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Increasing the Income of Chili Farmers by Implementation of Internal Company Institution

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ABSTRACT

Chili is an important commodity for daily consumption, and its demand has the potential to increase as the population grows. The centralized location of production and the uncertainty of production quantities cause price disparities, reflecting poor supply management. This study aims to describe the corporate institutions of chili farming, analyze institutional performance, and factors that affect income of farmers. The method used is descriptive quantitative with a sample of 77 respondents taken with the Slovin formula at Gapoktan Bina Tani and Gapoktan Sumber Jaya in Blora. Data were collected through interviews with questionnaires, and multiple linear regression analysis was used to determine influential factors. The results showed that the institutional strengthening program variable (X1), the partnership expansion program (X2), and the economic scale improvement program (X3) had a high average value, meaning that the majority of respondents gave positive responses to the programs implemented. Factors that have a significant effect on chili farming income are variables of education level, length of farming, and amount of production, while variables of age, land area, and company performance have no significant effect on chili farming income. This conclusion indicates the need for institutional development to improve the welfare of chili farmers.

1. INTRODUCTION

Chili is an important and strategic vegetable commodity for the national economy, both red chili and cayenne pepper because it has a considerable contribution to the formation of inflation rates, especially for volatile food inflation (Ryansyah, 2023). Based on analysis of the Bank Indonesia, the weight and frequency of each commodity show that there are four main commodities that contribute to inflation (Hu *et al.*, 2020). First, Red Chili has an inflation rate of 25.33% with a contribution to inflation of 0.15%. Then, Red Onion recorded inflation of 18.42% and contributed 0.09%. Cayenne Pepper with inflation of 13.51% contributed 0.04% to inflation. Finally, Green Chili has an inflation of 25.02% but only contributes 0.01% to national inflation.

Chili consumption in Indonesia is very high and has become a staple for the community, both locally and internationally. With continued population growth, the demand for chili is expected to increase further (Lukas *et al.*, 2023). In 2022, more than half of the total chili production in Indonesia, about 1.48 million tons, will be used for direct consumption by households. The remaining production is mostly used as raw material for the processing industry, while a small portion suffers losses due to leakage, and the rest is used for seeds.

According to the National Socio-Economic Survey (SUSENAS), chili consumption in Indonesian households during the 2002-2020 period fluctuated but overall increased by about 2.7%. Red chili and cayenne pepper consumption tended to be the same, while green chili consumption was less. Red chili consumption increased significantly from 1.42

kg/capita in 2002 to 2.95 kg/capita in 2015, marking an increase of 102.68%. The largest consumption of red chili occurred in 2015, while the lowest occurred in 2003 (Masyitoh, 2023). However, red chili consumption decreased in 2020. According to data from the Central Bureau of Statistics (BPS), large chili production in Indonesia in 2021 reached 1.36 million tons, an increase of 7.62% from the previous year (Marwa *et al.*, 2020).

Meanwhile, data on chili production in Central Java in 2020-2021 according to BPS Central Java is as follows (BPS, 2024). Chili production in Central Java shows significant variations between 2020 and 2021. In total production, large chili increased from 1,662,595 quintals in 2020 to 1,754,340 quintals in 2021. Similarly, the production of cayenne pepper increased from 1,590,990 quintals to 1,849,948 quintals.

In terms of land area, large chili peppers were planted on 22,590 hectares in 2020, with a slight increase to 22,758 hectares in 2021. For cayenne pepper, the land area also decreased from 22,104 hectares in 2020 to 21,093 hectares in 2021. Although the land area of cayenne pepper decreased, its productivity increased significantly, from 71.98 quintal/ha to 87.70 quintal/ha. Some districts show striking changes. For example, large chili production in Magelang increased sharply from 160,867 quintals in 2020 to 291,309 quintals in 2021. However, some areas such as Banyumas and Banjarnegara experienced a decline in production (BPS, 2022).

