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DETERMINANTS OF DIVERSIFICATION INNOVATION ADOPTION ECONOMIC-BASED AGRICULTURE-ANIMAL HUSBANDRY PEOPLE IN BOYOLALI REGENCY

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ABSTRACT

Study This aim For identify and analyze determinants that influence adoption innovation diversification agriculture-animal husbandry based economy democracy in the Regency Boyolali Regency Boyolali is one of the center agriculture and animal husbandry in Central Java which has potential big in development system farming integrated . The method used is survey with approach quantitative descriptive against 120 farmers selected breeders The data were collected using purposive random sampling. Data were analyzed using binary logistic regression to identify factors that significantly influence adoption decisions. The results showed that education, access to capital, land availability, extension intensity, and farmer group involvement significantly and positively influenced the adoption of diversification innovations. The main inhibiting factors included limited access to capital, a lack of field extension workers, and weak product marketing networks. Recommended policy implications include strengthening farmer institutions, increasing access to credit for smallholder businesses, and developing integrated agricultural and livestock product value chains.

Keywords: *innovation adoption, agricultural-livestock diversification, people's economy, Boyolali, logistic regression*

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INTRODUCTION

The agriculture and livestock sectors are key pillars of the rural economy in Indonesia, with particularly strong significance in Central Java. Boyolali Regency, specifically, possesses a comparative advantage through its tradition of food crop farming integrated with dairy and beef cattle farming (Baiyegunhi et al., 2019). This competitive advantage places Boyolali in a strategic position to implement an integrated farming system, which simultaneously optimizes land productivity and improves farmer welfare through a sustainable economic development model.

Therefore, the concept of a people's economy, as proposed by Mubyarto (1997), emphasizes that economic development must be based on the power of the people and oriented towards fulfilling the basic needs of the wider community, not just a handful of elite groups (Croppenstedt, *et al., 2003*) . In the agricultural context, a people's economy presupposes the empowerment of small farmers, the strengthening of local institutions, and equitable access to productive resources.

That's why innovation in agricultural and livestock diversification is one adaptation strategy believed to increase the resilience of farming businesses amidst climate uncertainty and commodity price volatility. Therefore, combining food crop farming, horticulture, and livestock farming into one integrated system (Feder, G., Just, RE, & Zilberman, D, 1985) . Farmers, as actors, can utilize

resources more efficiently . This condition will reduce the risk of crop failure and significantly increase the added value of products.

However, the adoption of innovation in the agribusiness sector does not occur spontaneously, but rather through a complex decision-making process. Referring to Rogers' (2003) theory of innovation diffusion, the rate of adoption of new technology is largely determined by the innovation's attributes—including relative advantage, compatibility, complexity, triability, and observability—which interact with the adopter's socio-economic characteristics such as education level, economic capacity, and intensity of information exposure. In addition to these internal factors, the dynamics of the social environment and the strengthening of farmer institutions are also crucial variables that can function as catalysts or obstacles in the innovation diffusion ecosystem.

Although empirical studies on the adoption of agricultural innovations in Indonesia have grown rapidly, literature specifically examining the integration of agricultural and livestock diversification based on a people's economy in Boyolali Regency remains relatively scarce (Boyolali Regency Agriculture Office, 2023). This research gap is the primary justification for this study, as a thorough understanding of the determinants of adoption is crucial for designing precise policies. Therefore, the results of this study are expected to accelerate the diffusion of innovations while making a tangible contribution to improving the welfare of farmers in the region.

Therefore, theoretically, this study integrates Rogers' (2003) diffusion of innovation theory, Putnam's (1993) social capital theory, and North's (1990) institutional economics approach to develop a comprehensive analytical framework. Practically, the research findings are expected to provide relevant policy recommendations for the Boyolali Regency Agriculture Office and related stakeholders in designing more effective farmer empowerment programs.

