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SOCIAL CAPITAL AND FARMERS' DECISION TO CULTIVATE PULU MANDOTI EMAS (PME) LOCAL RICE: A PROBIT MODEL

Muhammad Taufik Saputra*, Jangkung Handoyo Mulyo, and Dwijono Hadi Darwanto
Department of Agricultural Socio-Economics, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta, Special Region of Yogyakarta, Indonesia

*Correspondence Email: muhtaufiksaputra@mail.ugm.ac.id

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ABSTRACT

Salukanan Village, Enrekang Regency, is the production center of inherited local rice through generations, known as "pulu mandoti emas" (PME). The PME local rice has a unique aroma and can exclusively grow in the village of Salukanan, Enrekang Regency. The relatively long cultivation period (six months) drives the farmers neglecting PME cultivation. However, the higher selling price of PME (in average of Rp 72,200/kg) compared to regular rice makes the consumers only purchase it when needed for traditional events (weddings ceremonies, funerals, housewarming ceremonies, etc.). It is suspected that the social capital possessed by farmers influences their motivation to continue cultivating PME. This article aims to analyze social capital (communication frequency regarding PME cultivation with external parties, social trust, institutional trust, and norms of reciprocity) other factors such as socio-economy characteristics and institutional factors that affect farmers' decisions to continue cultivating PME. The study was conducted in Salukanan Village, Enrekang Regency, by collecting data from 96 farmer respondents selected through simple random sampling. A probit model regression analysis was used and the result indicated that strengthening social capital among farmers by improving communication, trust, and reciprocity, along with leveraging their existing experience through mentoring and knowledge-sharing initiatives, can significantly encourage the continued cultivation of PME local rice. Comprehensive support through inclusive policy development, training, counseling services, and active engagement initiatives is essential for sustaining PME local rice cultivation in Salukanan Village.

Keywords: *farmer decision, probit model, pulu mandoti emas, social capital*

BACKGROUND

The rice commodity, a long-standing indicator of the Indonesian economy, is a staple food that must be available in sufficient quantity, high quality, and at an affordable price (Anthoni & Yulianto, 2023; Suhesti, 2023). The spread of hybrid rice varieties has led to a growing desertion of traditional paddy cultivation, as farmers are increasingly opting for hybrids that provide food security and higher marketable surplus (Sinha, 2016). Despite this shift, in some regions, traditional paddy varieties still significantly contribute to rice availability. These traditional varieties, selected over decades, are often resistant to pests and diseases and tolerant of less favorable abiotic conditions. To improve sustainable rice food business development, effective management in downstream agribusiness institutions is essential (Indaryati & Adriani, 2023).

In Salukanan Village, Enrekang Regency, the cultivation of the aromatic and unique *Pulu Mandoti Emas* (PME) glutinous rice is a traditional practice with significant cultural value and a

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distinct market due to its exclusive growth conditions at high altitudes (Anwar et al., 2022; Amrullah et al., 2020). The PME local rice is a representation of the traditional customs of the Enrekang community and is consistently served as traditional dishes at various occasion such as weddings, funerals, housewarming ceremonies, naming ceremonies (*Akikah*), and other celebratory occasions (Asa et al., 2019). However, the six-month cultivation period and limited field allocation by farmers, coupled with the challenge of replicating its special aroma outside the village, result in very limited production (Anwar et al., 2022). Based on the data obtained, there were only 82 out of 147 farmers decide to continue to cultivate PME, putting its existence at risk due to declining interest and production (BPP Kecamatan Baraka, 2023).

Broader socio-economic condition of PME farmers in Salukanan Village could be one of many factors affecting this phenomenon. According to Edwards-Jones (2006) and Thompson (2009), farmers' decisions are often shaped by their access to previous knowledge and experiences, integrating disciplines such as sociology and economics into traditional agricultural practices. Farmers from minority ethnic groups, like those in Salukanan Village, tend to make production decisions based on community practices. If one farmer adopts a new method, neighbors are likely to follow. These groups often stick to traditional methods but face challenges in adopting new technologies due to lack of capital, low education levels, and limited knowledge of organic farming practices (Bui & Nguyen, 2021). This context underscores the vulnerability of PME rice cultivation and the need for supportive measures to sustain it.

