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THE IMPACT OF AGRICULTURAL AND LIVESTOCK BUSINESS DIVERSIFICATION ON FOOD SECURITY OF FARMING HOUSEHOLDS IN JEPARA REGENCY

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ABSTRACT

This study aims to analyze the impact of agricultural and livestock diversification on the food security of farming households in Jepara Regency, a crucial strategy to mitigate the risk of crop failure while increasing income stability. Using a descriptive quantitative approach through a survey of 120 respondents selected through purposive sampling in four sub-districts, the data were then analyzed using multiple regression and the Food Security Index (IKP). The study findings revealed that integration between the agricultural and livestock sectors significantly improved household food security, as evidenced by a 34.7% increase in the IKP score compared to households with a single business. This increase was driven by diversified income sources, independent food availability, and stronger economic stability. Therefore, this study recommends the need for local government policy support to expand the adoption of integrated farming systems in the Jepara region.

Keywords: *business diversification, food security, farming households, integrated farming, Jepara*

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INTRODUCTION

Food security plays a crucial role as a key pillar of national development. Therefore, ensuring a healthy, active, and productive life for the community requires optimal efforts to maintain food security. According to Law Number 18 of 2012, the essence of food security encompasses ensuring food availability from the national level down to the individual level, meeting comprehensive standards; not only sufficient in quantity and quality, but also ensuring safety, nutritional diversity, affordability, and equitable distribution (BKP, 2020). Furthermore, this fulfillment must align with religious values, beliefs, and local culture to create a sustainable food system.

Jepara, a regency in Central Java Province, boasts significant agricultural potential. This is supported by the 42,310 hectares of agricultural land in Jepara, with rice, corn, cassava, and soybeans as the primary crops (BPS Jepara, 2022). However, the food security of farming households in Jepara remains highly vulnerable. This is due to farmers relying solely on a single agricultural commodity for their income.

Furthermore, the agricultural diversification strategy is a land management strategy that combines various types of crops and livestock within a single farming system. However, this approach has been proven to improve food security in various rural areas in Indonesia. This is supported by research conducted by Susilowati (2016) in East Java, which showed that farmers who

implement business diversification have a 28% higher level of food security than farmers who operate monocultures. Furthermore, according to Ashari and Saptana (2018) in Central Java, who confirmed that the combination of food crop farming and livestock farming can stabilize household incomes throughout the year.

Therefore, the integration of agriculture and livestock farming is the most common form of diversification found in rural Java. Furthermore, livestock manure can be used as organic fertilizer for plants, while agricultural waste such as rice straw and bran can be used as animal feed (FAO, 2020). This is why this integrated farming system is known as an integrated farming system, which offers multiple benefits both ecologically and economically.

The urgency of this research is based on the limited empirical studies that specifically examine the correlation between integrated agricultural-livestock diversification and household food security in Jepara Regency. To date, the available literature tends to be generalistic, thus failing to capture the unique socio-economic characteristics and local agroecological typology that characterize the region. Therefore, this study aims to fill this gap by presenting a comprehensive analysis of the tangible contribution of business diversification to strengthening food security at the local farming household level.

This comprehensive study was designed to identify diversification patterns between the agricultural and livestock sectors at the household level in Jepara Regency, while simultaneously evaluating their food security status using the Food Security Index (IKP) approach. Furthermore, this study aims to examine the significant impact of these business diversification strategies on household food security stability, in order to provide a comprehensive picture of the effectiveness of agricultural-livestock integration in improving farmer welfare in Jepara Regency.

Based on this background, this study aims to comprehensively examine the agricultural and livestock diversification patterns implemented by farming households in Jepara Regency and evaluate their level of food security using the Food Security Index (IKP). In addition to measuring the impact of the integration of these two sectors on household food security, this analysis also aims to identify various determinants that moderate the relationship between diversification strategies and the achievement of sustainable food security.

RESEARCH METHODS

Research Design and Location

This research uses a descriptive quantitative approach with a survey method. The research locations were purposively selected in four sub-districts in Jepara Regency: Batealit, Bangsri, Keling, and Donorojo. These four sub-districts were selected based on the consideration that these areas are centers of agricultural production and have a relatively high livestock population compared to other sub-districts in Jepara.