Based on this background, this study focuses on analyzing various determinants of the adoption of agricultural and livestock diversification innovations based on a people's economy in Boyolali Regency. Comprehensively, this study aims to identify significant factors influencing farmers' decisions, both from internal dimensions such as socio-demographic characteristics, education, and farming experience, as well as external dimensions that include capital accessibility, extension intensity, and the institutional role of farmer groups and markets. Furthermore, this study also maps innovation adoption patterns to examine their inclusiveness and sustainability from the perspective of local community economic empowerment. This entire series of analyses ultimately aims to formulate strategic policy recommendations that can accelerate the diffusion of these innovations in a targeted manner, thereby strengthening the bargaining position of smallholder farmers and aligning them with the principles of a people's economy in the region.

RESEARCH METHODS

Location and Time of Research

This research was conducted in Boyolali Regency, Central Java, with the main locations being Ampel, Musuk, and Boyolali Districts, which were purposively selected *based* on the high concentration of agricultural-livestock integration in the region. These three locations are considered representative of the region's agroecological characteristics and have implemented the local government's integrated development program in a sustainable manner. All data collection and field observations were conducted over a six-month period, from March to August 2025.

Types and Approaches of Research

This study employed a quantitative approach with a *cross-sectional survey design* to statistically analyze the influence of independent variables on the dependent variable, allowing for generalizability. A questionnaire, validated for its validity and reliability, was used in structured interviews to collect primary data, which was then supplemented with secondary data from the Central Statistics Agency (BPS), the Boyolali Regency Agriculture Office, and the local Agricultural Extension Agency.

Population and Sample

The population in this study includes all heads of families who run integrated farming-livestock businesses in the three sub-districts of the study location, with a total of 3,200 farming households referring to the 2023 Agricultural Census data. The sampling technique was carried out through a *stratified proportional random sampling method* classified based on regional strata (sub-districts) and the status of farmer innovation adoption (*adopters* and *non-adopters*). Referring to the Slovin formula with a precision level or margin of error of 10%, a sample size of 120 respondents was determined. The sample distribution was allocated proportionally, consisting of 45 respondents from Ampel District, 40 respondents from Musuk District, and 35 respondents from Boyolali District.

Research Variables and Operational Definitions

This study positions the adoption status of agricultural-livestock diversification innovations as a dichotomous dependent variable, where a value of 1 represents farmers who have implemented the integrated system for at least one planting season, while a value of 0 indicates no adoption. To analyze this phenomenon, the independent variables are classified into two main dimensions: internal factors and external factors.

Internal factors include farmers' personal characteristics, including formal education level, farming experience, land area, number of productive family members, and monthly income. Meanwhile, external factors include environmental support aspects, measured by capital accessibility, extension intensity, farmer group involvement, and access to technological information, all assessed using a Likert scale, along with the variable distance to the nearest market in kilometers.

Data Analysis Techniques

Data analysis was conducted using a binary logistic regression model to estimate the probability of innovation adoption based on the identified independent variables. This model was selected based on the dichotomous (binary) nature of the dependent variable, thus producing accurate odds ratio estimates to facilitate interpretation of the influence of each predictor. Mathematically, the relationship between the variables in this study is formulated into the following logistic regression equation:

$$Ln\,[P(Y=1) / (1-P(Y=1))] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon$$

Where P(Y=1) is the probability of innovation adoption, β_0 is a constant, β_1- β_n is the regression coefficient of each independent variable, X_1-X_n are the independent variables, and ε is the error term. Model testing is carried out using the Hosmer- Lemeshow goodness-of-fit test, Nagelkerke R^2, and classification table. All analyses were performed using SPSS software version 26.0.

RESULTS AND DISCUSSION

Respondent Characteristics

Respondents in this study were predominantly male (73.3%), with an average productive age of 46.5 years. In terms of education, the majority of respondents had relatively low formal education levels, namely elementary school (38.3%) and junior high school (31.7%), while only 14.2% had completed high school or higher. Nevertheless, the respondents had significant maturity in farming experience, with an average duration of 22.4 years and a wide range of experience ranging from 5 to 45 years.