Studies have linked farmers decision to the social capital of the farmers, which is believed to be an important resource for farmers in building adaptation and decision-making process (Belay & Fekadu, 2021; Yaméogo et al., 2018). In this study, social capital refers to Grootaert & Bastelar, (2002) which distinguished social capital based on its dimensions, namely the structural dimension and the cognitive dimension. Structural social capital refers to relative objects and social structures that can be permanently observed, such as networks, associations, institutions, rules, and procedures. Meanwhile, the second form is known as cognitive social capital and consists of more subjective and intangible elements such as commonly accepted attitudes and norms of behavior, shared values, reciprocity, and trust.

Farmers of PME rice receive support from various parties, including the government, neighbors, extension workers, and village officials. The provision of production facilities and guidance is believed to motivate farmers to continue growing Pulu Mandoti rice in Salukanan Village (Latif et al., 2020). Kehinde et al. (2021), in their previous research, figured that private extension services play a significant role in promoting agricultural production and bridging the gap between public extension services and farmers, with many farmers preferring information from private extensions due to their effective delivery. Socioeconomic and institutional factors significantly influence farmers' adoption of rice varieties, as noted by Chekene & Chancellor (2015). Farmer organizations, extension services, research institutes, and NGOs are crucial for policy support and implementation to ensure proper uptake in the future.

Yaméogo et al. (2018) found that the effect of social capital depends on the type of indicator used and the necessary adaptation strategies. Components of structural and cognitive social capital enabled the development of composite indicators for investigating the influence of various aspects of social capital—such as bonding social capital, bridging social capital, social trust, institutional trust, and norms of reciprocity—on the adoption of climate change adaptation strategies (Belay & Fekadu, 2021). Uphoff & Wijayaratna (2000) emphasizes that social capital is an asset that can and should be

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invested in, yielding desirable returns through increased benefit flows. It is assumed that social capital of the farmers is something crucial that affect the decision making. In this research, we ask how does social capital could affect farmers' decision to cultivate *Pulu Mandoti Emas* (PME) rice. Additionally, we analyze the effect of socioeconomic characteristics and and institutional factors on the decision-making process of the farmers in Salukanan Village, Enrekang Regency.

RESEARCH METHODS

This research was carried out in Salukanan Village, Baraka District, Enrekang Regency, South Sulawesi which serves as the center for PME local rice production (Tenrisau Adam et al., 2023) from September – November 2023. An explanatory research design was employed in this study to explore the causal relationship between the binary dependent variable and its predictors (Saqib et al., 2016) namely the farmers' decision on cultivating PME local rice (binary), and independent variables such as social capital, socioeconomic characteristics and institutional factors of the farmer. The research sample is calculated based on one or two possibilities, namely, continuing to cultivate or not cultivating PME local rice.

The research respondents were selected using a simple random sampling based on Kretjie and Morgan method (Bougie & Sekaran, 2016) of 96 farmers. To answer the objective, we collected farmer households' socio-economic data through interviews using questionnaires as the instrument. The questions covered measurement for each variables used based on the previous research by Belay (2020) and Belay & Fekadu (2021) that addresses social capital as a determinant for farmers' decision making. Other than social capital, this research involves two other categories as determinant factors, namely socioeconomic characteristics and institutional factors referred from the previous research on factors affecting the adoption of rice varieties (Chekene & Chancellor, 2015).

A probit model will be used to address the research objectives, where the probit model is a non-linear model used to analyze the relationship between independent and dependent parameters (Sarma, 2021; Wolfolds & Siegel, 2019). The model below was designed to be able to capture the relationships between an ordered polytomous response variable and predictor variables, making it ideal for analyzing factors influencing farmers' decisions to cultivate local PME rice. The probit regression model to be used is as follows:

$$Z^* = \alpha_0 + \alpha_1 D_1 + \alpha_2 W_2 + \alpha_3 W_3 + \alpha_4 W_4 + \alpha_5 W_5 + \alpha_6 D_6 + \alpha_7 IF_1 + \alpha_8 IF_2 + \alpha_9 IF_3 + \alpha_{10} IF_4 + \alpha_{11} SC_1 + \alpha_{12} SC_2 + \alpha_{13} SC_3 + \alpha_{14} SC_4 + \varepsilon_i$$

Information:
Z^* : Probability of farmers cultivating PME local rice (1 = cultivating; 0 = not cultivating).
α_0 : Intercept
$\alpha_{1,2\ldots,14}$: Coefficient
D_1 : Gender (male = 1, female = 0)
W_2 : Age (year)
W_3 : Farming Experience (year)
W_4 : Education (year)
W_5 : Land area (ha)
D_6 : Use of technology (using = 1, not using = 0)

