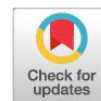


Research Article



Impact of Mobile Phone Usage and Credit Access on the Revenue of Duck Farmers in Brebes, Indonesia

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Abstract | This study aimed to examine the impact of mobile phone usage and credit access on the revenue of duck farmers. The research was conducted in Brebes Regency through interviews with 150 duck farmers using a structured questionnaire. The independent variables included age, gender, marital status, educational background, farming experience, land ownership status, mobile phone usage (measured by frequency of use per day), feed cost (IDR/kg), feed price (IDR/kg), credit access (availability and amount received), and number of ducks (measured in IDR/day). The dependent variable was the revenue from duck farming. Multiple linear regression analysis was employed to address the research objective. The results indicated that age, gender, marital status, farming experience, land status, and feed cost had no significant effect on revenue. However, educational background, mobile phone usage, feed price, credit access, and the number of ducks significantly influenced revenue ($p < 0.05$). On average, duck farmers in the study kept approximately 620 ducks, generating a daily income of IDR 992,000. The findings highlight that mobile phone usage and access to credit have a significant positive impact on duck farming revenue. Mobile phones enhance market access, communication, and farm management efficiency, while credit such as the Kredit Usaha Rakyat (KUR) facilitates investment in feed, infrastructure, and disease prevention, thereby boosting productivity. The study suggests that expanding access to KUR and implementing digital literacy programs could further strengthen these positive outcomes.

Keywords | Agricultural credit, Duck farming, Mobile technology, Revenue, Smallholder farmers

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INTRODUCTION

Livestock plays an important role in Indonesia such as dairy cattle (Mukson *et al.*, 2017; Setianti *et al.*, 2017), and poultry (Santoso *et al.*, 2016). Brebes is duck business center in Central Java, Indonesia. Mobile phone is one of the tool for sharing information. Mobile phone plays an important role in production and marketing. Some researchers conducted research on the effective utilization of mobile phone in agricultural sector (Khan *et al.*, 2022; Ahmad *et al.*, 2024; Bidisha *et al.*, 2018; Hoang, 2020; Rah-

man *et al.*, 2023; Rezki, 2023; Steinke *et al.*, 2019; Zant, 2023; Mwikamba *et al.*, 2024). Khan *et al.* (2022) stated mobile phone is very useful tool to improve the income of the rural farmers in Pakistan. They stated mobile phone reduced transaction cost and increased revenue. Abdilahi *et al.* (2021) stated that the utilization of mobile phone by farmer's has increase over the years. Mobile phone are now commonly used by farmers. Adesiji *et al.* (2024) stated mobile phone also are also used in smart agriculture. Agricultural credit was proposed in all of the countries in the world.

Credit in agriculture is used for input buying and investment development (Dirir and Aden, 2024; Haryanto *et al.*, 2023). The strategy of the Indonesian government to develop the macroeconomic sector released the *Kredit Usaha Rakyat* (KUR) with a low interest rate of only 3-6% a year. Statistic data showed the KUR from 2022-2024 is shown in Figure 1. KUR has been increased significantly since 2022, it means farmer could accept KUR to support their business. Haryanto *et al.* (2023) stated there was a positive correlation between KUR and technical efficiency and productivity. The aforementioned study further stated that KUR number was increase every year. As shown in Figure 1 the number of KUR in Central Java Province increase from IDR 37.6 Trillion in 2022 up to IDR 46.27 Trillion in 2024.

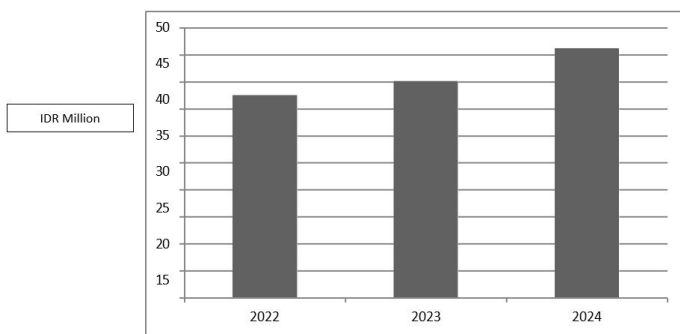


Figure 1: *Kredit Usaha Rakyat (KUR) 2022-2024 in Central Java Province (Central Bureau of Statistics Central Java, 2024).*

Several studies have examined the impact of agricultural credit on income, management strategies, and productivity (Li and Huo, 2021; Saqib *et al.*, 2016; Si *et al.*, 2021; Tianyuan *et al.*, 2023; Yeasmin *et al.*, 2024; Wanzala *et al.*, 2024; Zhao *et al.*, 2025). The study was conducted to investigate the impact of mobile phone and credit access on the revenue of duck farmers in Central Java Indonesia. Agriculture plays a pivotal role in rural livelihoods, particularly in developing countries like Indonesia, where the livestock sector contributes significantly to food security and economic growth. In Central Java, Brebes Regency serves as a major hub for duck farming, a critical subsector supporting local economies. However, challenges such as limited access to markets, high transaction costs, and inadequate financial support often hinder smallholder farmers' potential.