Chili prices fluctuate due to the market pattern of plummeting prices when production is high and falling prices when production is low, caused by supply issues (Lu *et al.*, 2023). Chili production is concentrated in a few locations and fluctuates monthly, while demand is stable monthly, leading to price disparities. The problem of supply distribution from production centers to other areas exacerbates the price imbalance, coupled with limited capital in the agricultural sector (Mi, 2023). Farmers who have limited capital have to finance themselves because of the difficulty of accessing capital, markets, and technology from outside. Farmers are generally unable to sell their crops directly to big city markets due to limitations in transportation, storage, packaging, and processing (Asir *et al.*, 2023). These limitations encourage farmers to sell their harvest to intermediary traders, which puts them in a stronger bargaining position in determining prices. Farmers usually sell to one trader from the beginning to the end of the harvest, limiting their ability to sell to other traders in the following harvest.

Chili marketing involves many institutions at different levels of the distribution channel. Bank Indonesia proposes a farmer corporation development program with three main pillars: strengthening corporatization, capacity building, and access to financing. Strengthening corporatization aims to increase economies of scale and added value through grouping similar business groups with similar locations and interests (Saptana *et al*., 2023). The Ministry of Agriculture targets to improve farmers' welfare through the farmer corporation program, in accordance with Minister of Agriculture Regulation No. 18/Permentan/RC.040/4/2018. Farmer corporations are economic institutions with most of the capital owned by farmers, as stipulated in the grand design of developing farmer corporations as economic drivers of agricultural areas for farmers' welfare (Harjanto *et al.*, 2022). Through increased economic scale, farms can gain easier access to financing. Strengthening farmer corporations and institutions aims to establish formal and modern institutions such as cooperatives, associations, Farmer-Owned Enterprises (BUMP), and others. Collaboration between farms and business partners along the value chain is encouraged through horizontal and vertical approaches.

This institutional strengthening and cooperation is expected to increase the productivity and economies of scale of farming businesses, as well as provide various benefits, such as increased human resource capacity, access to broader markets, and ease in obtaining financing (Jumiyati, 2019). The farmer corporation program implemented in Blora Kota and Todanan sub-districts, Blora district, has focused on chili commodities since 2021. However, initial observations show that the implementation of the program has not run optimally. Therefore, an in-depth analysis is needed to identify and improve the existing constraints.

The aim of this study is to analyze the extent to which the implementation of corporate internal programs, namely the Institutional Strengthening Program, Partnership Expansion Program, and Economic Scale Enhancement Program, contributes to increasing chili farmers' income. This research seeks to identify key indicators from each program, such as formal institutions, collaboration, technological innovation, and business diversification, that have a significant impact on farmers' income. The findings of this study are expected to provide in-depth insights on the effectiveness of farmer empowerment strategies implemented by corporation and offer policy recommendations to improve welfare of chili farmers through institutional strengthening, partnership development, and economic scale enhancement.

2. RESEARCH METHODS

This research was conducted in two Association of Farmer Groups (Gapoktan): Gapoktan Bina Tani (Purworejo Village, Blora City Subdistrict) and Gapoktan Sumber Jaya (Dringo Village, Todanan Subdistrict) in Blora Regency, Central Java Province. The locations were purposively selected with consideration of the program that prioritizes institutional corporations, especially in chili farming. The number of farmer members in the two farmer groups is 1,016 people. The research was conducted on 4 farmer groups (Poktan) from Gapoktan that cultivate chili plants, with a total of 339 members. The three Poktans are Sumber Rejeki 1, 2, and 3 with a population of 314 people, and 1 Poktan Taruna Muda with a population of 25 people. The sample size (n) was determined based on population size (N) and the margin of error (e) using the Slovin formula (Equation 1).

$$n = \frac{N}{1+N \cdot e^2} \quad (1)$$

With population number of 339 and margin of error 10%, then the required sample size is 77. The total number of sample was distributed into 4 farmer groups based on the number of group member as presented in Table 1.