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IF_1 : Access to loan (access = 1, no access = 0)
IF_2 : Membership in farmer groups (dummy, registered as member = 1)
IF_3 : Access to extension services (dummy, having access = 1)
IF_4 : Access to subsidies (dummy, having access = 1)
SC_1 : Frequency of External Communication
SC_2 : Social Trust
SC_3 : Institutional Trust
SC_4 : Norms of Reciprocity
ε_i : Error

RESULT AND DISCUSSION

Socio-economy Characteristics of Farmers

The age characteristics of farmers respondent in this study is categorized into generations based on Treuren & Anderson (2010). A higher percentage of farmers from the baby boomer implies that older generations have a stronger preference for maintaining traditional agricultural practices, possibly due to their familiarity with these methods and the cultural significance attached to them. However, if the younger generation does not get involved, the sustainability of these practices is at risk. Without the younger generation's participation, the knowledge and skills required to cultivate traditional rice variants may not be passed down, potentially leading to a decline in the cultivation and preservation of these heritage crops. Moreover, farmers with higher education are more likely to obtain technical information easily because of their ability to digest information from various sources and it influence to adopt more easily, leading to a decline in the cultivation of traditional rice varieties as they may be perceived as less efficient or economically become viable, they are more open to innovation and change, and tend to seek solutions considered more effective and efficient (Ashraf et al., 2015; Sarker & Itohara, 2007). The social characteristics of the respondent farmers in Salukanan Village can be seen in the following Table 1.

Table 1. Farmers' Socio-economy Characteristic in Salukanan Village, Enrekang Regency

Respondents Characteristics	PME Farmers		Non-PME Farmers	
	Total	%	Total	%
Gender				
Male	63	98	28	88
Female	1	2	4	13
Age (Year)				
Millenials (29-43 years old)	10	16	5	16
Generation X (44-58 years old)	27	42	18	56
Baby Boomer (59-77 years old)	20	31	7	22
Silent Generation (78-98 years old)	7	11	2	6
Education (Year)				
Uneducated (0 year)	0	0	0	0
Elementary School (1-6 years)	16	25	6	19
Junior High School (7-9 years)	16	25	2	6
Senior High School (10-12 years)	29	45	21	66
Bachelor Degree (13-16 years)	3	5	3	9

Source: Primary Data Analysis (2023)

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Farming Characteristic in Salukanan Village

Respondent farmers with large land holdings tend to decide to cultivate PME local rice because they have sufficiently extensive land to allocate for both PME local rice and Lambau' rice cultivation. In contrast, respondent farmers with smaller land holdings might be less inclined to cultivate PME local rice due to limited space, prioritizing higher-yielding hybrid rice to maximize their production and income from their restricted land area. The land area used by farmers to cultivate Lambau' rice is a crucial consideration since Lambau' rice is regularly consumed by the community in Salukanan Village, Enrekang Regency. Despite the high price of PME local rice observed during research, averaging around Rp 72,200 per kilogram, respondent farmers still reserve their land for cultivating Lambau' rice for their daily household consumption.

Based on the experience of the farmer, extensive farming experience is associated with a greater likelihood of maintaining traditional agricultural practices, whereas less experienced farmers may be more inclined to adopt newer, potentially more efficient or profitable farming methods, moving away from traditional rice cultivation. Aye & Oji (2009) stated that the more experience a farmer has, the less reluctance they have towards risks. Less experienced farmers in Salukanan Village may face difficulties cultivating traditional locally inherited varieties, leading them to be more reluctant to take risks and decide to plant new varieties such as hybrid rice. The characteristics of agricultural business can be seen in Table 2.

Table 2. Farming Characteristics of Farmer Respondents in Salukanan Village, Enrekang Regency

Respondents Characteristics	PME Farmers		Non-PME Farmers	
	Total	%	Total	%
Land Area (ha)				
0.10 – 0.50	12	19	5	16
0.51 – 1.00	46	72	27	84
1.01 – 1.50	6	9	0	0
1.51 – 2.00	0	0	0	0
Farming Experience (year)				
10 - 20 years	3	5	2	6
21 - 30 years	10	16	6	19
31 - 40 years	19	30	14	44
41 - 50 years	13	20	3	9
> 50 years	19	30	7	22

Source: Primary Data Analysis (2023)

Social Capital of Farmers in Salukanan Village

The social capital of respondent farmers is observed based on the dimensions of social capital they possess. Grootaert & Bastelar (2002) divided social capital into two dimensions called structural and cognitive. Structural social capital consists of the frequency of external communication, while cognitive social capital consists of social trust, institutional trust, and virtue norms. More detailed information about the social capital of respondent farmers can be seen in Table 3.