The advent of mobile phones has transformed the agricultural sector by helping farmers access real-time information, streamline operations, and connect with broader markets. Previous studies have shown that mobile phones enhance agricultural outcomes by facilitating communication, reducing transaction costs, and expanding market reach (Khan *et al.*, 2022; Rezki, 2023). Similarly, agricultural credit has been recognized as a vital tool for empowering

farmers to invest in productive assets, improve efficiency, and boost productivity (Haryanto *et al.*, 2023; Tianyuan *et al.*, 2023). In Indonesia, the government's KUR program has been instrumental in providing affordable credit to smallholder farmers. Despite its potential, the combined impact of mobile phone utilization and credit access on farmers' revenue remains underexplored, particularly in the context of duck farming.

This study aims to investigate the impact of the utilization of mobile phones and credit access on the revenue of duck farmers in the Brebes Regency. By understanding these relationships, this research provides valuable insights into the integration of digital tools and financial services to enhance the productivity and income of smallholder farmers.

MATERIALS AND METHODS

The study was conducted in Brebes Regency, Central Java, Indonesia. A total of 150 duck farmers were selected using a stratified random sampling technique based on farm size (small, medium, and large-scale farmers) to ensure representativeness. The study employed a multiple linear regression analysis to examine the relationship between independent variables and the dependent variable. Before the regression analysis was carried out, a normality test and a classical assumption test (Multicollinearity and heteroscedasticity tests) were carried out. The normality test used the Kolmogorov Smirnov test. The Multicollinearity test used the variance inflation factor (VIF) and the Heteroscedasticity test used the scatterplot test (Mariyono *et al.*, 2019). The regression equation is specified as follows and its variables is defined in Table 1:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \epsilon$$

Where;

Y= Revenue from duck farming (IDR per month)

X₁= Age of farmer (years)

X₂= Gender (dummy variable: 0 = female, 1 = male)

X₃= Marital status (dummy variable: 0 = non-married, 1 = married)

X₄= Educational background (categorical: 0 = no school, 1 = elementary, 2 = junior high school, 3 = senior high school, 4 = undergraduate/diploma)

X₅= Experience in duck farming (years)

X₆= Land status (dummy variable: 0 = rented, 1 = owned by farmer)

X₇= Mobile phone usage (dummy variable: 0 = not using, 1 = using)

X₈= Feed cost (IDR per month)

X₉= Feed price (IDR per kg)

X₁₀= Credit access (dummy variable: 0 = without formal

credit, 1 = with formal credit)

X_{11} = Number of ducks reared (heads)

α = Constant

β = Regression coefficient

ϵ = Error

Table 1: Variables measurement.

No	Variables	Measurement
1	Age (year) (X1)	Actual age of the farmer (year)
2	Gender (X2)	0 = female, 1= male
3	Marital Status (X3)	0 = non married, 1= married
4	Educational background (X4)	0= no attending school, 1= elementary, 2= Junior high school, 3= senior high school, 4= undergraduate/diploma
5	Farming experience (year) (X5)	Length of duck rearing (year)
6	Land tenure (X6)	0= rent, 1 = owned by farmers
7	Mobile phone (X7)	0 = not using mobile phone, 1= using mobile phone
8	Feed cost (IDR)(X8)	Cost spend for duck rearing per month
9	Feed price (IDR)(X9)	Price of feed per kg
10	Credit (X10)	0=without formal credit, 1 = with formal credit
11	Number of duck (heads) (X11)	Total number of ducks reared by farmer (head)
12	Revenue (IDR/ month) (Y)	Amount of revenue obtain per day

IDR: Indonesian Rupiah (1USD = 16,828.56 IDR).

The multiple regression analysis was chosen because it allows for the examination of the simultaneous effects of multiple predictors on the dependent variable, providing a comprehensive understanding of the factors influencing revenue of duck farming. The hypothesis in this study was: H_0 = there is no influence of mobile phone and KUR credit access on revenue, H_1 : there is an influence of usage mobile phone and KUR credit access on revenue. The error used was 5%. If the significance was less than ($P < 0.05$) then H_1 was accepted and H_0 was rejected. If ($P > 0.05$) then H_0 was accepted and H_1 was rejected.