Table 1. Number of respondent farmers

No.	Farmer Group	Population	Sample Size
1.	Sumber Rejeki 1	66	15
2.	Sumber Rejeki 2	115	26
3.	Sumber Rejeki 3	133	30
4.	Taruna Muda	25	6
	Total	**339**	**77**

The data used in this study consisted of primary data obtained directly from farmers through questionnaires, and secondary data obtained from various sources such as Bank Indonesia of Central Java Province, Blora District Agriculture Office, Central Java Provincial Statistics Agency, and other relevant agencies (Sugiyono, 2014). Data collection techniques include direct observation, interviews, use of questionnaires, and documentation. Observations were conducted by direct observation of the location and object of research, interviews involving key respondents, questionnaires were used to obtain structured written data, and documentation was used to support research information and data (Doyle *et al.*, 2020).

Data analysis is the process of systematically compiling data obtained from filling out questionnaires, field notes, and other materials so that it is easy to understand and the results can be informed to others. This research used descriptive analysis to provide an overview of the object under study based on the data or samples that have been collected. This method uses a closed questionnaire to measure the performance impact of chili farmers. Interviews were conducted with farmers while supporting data was obtained from relevant agencies. The research refers to the Technical Guidelines for the 2022 Corporate Program Guidelines, with stages including identification of initial conditions, program determination, implementation, monitoring, evaluation, and reporting (Sustiawan, 2022).

Multiple linear regression analysis highlights the internal cost, revenue, and income design of the agricultural context. Costs are divided into fixed costs and variable costs, which depend on the amount of production. Receipts are the proceeds of product sales, while farm income is the difference between total receipts and production costs. Gross income is the total income of farmer in one year, while net income is income minus production costs during the production process. Multiple linear regression analysis was used to examine factors affecting farmers' chili business income, including age, education, farming experience, chili land area, chili production, and company performance in corporate development programs. This method helps in determining the possible influence of these variables on farmers' income (Ulma *et al*., 2023).

The *t*-test (partial test) is used to partially test the effect of the independent variable on the dependent variable, assuming the effect of the other independent variables remains, to determine the individual relationship between the independent variable and the dependent variable (MacKinnon *et al.*, 2002). The *F* test (simultaneous test) is to test all independent variables as a whole and simultaneously in a model to determine whether the independent variables jointly

affect the dependent variable (Alita *et al*., 2021). The coefficient of determination (R^2) provides an indication of how far the independent variable can explain the dependent variable. The closer it is to 1, the more information the independent variables provide to predict variations in the dependent variable; lower values indicate limited information from the independent variables to predict variations in the dependent variable.

The independent variables in this study consist of three main programs: Institutional Strengthening Program (X1), Partnership Expansion Program (X2), and Economic Scale Enhancement Program (X3). The Institutional Strengthening Program (X1) is measured through two indicators: the presence of formal institutions (X1.1) that assist farmers in managing their businesses and institutional licensing (X1.2) that supports the legality of farmers' enterprises. The Partnership Expansion Program (X2) includes four indicators: collaboration (X2.1), which reflects partnerships with various stakeholders, contracts (X2.2) indicating the formality of business relationships, market expansion (X2.3) aimed at opening access to new markets, and access to financial institutions (X2.4), which facilitates financial support for farmers. Meanwhile, the Economic Scale Enhancement Program (X3) is measured through six indicators, namely production (X3.1) reflecting yield levels, diversification (X3.2) as a representation of product or business variety, technological innovation (X3.3) demonstrating the adoption of new technologies, land size (X3.4) as an indicator of farm expansion, new ventures (X3.5) for the development of additional businesses, and digital agriculture (X3.6) involving digital technology in agricultural management. The dependent variable in this study is farmers' income from chili cultivation, measured in terms of financial outcomes resulting from the implementation of these programs. This study aims to analyze the extent to which each program and its indicators contribute to increasing farmers' income.