Population and Sample

The population in this study was all farming households that owned food crop farming businesses and/or livestock businesses in four selected sub-districts. Based on data from the Jepara Regency Agriculture Service (2024), the number of farming households in the four sub-districts was 4,820 families. Sampling was carried out using a purposive sampling technique with the following criteria: (1) the head of the family or family members had been actively farming for at least two years; (2) had agricultural land of at least 0.25 hectares; and (3) were willing to be respondents. Based on the Slovin formula calculation with a 9% error rate, a sample size of 120 respondents was obtained.

Data Collection Techniques

Data collection for this study was conducted through structured interviews using questionnaires that had been tested for validity and reliability. The data collected included: (a) household socio-economic characteristics; (b) types and scales of agricultural and livestock businesses; (c) household income from various sources; (d) food consumption patterns; and (e) perceptions of food security. In addition to interviews, secondary data were collected from BPS, the Department of Agriculture, and relevant policy documents.

Variables and Measurement

This study places household food security as a dependent variable quantified through the Food Security Index (IKP) adapted from Purwaningsih et al. (2015), which includes the dimensions of food availability, accessibility, utilization, and stability with a score range of 0 to 100. On the other hand, business diversification is positioned as the main independent variable measured using the modified Herfindahl-Hirschman Index (IHH), where a value close to 0 represents a high level of diversification, while a value close to 1 indicates a monoculture pattern. To strengthen the accuracy of the analysis model, this study also controls a number of crucial variables such as land ownership area, total income, dependency burden in the family, education level of the head of the family, and the intensity of access to agricultural extension services.

Data Analysis Methods

The approach in this study uses three approaches: (1) descriptive analysis to describe the characteristics of respondents and business diversification patterns; (2) calculation of IKP to determine the level of food security; and (3) multiple regression analysis to test the effect of business diversification on food security by controlling for other variables. Before the regression analysis was carried out, classical assumption tests were first carried out including normality, heteroscedasticity, and multicollinearity tests. Data processing was carried out using SPSS software version 25.0 and Microsoft Excel.

RESULTS AND DISCUSSION

Respondent Characteristics

The respondent profile was dominated by men (67.5%), with an average age of 48.3 years, considered productive but mature. In terms of education, the majority of farmers had primary and secondary education, with 42.5% having an elementary school degree and 33.3% having a junior high school degree. Although their land holdings were relatively small, averaging 0.68 hectares (0.25-2.5 ha), the respondents possessed social capital in the form of 18.7 years of extensive farming experience. This extensive experience reflects independence in mastering techniques and managerial skills, which are crucial for the sustainability of farming management in Jepara Regency.

Agricultural and Livestock Business Diversification Patterns

The survey results showed that the majority of farmers, 78 respondents (65.0%), had adopted a diversification strategy through the integration of food crops and livestock subsectors. In this integration practice, beef cattle were the most dominant livestock commodity raised (38.5%), followed by goats or sheep (31.4%) and poultry (25.6%). Specifically, the most commonly implemented business combination patterns in the field were rice-corn-cattle (34.6%) and rice-cassava-goats (28.2%). On the other hand, the remaining 42 respondents (35.0%) were identified as still maintaining a monoculture business system of food crops without involving livestock components as an additional source of income.

The analysis revealed a striking contrast in the level of farm concentration, with the diversified group recording an average Herfindahl-Hirschman Index (IHH) of 0.38, significantly lower than the monoculture group's 0.89. This significant difference in IHH values confirms that diversified farmers have a more variable and distributed business portfolio. This strategic move was primarily driven by the urgency of mitigating the risk of crop failure (45.2%), efforts to increase income (38.7%), and optimizing the use of family labor (16.1%) to ensure the economic stability of farming households.