RESULTS AND DISCUSSION

CHARACTERISTIC OF RESPONDENTS

As shown in Table 2, the average age of the respondents was 47.6 years, indicating that duck farmers in Brebes Regency are generally within a productive working age. The gender distribution revealed that 9.3% of respondents were female, while 90.7% were male, suggesting that duck farming is predominantly undertaken by men, likely due to the physical labor involved in rearing ducks.

Table 2: Socio-economic characteristics of respondents.

No	Variables	Mean	Standard Deviation
1	Age (year)	47.6	11.98
2	Gender	0.90	0.29
3	Marital Status	0.95	0.21
4	Educational background	1.25	1.21
5	Farming experience (year)	17.7	9.55
6	Land tenure	0.07	0.26
7	Mobile phone	0.95	0.21
8	Feed cost (IDR/day)	321,220	142,270
9	Feed price (IDR/kg)	2,443	0.40
10	Credit	0.83	0.37
11	Number of duck (heads)	620	276.78
12	Revenue (IDR/day)	992,000	538,050

A large proportion of the respondents (95.3%) were married, with only 4.7% unmarried. In terms of education, most had completed only elementary school, highlighting the need for enhanced informal education and training programs to improve farmers' capabilities. Training on feed processing, duck egg handling, and value-added product development is particularly needed.

The respondents had an average of 17.7 years of experience in duck farming, indicating a strong background in the field. Most farmers (92.7%) rented land, while only 7.3% owned the land used for duck raising.

Regarding technology adoption, 95.3% of duck farmers used mobile phones in their business activities, while only 4.7% did not. The average feed cost was IDR 321,220, and the average feed price per kilogram was IDR 2,443. A significant portion of respondents (83.3%) had access to credit, while 16.7% did not. On average, each farmer raised around 620 ducks.

The use of mobile phones was widespread, with 95.3% of respondents utilizing them for business purposes. Farmers predominantly used mobile phones to manage feed purchases and market duck eggs. Regarding credit access, 83.3% of farmers utilized formal credit, primarily through government schemes like KUR, while 16.7% did not. On average, farmers reared 620 ducks and earned IDR 992,000 per day in revenue.

REGRESSION ANALYSIS AND REVENUE DETERMINANTS

The results of the Kolmogorov Smirnov test show a P value > 0.05 , which indicates that all variables are normally distributed. The multicollinearity test shows a VIF value < 10 , which indicates that all variables are free from multicollinearity. The research data is spread without forming a certain pattern, which indicates that it is free from heteroscedasticity. Based on the normality test and the classical

assumption test, the regression analysis is the best linear unbiased estimator (BLUE). As presented in Table 3, factors such as age, gender, marital status, experience, land status, and feed cost did not significantly influence revenue ($p > 0.05$). However, educational background, mobile phone usage, feed price, credit access, and the number of ducks significantly influenced revenue ($p < 0.05$). This suggests that improving farmers' education and providing better access to mobile technologies and credit facilities could enhance their earnings. The variable age showed a p-value of 0.643, indicating that it does not have a statistically significant impact on farmers' income ($p > 0.05$). This may be because most farmers fall within a productive age range and possess adequate experience, making age differences less influential in determining income levels.

Table 3: Regression analysis.

No Variables	Standardized co-efficients (Beta)	P Value
1 Age (year)	0.040	0.643
2 Gender	0.107	0.151
3 Marital Status	-0.019	0.811
4 Educational background	0.202	0.010*
5 Farming experience (year)	0.156	0.062
6 Land tenure	0.060	0.428
7 Mobile phone	0.098	0.024*
8 Feed cost (IDR)	-0.114	0.169
9 Feed price (IDR)	0.194	0.020*
10 Agricultural credit	0.067	0.044*
11 Number of duck (heads)	0.390	0.000**
12 F Test	5.899	0.000**
R Square		0.520

Dependent variable: Revenue; Exp: ** significance at $P<0.01$; * significance at $P<0.05$.

Farming experience had a p-value of 0.062, suggesting a marginal or near-significant influence on income. Although the value is slightly above the conventional threshold ($p = 0.05$), it indicates that experience may contribute to increased income, but the statistical evidence is not strong enough to confirm it as a significant factor.

The F-test yielded a p-value of 0.000, demonstrating that the overall regression model is highly significant in explaining variations in farmers' income. This means that, when considered together, the independent variables in the model significantly influence the dependent variable—farmers' income.

IMPACT OF MOBILE PHONE ON REVENUE

As shown in Table 3, there was a positive correlation between mobile phone utilization and revenue ($P<0.05$).