3. RESULTS AND DISCUSSION

Institutionalization is important in the agricultural production system for sustainability. The farmer corporatization program is carried out according to stages: institutional strengthening, increasing economic scale, and collaboration with business institutions. The corporatization program guidelines state that implementation of the program can be carried out in stages from 2021 to 2023 as a pilot project. The corporatization program provides guidance and assistance to farmer groups in the upstream, on-farm, and downstream sectors through technical assistance, training, and infrastructure. Technical training includes production of organic fertilizer from cow manure, digital onboarding for marketing chili and its derivative products, cultivation demonstration plots for curly red chili, establishing cooperatives, production chili powder as derivative products, seeding using greenhouse technology, increasing chili plant productivity, and production media for chili planting (Triastono *et al.*, 2023). Facilities and infrastructure was received to support the program including agricultural demonstration plots, cultivators, drip irrigation, boreholes, water supply towers, and cooperative management equipment.

Strengthening program for farmers' corporate institution is performed through the establishment of formal institutions and obtaining business licenses, such as Joint Business Cooperatives or KUB (*Koperasi Usaha Bersama*) and Consumer Cooperatives. Poktan Taruna Muda formed KUB Taruna Bumi Mandiri in 2019 with 135 members, while Gapoktan Bina Tani Purworejo formed Mustika Jaya Tani Consumer Cooperative in 2020 with 55 members. Regular meetings of the cooperative members are held monthly. Greater economic benefits for farmers can be improved by economic scale of chili farming through expansion of business units, increasing yield and productivity, and technological innovation (Gadanakis *et al*., 2024).

Table 2 shows that over the last 4 years, chili farming in Blora in average harvested 34.9 ha with annual production of 241.58 ton and land productivity of 6,680.86 kg/ha. Based on this data, the acceleration of processed product need to be developed to increase added value and diversify agricultural products, changing the mindset of the agricultural system to be more diverse. One of the interventions is training in making derivative processed products of chili such as chili powder and chili flakes. Expansion of cultivation land for curly chili in the Poktan Taruna Muda from 3 ha to 45 ha should be carried out with the formation of cooperative that houses the cluster in Taruna Muda. In addition, business units have to be established and diversified, such as marketing business units, from the beginning of the cluster formation until the establishment of the cooperative institution. The use of technological innovations, such as ozone machines, is still not optimal due to operational cost constraints. Ozone machines often do not operate every day due to additional costs that must be borne by buyers in the auction system.

Table 2. Increased yield and productivity of chili farmers in Blora

No.	Year	Average harvested area (ha/year)	Average yield (ton/year)	Average productivity (kg/ha/year)
1.	2020	33	195.25	6,286.46
2.	2021	55.25	470.50	8,182.00
3.	2022	34.5	191.50	5,765.23
4	2023	16.83	109.06	6,489.75
	Average	34.9	241.58	6,680.86

Strengthening partnerships with business support institutions and stakeholders increases marketing opportunities for agricultural products and strengthens bargaining position of the farmer. This cooperation includes a commitment to market chilies through direct middlemen, development of marketing networks through the Segari marketplace, contracts with marketplaces, market expansion through e-commerce and social media, and access to financing institutions such as LPDB and BRI through farmer corporate institutions.

The respondents of this study were farmers from two Gapoktan: Bangun Tani in Purworejo Village, Blora Kota Subdistrict, and Sumber Jaya in Dringo Village, Todanan Subdistrict, Blora District, Central Java Province. The locations were purposively selected because they have organized a corporate institutional program, particularly in chili farming, with farmers involved from Tani Mustika Jaya Cooperative and Taruna Bumi Mandiri Cooperative. This activity is an assistance for food cluster development in Blora District, which started in 2021. This assistance follows guidelines that are adjusted to policies, including Regulation of the Minister of Agriculture of the Republic of Indonesia Number 18/Permentan/Rc.040/4/2018 and Guidelines for the 2021 MSME Corporatization Program which emphasize strengthening corporatization, capacity building, and access to financing.

The variable of Institutional Strengthening Program (X1) is measured by 2 statement items. The results of the descriptive statistical analysis of the Institutional Strengthening Program variable (X1) are shown with the frequency of answers to each statement and the average value (mean) presented in Table 3. The analysis showed that respondents tended to agree with the institutional strengthening program, with the highest scores selected being 4 and 5, indicating moderate agreement to agree. The program succeeded in strengthening formal and farming institutions, with an average score of 4.92. In addition, the program also succeeded in improving product quality through certification or licensing, with an average score of 4.77.