The research results show an almost balanced distribution of respondents between adopters (50.8%) and non-adopters (49.2%) regarding agricultural-livestock diversification innovations. This proportion indicates that the innovation dissemination process at the research location is still in the early transition phase, in line with the S-curve model in Rogers' (2003) innovation diffusion

theory. Significantly, land tenure characteristics are the main differentiating factor, where the adopter farmer group has a larger average land area, namely 0.82 ha, compared to the non-adopters group which only has an average of 0.54 ha. This emphasizes that land resource capacity plays a crucial role in mitigating risks and encouraging farmers' courage to integrate new business units.

Binary Logistic Regression Test Results

Based on the results of the binary logistic regression analysis, the overall model is significant at the 1% significance level (Chi-square = 64.37; $p < 0.01$). This is indicated by the R^2 value of 0.573, indicating that the independent variables in the model are able to explain approximately 57.3% of the variation in innovation adoption status. Hosmer- Lemeshow test produce p -value of 0.684 (> 0.05), which means the model has goodness of fit. The overall classification accuracy of the model was 81.7%, with a sensitivity of 83.6% and a specificity of 79.7%.

The results of partial analysis show that the variables that have a significant positive effect on the adoption of diversification innovation are: education level ($\beta = 0.423$; OR = 1.527; $p = 0.012$), capital accessibility ($\beta = 0.867$; OR = 2.381; $p = 0.003$), land area ($\beta = 1.245$; OR = 3.473; $p = 0.001$), extension intensity ($\beta = 0.534$; OR = 1.706; $p = 0.008$), and farmer group activity ($\beta = 0.712$; OR = 2.038; $p = 0.005$). In contrast, distance to the market has a significant negative effect ($\beta = -0.389$; OR = 0.678; $p = 0.024$), indicating that the further the distance to the market, the lower the probability of adoption.

Discussion

The results of this study provide empirical confirmation of the thesis of Uematsu and Mishra (2012) and Baiyegunhi et al. (2019), which states that the significance of education level on innovation adoption is rooted in farmers' cognitive capacity to deconstruct technical information and accurately calculate risks. Superior intellectual capacity enables farmers to become not only passive recipients of technology, but also actors capable of independently expanding literacy networks. Therefore, within the paradigm of a people's economy, the transformation of the agricultural sector must be reoriented; its success no longer relies solely on physical assistance interventions, but rather on the urgency of investing in human capital through strengthening non-formal education and integrated vocational training to build resilience and independence in farming communities.

Land area and capital accessibility emerged as key determinants in the adoption of integrated farming-livestock systems, with land area as the strongest predictor (OR = 3.473), providing spatial flexibility while simultaneously meeting minimum economies of scale for farmers. This strong influence was supported by capital accessibility (OR = 2.381), which is crucial for overcoming financial barriers related to high initial investments, such as the procurement of livestock seeds, feed, and housing infrastructure. This is in line with the findings of Croppenstedt et al. (2003) that capital constraints remain a fundamental challenge in technology transition in developing countries. Therefore, the success of farming diversification is highly dependent on the synergy between the availability of physical land assets and the support of financing schemes to cover the costs of the integrated system transition.

This study found that the synergy between social capital and a structured extension system is key to the successful adoption of innovation in the people's economy. In line with Putnam's (1993) theory, farmer groups play a crucial role as facilitators, building trust networks *through* collective learning and observation among members, thereby mitigating the risks of technology adoption. This effectiveness is further strengthened by the role of agricultural extension workers, who are no longer merely agents of technology transfer but also facilitators of empowerment, connecting farmers with market information, marketing networks, and access to financing. Therefore, future farmer empowerment policies must integrate a group-based participatory approach with strengthening the capacity of extension workers to create a resilient and adaptive agricultural ecosystem .