Farmers frequently use mobile phones to order feed and expand the market for duck eggs. Some consumers also place egg orders via mobile phones, enhancing market accessibility. These findings align with Rezky (2023), who stated that mobile phone utilization improves farmers' social characteristics. Furthermore, studies in Indonesia have also highlighted the role of mobile phones in agribusiness management. Mariyono et al. (2022) found that mobile phones are widely used to support agribusiness activities by improving access to market information and business management. Similarly, Mariyono et al. (2024) emphasized that mobile phone adoption enhances the management and performance of vegetable-based businesses. These comparative studies reinforce the argument that mobile phone usage is a transformative tool for improving agricultural productivity and financial outcomes.

Abdullahi et al. (2021) stated mobile phone make farmer easily to communicate with other farmer or product buyers. Aker and Ksoll (2016), stated that mobile phone improves agricultural outcomes. Farmer also can easily communicate with extension services when they are facing with problem. These findings are also in agreement with Hoang (2020), who found mobile phones make the fruit marketing easier in Vietnam. Since now many online training offer, if farmers use mobile phones can access that free such as Youtube, Facebook, Instagram etc. This finding is consistent with Khan et al. (2022) highlighted that mobile phones enhance rural farmers' income by reducing transaction costs and improving market access. These studies collectively demonstrate how mobile phones can enhance agricultural productivity and revenue by bridging information gaps and fostering market connectivity. Mobile phones are transformative tools for smallholder farmers, especially in developing countries. By encouraging greater adoption of mobile technologies among duck farmers, stakeholders can help boost productivity, streamline operations, and eventually increase revenue.

IMPACT OF CREDIT ACCESS ON REVENUE

Credit influence the revenue significantly (Table 3). The regression coefficient was positive number, it means increasing number of credit access would increase the revenue. Usually farmer use credit to buy the production input and to invest in the duck production facility. Steinke et al. (2019) stated agricultural credit plays an important think in smallholder farming. Credit can easily improve investment, and reduce poverty (Tianyuan et al., 2023). In Indonesia, KUR is a highly effective credit scheme for smallholder farmers (Haryanto et al., 2023). The average age of duck farmers in this study is 47.6 years, meaning they are still within the productive age range and eligible to access KUR. According to Indonesian government regulations, smallholder farmers who wish to obtain credit must be un-

der 50 years old. The findings in this study align with previous research highlighting the crucial role of microcredit in supporting smallholder farmers. Mariyono *et al.* (2019) emphasized that microcredit facilitates technology adoption and improves farmers' welfare. Additionally, Mariyono *et al.* (2020) found that access to financial support significantly influences business performance in the agricultural sector, particularly in improving distribution channels and market efficiency. These studies reinforce the importance of credit access in sustaining smallholder farmers' productivity and income growth.

Based on the statistical results, 95.3% of the surveyed duck farmers in Brebes Regency reported using mobile phones in their farming activities, demonstrating widespread adoption. This significant usage level correlates with increased revenue, as mobile phones are primarily used to order feed, communicate with customers, and find better market opportunities for duck eggs. On average, farmers with mobile phones achieved a daily revenue of IDR 992,000 from raising 620 ducks, suggesting that access to mobile communication technology helps streamline their business activities. This finding aligns with prior studies emphasizing the role of mobile phones in improving agricultural outcomes. For instance, Khan *et al.* (2022) found that mobile phones help reduce transaction costs, enabling farmers to connect with buyers and suppliers efficiently.

The use of mobile phones also allows smallholder farmers to access online agricultural resources and training. Abubakar *et al.* (2019) highlighted that mobile phones facilitate quick communication with extension services, helping farmers address technical issues effectively. This capability not only boosts productivity but also fosters innovation in agricultural practices. In summary, the presence of good communication tools, such as mobile phones, significantly contributes to the improvement of smallholder farmers' revenue. Policymakers and stakeholders should focus on increasing the availability of affordable mobile technologies to further enhance smallholder farmers' efficiency and income.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this study, mobile phone usage and credit access have a positive effect on the revenue of duck farmers. An increase in the utilization of these resources is associated with higher farmer income. The findings indicate that mobile phones improve market access, facilitate communication, and support better farm management, while credit availability enables investment in production inputs and infrastructure, all of which contribute to increased productivity and revenue.

These results highlight the importance of integrating digital tools and financial services to strengthen the economic resilience of smallholder farmers. Policies that encourage mobile technology adoption and provide accessible credit schemes, such as Kredit Usaha Rakyat (KUR), can play a vital role in enhancing the productivity and sustainability of the duck farming sector.

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NOVELTY STATEMENT

Duck business plays important role to generate income for farmers. Utilization of mobile phone and credit intersetting to be investigated, but up to present not much study on that. So this paper try to invetigated the impact of mobile phone and credit on revenue of duck farmer income.

AUTHOR'S CONTRIBUTIONS

All authors contribute to the conduct of research, the writing process, and in data analysis.

CONFLICT OF INTEREST

The authors state there is no conflict of interest.

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