, Tulung District, Klaten Regency.

Based on the table 19, it can be seen that social and economic characteristics together have an effect on the availability of food for farming families with a coefficient of determination (R^2) of 0.978 at a significance of 0.00, together they have a significant effect on the availability of food for farming families by 97.8%, while the remaining 2.2% is influenced by other factors outside the study. From the results of partial analysis, it was found that the age of farmers did not significantly affect the availability of family food.

In Aminah (2015) research, it was emphasized that productive age plays a vital role in increasing agricultural production. Productive age allows farmers to have more opportunities to engage in farming and strong motivation to adopt new technologies and innovations in farm management (Arvianti, Masyhuri, Waluyati, & Darwanto, 2019). When farm management is done effectively, yields can be optimized, which in turn maintains food availability. In addition, individual experience and motivation also play a crucial role (Savira et al., 2020). Despite their advanced age, if they have extensive farming experience, they can form deep skills and knowledge in managing the farm (Taek, Supriadi, & Taek, 2022). They have gone through a long learning process, relying not only on theory but also practical experience in dealing with various challenges in farming.

Conclusion

Based on the results and discussion, it can be concluded that the socio-economic characteristics of farmers, which include age, education, area of cultivated land, number of dependents, and farmers' income, together have a significant effect on the food availability of farmer families with a contribution of 97.8%, while 2.2% is influenced by other variables outside the study. Farmers' age through education has a significant effect on food availability, but farmers' education through income does not have a significant indirect effect. Similarly, the size of cultivated land through income also has no significant effect on family food availability. The direct effect of these factors is greater than the indirect effect, so the income variable is not a significant

mediator in the relationship between education and land area on food availability.

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