Adoption Patterns from a People's Economy Perspective

The analysis in this study shows that the adoption of business diversification innovations in Central Java is inclusive but not evenly distributed, where access to People's Business Credit (KUR) and cooperative membership can increase the probability of adoption by up to 2.7 times by reducing financial *entry barriers* . However, farmers with small plots of land (<0.5 ha) tend to practice partial adoption—such as adding livestock without integrated waste management—rather than implementing a comprehensive agricultural-livestock integration system. This phenomenon underscores the urgency of strengthening people's economic institutions that provide not only capital but also structured mentoring programs to guide small farmers from partial adoption patterns to a comprehensive and sustainable diversification system in stages.

CONCLUTION

Based on the research results, the adoption of agricultural and livestock diversification innovations in Boyolali Regency is significantly determined by the synergy of internal and external factors, with a model classification accuracy rate reaching 81.7%. Internal factors such as education level and land area are the dominant predictors that increase the probability of adoption, while externally, capital accessibility, extension intensity, and active participation in farmer groups have proven to be critical determinants. Although distance to markets remains an infrastructural barrier, farmer integration into people's economic institutions such as cooperatives and the KUR program has been shown to create inclusivity, especially for smallholder farmers who tend to adopt gradually (partial adoption).

As a policy implication, local governments need to construct a comprehensive supporting ecosystem by strengthening field extension systems and simplifying People's Business Credit (KUR) procedures to expand capital reach. Furthermore, strengthening farmer groups as a vehicle for collective learning and improving marketing infrastructure in integrated areas are urgently needed to overcome logistical barriers. Future diversification programs must be designed with a gradual approach based on specific local needs, ensuring that the transformation toward an integrated agricultural-livestock system is sustainable and able to improve the economic welfare of the people at large .

BIBLIOGRAPHY

Baiyegunhi , L. J. S., Fraser, G. C. G., & Darroch, M. A. G. (2019). Adoption of improved cowpea varieties by smallholder farmers in the Nioro du Sahel zone, Mali. African Journal of Agricultural Research, 4(9), 818-826.

Croppenstedt , A., Demeke, M., & Meschi, M. M. (2003). Technology adoption in the presence of constraints: The case of fertilizer demand in Ethiopia. Review of Development Economics, 7(1), 58-70.

Department of Agriculture Regency Boyolali . (2023). Report Annual Agriculture and Livestock Sector Regency Boyolali 2022/2023 . Boyolali : Boyolali Agriculture Service .

Feder, G., Just, R. E., & Zilberman, D. (1985). Adoption of agricultural innovations in developing countries: A survey. Economic Development and Cultural Change, 33(2), 255-298.

Kasryno , F. (2000). Policy reform development agriculture going to realization agriculture tough and independent Food . Proceedings of the National Seminar on Agricultural Development Millennium III, Bogor: Center for Agricultural Socio-Economic Research.

Mubyarto. (1997). People's Economy, IDT Program, and Indonesian Economic Democracy. Yogyakarta: Aditya Media.

North, D. C. (1990). Institutions, Institutional Change, and Economic Performance. Cambridge: Cambridge University Press.

Putnam, R.D. (1993). Making Democracy Work: Civic Traditions in Modern Italy. Princeton: Princeton University Press.

Rogers, E.M. (2003). Diffusion of Innovations (5th ed.). New York: Free Press.

Saragih , B. (2010). Agribusiness : A New Paradigm for Agricultural-Based Economic Development Agriculture . Bogor: IPB Press.

Soekartawi . (2005). Basic Principles of Communication Agriculture . Jakarta: University of Indonesia Press.

Uematsu, H., & Mishra, A. K. (2012). Organic farmers or conventional farmers: Where's the money? Ecological Economics, 78, 55-62.

Wibowo, A. (2020). Analysis determinant adoption technology agriculture integrated in the area agriculture food Sustainable Central Java. Journal of Agricultural Economics and Agribusiness , 4(3), 512-525.

Yusdja, Y., & Ilham, N. (2004). Overview policy development agribusiness cow cut . Analysis Policy Agriculture , 2(2), 167-182.