Table 3. Frequency of respondents' answers to the chili farming corporation institutional strengthening program (X1)

Variable Indicator	Frequency of Respondent Answers						Total	Mean
	1	2	3	4	5	6		
X1.1 (Formal Institutions)	0	0	0	15	**53**	9	**77**	**4.92**
	(0%)	(0%)	(0%)	(11.69%)	**(68.83%)**	(19.48%)		
X1.2 (Institutional Licensing)	1	0	0	17	**56**	3	**77**	**4.77**
	(1.3%)	(0%)	(0%)	(22.08%)	**(72.73%)**	(3.90%)		

Table 4. Frequency of respondents' answers to the strengthening partnership program with business support institutions (X2)

Variable Indicator	Frequency of Respondent Answers						(mean)
	1	2	3	4	5	6	
X2.1 (Cooperation)	1	0	1	18	**47**	10	**4.82**
	-1.03%		-1.03%	-23.38%	**-61.04%**	-12.99%	
X2.2 (Contract)	1	0	1	13	**53**	9	4.87
	-1.03%		-1.03%	-16.88%	**-68.83%**	-11.69%	
X2.3 (Market Expansion)	1	1	0	16	**53**	6	4.78
	-1.03%	-1.03%		-20.78%	**-68.83%**	-7.79%	
X2.4 (Access to Financial Institutions)	1	0	2	14	**54**	6	4.79
	-1.03%		-2.60%	-18.18%	**-70.13%**	-7.79%	

The variable of Partnership Expansion Program (X2) was measured by 4 statement items, and the analysis results show the frequency of answers and the mean value of each statement (Table 4). The results of the analysis showed that the majority of respondents approved of the program to strengthen partnerships with business support institutions, with the most selected scores being 4 and 5. The program succeeded in adding business partners, expanding access to marketing, and financing, and establishing contracts with other institutions/stakeholders.

The Economic Scale-Up Program variable (X3) was measured by 6 statement items and the analysis results (Table 5) showed success in increasing production capacity, product diversification, land addition, diversification of new business units, and implementation of digital farming. This success is also reflected in the formation of cooperatives that support the company's program objectives.

Table 5. Description of the frequency of respondents' answers to the business scale-up program (X3)

Variable Indicator	Frequency of Respondents' Answers						(Mean)
	1	2	3	4	5	6	
X3.1	1	0	0	4	**58**	14	**5.08**
(Production)	(1.03%)	(0%)	(0%)	(4.19%)	**(75.32%)**	(18.18%)	
X3.2	1	0	0	11	**60**	5	4.87
(Diversification)	(1.03%)	(0%)	(0%)	(14.29%)	**(77.92%)**	(6.49%)	
X3.3	1	3	2	14	**53**	4	4.65
(Technological Innovation)	(1.03%)	(3.90%)	(2.60%)	(18.18%)	**(68.83%)**	(5.19%)	
X3.4	1	6	1	17	**47**	5	4.53
(Land Area)	(1.03%)	(7.79%)	(1.03%)	(22.08%)	**(61.04%)**	(6.49%)	
X3.5	1	2	1	17	**50**	6	4.70
(New Business)	(1.03%)	(2.60%)	(1.03%)	(22.08%)	**(64.94%)**	(7.79%)	
X3.6	1	2	1	10	**58**	5	4.78
(Digital Farming)	(1.03%)	(2.60%)	(1.03%)	(12.99%)	**(75.32%)**	(6.49%)	

The results of the analysis showed that the majority of respondents gave an affirmative response to the business scale-up program, which was marked by the respondents' scores on a scale of 4 and 5. According to them, the corporate program succeeded in increasing production capacity, encouraging product diversification, expanding land, and creating new business units, as well as encouraging the application of digital farming. The program's success indicators have been achieved as planned, supported by the institutions of Taruna Bumi Mandiri Cooperative and Mustika Jaya Tani Cooperative, which are in line with the objectives of the program. Furthermore, the hypothesis in this study was tested using multiple linear regression models. The aim is to obtain a comprehensive picture of the effect of age, education, length of farming, land area, production, and performance on farmers' income in relation to the application of corporate institutions in chili farming. In multiple linear regression analysis, partial analysis is also obtained which can be seen in the t-test. The results of the *t*-test analysis also show the results of non-standard coefficients and standardized coefficients.