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Table 3. Farmer Respondents' Social Capital in Salukanan Village, Enrekang Regency, 2023

Respondents Characteristics	PME Farmers		Non-PME Farmers	
	Total	%	Total	%
Structural Social Capital				
Very high	22	34	9	28
High	34	53	18	56
Medium	8	13	5	16
Low	0	0	0	0
Very low	0	0	0	0
Cognitive Social Capital				
Very high	27	42	9	28
High	36	56	23	72
Medium	1	2	0	0
Low	0	0	0	0
Very low	0	0	0	0

Source: Primary Data Analysis (2023)

Farmers in Salukanan Village with high social capital tend to decide to continue cultivating local PME rice because they feel a responsibility towards agricultural traditions and customary community values in Salukanan Village. Strengthening social capital through creativity, motivation, can improve rice seeds and encourage farmers to continue traditional rice cultivation (Mundiyah & Tahir, 2020). Farmers' involvement can serve as motivation to preserve and uphold the traditional cultivation practices of locally inherited PME rice. Meanwhile, the lack of information from social interactions makes farmers in Salukanan Village with moderate social capital more reliant on modern practices that are easier to find or understand.

Farmers in Salukanan Village are motivated to preserve and continue the cultivation of PME local rice to uphold their heritage and community traditions. Their communication with internal parties, such as family members, close neighbors, and other farmers within the village, reinforces the significance of PME rice cultivation. This strong sense of community, or bonding social capital, fosters a shared responsibility among farmers, encouraging them to collectively improve their management practices. However, this close-knit nature can also limit the flow of information within the group, often reducing their openness to adopting new technologies (Belay & Fekadu, 2021; Yoder & Roy Chowdhury, 2018). By maintaining these traditional practices, farmers not only honor their cultural heritage but also support the social fabric of their community, even as they face challenges in integrating modern agricultural advancements.

Farmers who decide not to cultivate PME local rice often admit that they have limited access to information about its cultivation. In contrast, they find it easier to obtain information about hybrid rice cultivation. The effects of networks on farmer decision-making vary depending on whether these networks consist of weak-tie relationships, which connect disparate individuals and organizations, or strong-tie relationships, which are shared by groups where members are well-acquainted with each other (Manson et al., 2016). Weak-tie relationships provide broader access to diverse information and innovations, which can be crucial for adopting new farming practices. However, the lack of such networks for PME cultivation means that farmers are less likely to receive the necessary guidance and support, influencing their decision to hybrid rice varieties cultivation.

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Factors Influencing Farmers' Decision to Cultivate Pulu Mandoti Emas

The instrument's validity is tested using the product-moment formula with the indication that the questionnaire items used to measure social capital, namely frequency of external communication, social trust, institutional trust, and norms of reciprocity, are all significant ($p < 0.05$). More to that, the results of the reliability test show Cronbach's alpha values are higher than the benchmark alpha (0.60), indicating that the statements used in the social capital variable are reliable or in other words, the measurement results can be trusted.

The research objective is then answered using the probit model to observe the influence of independent variables on the dependent variable (Machmuddin, 2023). The results of the Probit analysis are used to identify the factors influencing farmers' decisions to cultivate local PME rice in Salukanan Village, Enrekang Regency (Table 4). This coefficient is used to measure how much of the variation in the dependent variable can be explained by the variation in the values of the independent variables.

Table 4. Probit Analysis of Farmers' Decision To Cultivate Pulu Mandoti Emas (PME), 2023.

Variable	Coefficient	z	Probability
Constant	0.3988872^{ns}	-2.89	0.232
Gender (D_1)	-0.025996 ^{ns}	1.19	0.101
Age (W_2)	0.0313642**	-1.6	0.035
Farming Experience (W_3)	-0.0095394 ^{ns}	2.03	0.715
Education (W_4)	-0.123218 ^{ns}	-0.37	0.734
Land Area (W_5)	0.2349087 ^{ns}	-0.34	0.378
Use of Technology (D_6)	-0.217122 ^{ns}	0.3	0.13
Access to Loan (IF_1)	0.4304968 ^{ns}	-1.37	0.181
Membership in Farming Groups (IF_2)	-0.1418048 ^{ns}	1.31	0.386
Access to Extention Services (IF_3)	-0.0917223 ^{ns}	-0.71	0.726
Access to Subsidies (IF_4)	0.1814054**	-0.31	0.046
Frequency of External Communication (SC_1)	0.2004682**	1.95	0.018
Social Trust (SC_2)	0.208011**	2.41	0.014
Institutional Trust (SC_3)	0.2229274**	2.39	0.014
Norms of Reciprocity (SC_4)	0.3988872^{ns}	2.41	0.232
Mc Fadden R^2			0.363
LR Statistic			44.4
Prob (LR Statistic)			0.0001***