Level of Food Security of Farming Households

Analysis of the Food Security Index (IKP) revealed that the average collective score of respondents was 62.4. Distributively, the food security conditions of the sample showed significant variations: the majority of households were at the level of being fairly food secure at 40.8% (49 respondents) and the food secure category at 20.8% (25 respondents). However, disparities were still found that need attention, where 26.7% (32 households) were identified as being in a food vulnerable condition, while the remaining 11.7% or 14 households were still classified as not being food secure .

Comparative analysis based on business status shows a significant disparity in the Food Security Index (IKP) between the two household groups. Households implementing business diversification recorded an average IKP of 71.3, far exceeding the monoculture group which only reached 47.8, with a difference of 23.5 points which was proven to be statistically significant ($p < 0.01$). Specifically, the food stability dimension was the most crucial differentiator with a gap of 28.6 points, which confirms that diversification of livelihood strategies plays a vital role in maintaining the consistency of household food access, particularly in mitigating food insecurity during seasonal fluctuations or lean periods.

Impact of Business Diversification on Food Security

Based on the results of multiple linear regression analysis, the validity of the model was confirmed with an F-value of 24.37 ($p < 0.001$) and a coefficient of determination (R^2) of 0.681. This finding indicates that the independent variables in the model simultaneously explain 68.1% of the variation in the Food Security Index (IKP), while the remainder is influenced by other factors outside the study. The accuracy of this model's estimation is also supported by the fulfillment of all classical assumption tests, including normal data distribution, the absence of heteroscedasticity symptoms, and *a Variance Inflation Factor* (VIF) value that is consistently below the threshold of 10, so that the model is declared free from multicollinearity problems.

Furthermore, based on the coefficient of the business diversification variable (measured by 1-IHH), it shows a positive and significant value ($\beta = 18.43$; $p < 0.001$), which means that every one unit increase in the diversification index increases the IKP score by 18.43 points. This shows that this result is consistent with the findings of Ashari and Saptana (2018) who concluded that business diversification is one of the most important factors in establishing food security for farming households in rural Java.

Furthermore, the results show that total household income also has a significant positive effect on the IKP ($\beta = 0.0023$; $p < 0.05$). This indicates that the higher the income earned from diversified businesses, the better the household's access to diverse and nutritious food. This finding aligns with the food security theory proposed by Maxwell and Smith (1992), which states that economic accessibility is one of the main pillars of food security.

Furthermore, the land area variable had a positive but insignificant effect ($\beta = 3.12$; $p = 0.09$), indicating that land area is not a primary determinant of food security if business management is not diversified. This finding is interesting because it suggests that the quality of business management is more important than the quantity of land resources. Meanwhile, access to

agricultural extension had a significant positive effect ($\beta = 5.67$; $p < 0.05$), underscoring the importance of field extension workers in assisting farmers in adopting integrated agricultural practices.

Therefore, the findings of this study indicate that diversification into the livestock sector, in particular, makes a significant contribution to food security through two main mechanisms. First, livestock provides a source of animal protein that can be directly consumed by household members, thereby improving family nutritional quality. Second, proceeds from livestock sales serve as living savings that can be withdrawn at any time when food needs increase or food prices spike, thus strengthening the stability dimension of household food security.

CONCLUTION

Based on the research results and discussions that have been described, several conclusions can be drawn as follows:

The majority of farming households in Jepara Regency, 65.0%, have adopted a business diversification strategy by integrating the food crop and livestock sectors, particularly through rice-corn-cattle and rice-cassava-goat combination schemes. Despite these steps, food security in the region still faces significant challenges; data shows that only 40.8% of households are classified as sufficiently food secure, while the remaining 38.4% remain vulnerable or insecure. This phenomenon indicates that while diversification practices are commonplace, their effectiveness in ensuring comprehensive food availability still requires further strengthening.

Empirically, business diversification has been shown to provide a significant positive contribution, with households implementing this system having an average Food Security Index (IKP) score 34.7% higher than those using monoculture. This success is driven by mechanisms for increasing income, providing independent sources of animal protein, and creating household economic stability. To optimize this potential, strategic policy interventions are needed from the Jepara Regency Government, particularly in strengthening extension services, expanding access to capital, and providing intensive mentoring for farmers to adopt a more efficient and sustainable integrated farming system.

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