The results of the descriptive analysis of 77 data samples (Table 6) showed that there were no problematic data so all data could be used for further analysis. The length of chili farming in the two Gapoktan shows a wide variation, from 1 to 50 years, which is influenced by experience, farming tradition, and economic conditions. The range of land size of chili farmers reflects variations in farm scale and factors such as local policies and land conditions affect the size of land owned. Chili farmer production varies from 100 kg to 2000 kg, influenced by soil conditions, farming techniques, and other factors. The income of chili farmers shows a varied range, from minus IDR 3,716,500 to IDR 35,531,667, influenced by various factors such as land area, production level, market price, and production costs. Negative income is caused by production costs that are greater than income from crops, while high income reflects the ability of farmers to manage agricultural businesses well.

To increase farmers' income, it is important to provide education, training, and technical assistance support related to efficient farming practices, as well as better marketing strategies so that farmers can better manage their businesses. Out of 77 respondents, the majority of farmers in this study had a low level of education, with the majority having a primary school education (75.3%), followed by junior high school (13.0%), and middle level (9.1% high school, 2.6%

Table 6. Descriptive statistical test results

	N	Minimum	Maximum	Mean	Std. Deviation
Age (Year)	77	28	69	50.66	10.873
Education Level	77	1	4	1.39	0.764
Length of Farming Business (Years)	77	1	50	21.03	12.950
Land Area (m^2)	77	200	10,000	2180.97	1422.159
Production (Q) Kg	77	100	2000	684.42	438.918
Performance	77	0	1	0.92	0.270
Income	77	-3,716,500	35,531,667	7,563,183.37	7,571,645.77
Valid N (listwise)	77				

college). The majority of farmers came from Bangun Tani and Sumber Jaya farmer groups with the majority performing in the Champion Farmer Group category (92.2%). The majority of farmers were under 41 years old, with most being over 51 years old, indicating the importance of knowledge transfer from older to younger generations in agricultural practices. This also underscores the relevance of farmer corporation programs to maintain the sustainability of agricultural knowledge and skills.

A good regression model must fulfil classical assumptions such as normal distribution, no correlation between independent variables, no autocorrelation, and no heteroscedasticity. The normality test is carried out using graphic analysis and test statistics, such as histograms and normal probability plots. The test is supported by statistical tests as summarized in Table 7. The test results show that the data is normally distributed, with the sig value in the Kolmogorov-Smirnov test greater than 0.05, which indicates compliance with the normal distribution assumption. Multicollinearity in the regression model was tested using tolerance and VIF values. A tolerance value > 0.1 and VIF < 10 indicates the absence of multicollinearity. In the current study, the tolerance value ranges from 0.500 to 0.665, and the VIF value ranges from 1.503 to 2.001 (Table 8) which indicates that there is no multicollinearity. The autocorrelation test is a randomization test, data that can be tested with a statistical model must be random. The autocorrelation using Durbin-Watson test shows a value of 1.426 which indicates the absence of autocorrelation. Regression that does not contain heteroscedasticity problems indicates that the data is homogeneous or an acceptable model if the data distribution is homoscedastic. Testing the heteroscedasticity of this study using a graph. If it is found that the points spread out not forming a certain pattern, the regression model indicates that there is no heteroscedasticity problem.