Information: *, **, and *** significant 10%, 5%, 1% respectively, and ns not significant
Source: Primary Data Analysis (2023)

Experienced farmers are less likely to resist risks and demonstrate distinct abilities in managing marginal land. They tend to use traditional techniques inherited from their parents (Karunathilaka & Thayaparan, 2016; Kustiari et al., 2006). The results imply that the more experienced the farmers, the more likely they are to continue cultivating PME local rice. In Salukanan Village, knowledge of PME rice cultivation has been passed down through generations, from parents, grandparents, and ancestors to their descendants. This generational tradition of PME rice cultivation is a cultural heritage that must be preserved to achieve food security in Enrekang Regency, South Sulawesi Province (Hasmah, 2020; Ismail & Dyah, 2023).

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High communication intensity of farmers with agricultural extension workers, village officials, and local government increases the likelihood of farmers deciding to cultivate PME local rice. Strengthening communication involves building strong networks with stakeholders in the agricultural industry to facilitate farmers' access to information on the benefits of cultivating PME local rice and engaging them in decision-making activities within the village. According to Belay & Fekadu (2021), bridging social capital refers to social networks with distant individuals such as colleagues and associates. Moghfeli et al. (2023) figured that the level of farmers' bridging social capital could indicate the support and information sharing among the farmers, which may affect their decision-making process.

Farmers' trust in internal parties, such as family, fellow farmers, and neighbors, stimulates a positive expectation of trustworthiness and reciprocal cooperation. Simultaneously, the trust built with external parties like agricultural extension workers, village officials, and local government in Salukanan Village creates a strong sense of involvement. The farmers in Salukanan Village feel the bond of becoming part of a community through cultural norms that have been established and inherited through generations, enhancing their motivation to preserve culture by maintaining the practice of cultivating PME local rice.

According to Zapata-Salas et al. (2023) trust represents an individual's subjective assessment of the likelihood that another person or group will take a specific action. This trust empowers individuals to take actions, even when there's a risk of loss if the trusted party fails to meet expectations. In Salukanan Village, celebrating collective events like *makkombong* (an activity that joined by all farmers all over the village where they are helping each other on harvesting rice) and engaging in cultural events reinforces shared traditions, connects generations, and weaves a vibrant cultural identity. These interactions build relationships and act as resources that provide shared interpretations, representations, and systems of meaning among members (Zain et al., 2022).

Farmers in Salukanan Village, driven by a sense of responsibility for cultural heritage, willingly embrace risk to preserve rice cultivation traditions handed down through generations. Their mutual commitment to promoting local culture is evident in their collaborative efforts and awareness that cultivating PME local rice aligns with sustainable farming practices. This reciprocal relationship gains momentum as it adapts to the demands of agricultural commercialization in rural areas. Social reciprocity serves as both an internalized moral norm and a pattern of social exchange (Miao et al., 2015; Santosa et al., 2022).

CONCLUSION AND SUGGESTION

Strengthening social capital among farmers can significantly encourage the continued cultivation of PME local rice by improving communication, trust, and reciprocity. Leveraging farmers' existing experience through mentoring and knowledge-sharing initiatives can further promote this practice. The homogenous institutional conditions of PME farmers showed how strong the social capital among farmers in Salukanan Village even if it doesn't directly affect their decisions on cultivationg PME local rice. Further research is essential to identify the specific needs and challenges of PME local rice farmers, enabling more tailored and effective institutional support.

To support the continuity of PME local rice cultivation, policy development should include representatives from Salukanan Village farmer groups in agricultural discussions, such as village council meetings or dedicated agricultural committees. Organizing training sessions in collaboration

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with agricultural extension agents or universities will allow farmers to share experiences and best practices. Additionally, establishing counseling services with designated office hours or phone lines would provide valuable advice and connect farmers with resources. Encouraging young farmers to actively participate in established platforms through demonstrations, outreach programs, or incentives would further enhance engagement, creating a vibrant and resilient agricultural community in Salukanan Village.

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