Table 7. Normality test results with Kolmogorov-Smirnov

		Unstandardized Residual
N		77
Normal Parameters	Mean	0.0000000
	Std. Deviation	2989260.32388860
Most Extreme Differences	Absolute	.050
	Positive	.049
	Negative	-.050
Test Statistic		.050
Asymp. Sig. (2-tailed)		.200

Table 8. Multicollinearity test results

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Age (Year)	0.542	1.845
Education Level	0.539	1.855
Length of Farming Business (Years)	0.634	1.576
Land Area (m^2)	0.500	2.001
Production (Q) Kg	0.500	2.001
Performance	0.665	1.503

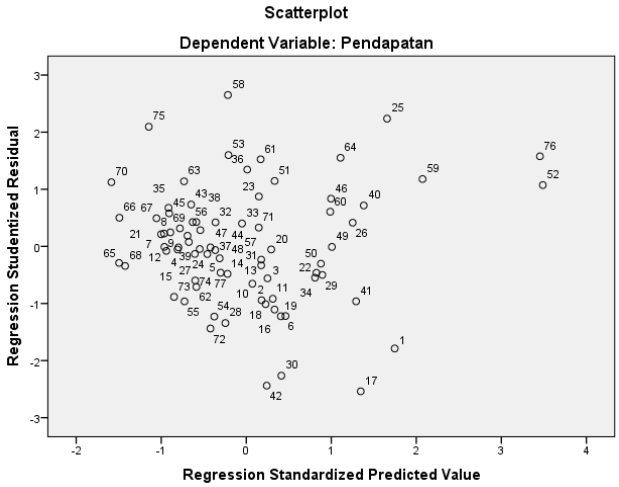

Figure 1. Heteroscedasticity test results

The results of the heteroscedasticity test (Figure 1) in the equation obtained the points spread out not to form a certain pattern, which is not wavy, or lines, indicating that the data is homoscedastic. Thus, the regression model can be continued at the next stage. The size of the coefficient of determination shows the size of the influence of the independent variables on income. The results of the analysis (Table 10) show that the coefficient of determination is 0.831 (Adjusted R^2) or 83.1%, indicating that most of the income can be explained by the independent variables, while the remaining 16.9% is explained by other factors not studied.

The simultaneous influence of the independent variables is evaluated from the results of the *F* test. If the ANOVA test results obtained an alpha (α) value is < 0.05 indicates evidence that there is a simultaneous influence, but if α > 0.05 or *F*-calculate < *F*-table, it indicates the rejection of the simultaneous influence of the independent variables on income. The *F* test obtained a significance value of 0.000 (Table 11), less than the level of α = 0.05. These results indicate that the regression model in the study is feasible or fit, or it can also be said that there is a simultaneous influence of independent variables such as age, education, length of farming, land area, production, and performance on income.

The actual regression test results to answer the research hypothesis is the t-test, if the t count is greater than the t table and the alpha value is less than 0.05 indicates the hypothesis is accepted. The regression analysis results (Table 12) show that the variable education level has a significant impact on farmers' income, with a coefficient of 2,068,455.87 and a significance level of 0.002. This indicates that the higher the level of education a farmer has, the greater the potential income they can earn, as education enables farmers to adopt new technologies and manage their agricultural businesses more effectively. The variable length of farming business also has a significant impact on income, but with a negative direction. The coefficient value of -119,498.29 and a significance level of 0.001 suggest that the longer a farmer has been running their business, the lower their income tends to be. This could be due to challenges such as soil degradation or a lack of innovation over the years.

Table 10. Test results of the coefficient of determination

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Durbin-Watson
1	0.919[a]	0.844	0.831	3,114,737.95	1.426

Table 11. Summary of the *F* test results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,677,954,820,931,009.0	6	612,992,470,155,168.1	63.185	0.000
Residual	679,111,473,582,067.4	70	9,701,592,479,743.8		
Total	4,357,066,294,513,076.0	76			

Table 12. Summary of the *t*-test results

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	β	Std. Error	β		
(Constant)	-8,666,289.64	3,108,943.84		-2.788	0.007
Age (year)	88,750.44	44,627.48	0.127	1.989	0.051
Education level	2,068,455.87	637,326.54	0.209	3.246	0.002
Length of farming business (years)	-119,498.29	34,640.35	-0.204	-3.450	0.001
Land area (m^2)	26.227	355.40	0.005	0.074	0.941
Production Q (kg)	15,100.30	1151.54	0.875	13.113	0.000
Performance	1,062,064.06	1,623,355.45	0.038	0.654	0.515

The factor of production has the most significant impact on income, with a coefficient of 15,100.30 kg and a significance level of 0.000. This finding indicates that an increase in harvest quantity directly and significantly boosts farmers' income. It reflects the importance of focusing on strategies to enhance agricultural productivity to support farmers' livelihoods. Meanwhile, the variable farmer age shows insignificant effect on income, with a significance level of 0.051. Although its coefficient value is positive (88,750.442), this result suggests that age is not a dominant factor influencing income, as it may be offset by other factors such as experience or education. The variable of land area also shows no significant effect on income, with a significance level of 0.941. While it is logical to assume that larger land areas would increase income, this result may indicate inefficiencies in land use or suboptimal practices on larger plots of land. The variable business performance has a coefficient of 1,062,064.061 with a significance level of 0.515, which also indicates an insignificant effect on income. This finding may suggest that the performance indicators used do not fully reflect factors directly related to income growth or that other factors are more dominant in determining farmers' financial outcomes.

In general, the farmer corporation program runs in accordance with corporate guidelines. Farmers have carried out activities in group institutions and legality, have strong leaders/leaders, established sales mechanisms through groups/institutions, are able to produce products that are accepted by the market and have added value (product diversification), are able to increase production, are able to establish partnerships with business support institutions so that corporations are able to become the strength of farmers' economic institutions (Saptana *et al*., 2023).

Based on the performance score, the performance achievement of chili farmer corporations consists of three main indicators (Sembiring *et al*., 2022). First, the implementation of the farmer corporation program with indicators of institutional strengthening succeeded in encouraging the formation of formal institutions and strengthening farming institutions with an average score of 4.92 (moderately agree). The corporate program succeeded in improving product quality and standards through product certification/licensing with an average score of 4.77 (moderately agreed). Second, the implementation of corporate farmer programs with indicators of partnership expansion programs succeeded in adding business partners with an average score of 4.82 (moderately agree), expanding marketing access with an average score of 4.87 (moderately agree), expanding access to financing with an average score of 4.78 (moderately agree), establishing cooperation with institutions and/or other stakeholders with an average score of 4.79 (moderately agree). Third, the implementation of corporate farmer programs with indicators of increasing business scale successfully increase production capacity or productivity with an average assessment score of 5.08 (agree), encourage diversification or increase in added value of products with an average assessment score of 4.87 (moderately agree), adopt new technological innovations with an average assessment score of 4.65 (moderately agree), increase land area with an average score of 4.53 (moderately agree), encourage the formation or diversification of new business units with an average evaluation score of 4.70 (moderately agree), and encourage the application of digital farming on chili farms with an average score of 4.78 (moderately agree).

The results of data analysis (Table 12) show that age has a positive but insignificant effect, education has a positive and significant effect, length of farming has a negative and significant effect, land size has a positive but insignificant effect, production has a positive and significant effect, and company performance has a positive but insignificant effect on farmers' income in the corporate institutional system of chili farmers in Blora Regency.

4. CONCLUSION

Based on the results of research and data processing, it can be concluded that the variables of institutional strengthening program (X1), partnership expansion program (X2), and economic scale improvement program (X3) have a high average value, meaning that the majority of respondents gave positive responses to the programs implemented. Factors that have a significant effect on chili farming income are variables of education level, length of farming, and amount of production, while variables of age, land area, and company performance have no significant effect on chili farming income. This conclusion indicates the need for institutional development to improve the welfare of chili farmers.

Based on the research conclusions, the recommendations are as follows: (1) Strengthen farmer institutions by functioning the corporation as an institution that is an extension of the extension service so that the position of farmers becomes stronger and their welfare increases. (2) Planning the activities of agricultural corporations, starting from land use, setting planting patterns or times, and processing to marketing results so as to achieve efficiency and optimal utilization of the machinery provided. (3) Organize training that reaches more farmers so that their knowledge, skills, and entrepreneurship in managing farmer institutions increase. (4) Seek cooperation with private companies or state-owned enterprises to utilize production or build technology-based processing facilities in an effort to create added value to the products.

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