# Factors Affecting Income from Public Agricultural Land Use: An Empirical Study from Vietnam

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## Abstract

The study aims to determine the factors and their influence on the income from using public agricultural land of households. Public agricultural land is agricultural land, including land for growing annual crops, perennial crops, and land for aquaculture, leased by commune-level People's Committees with a lease term of not more than 5 years. Secondary data were collected for the 2017–2021 period at state agencies. Primary data were collected from a survey of 150 households renting public agricultural land. The regression model assumed that there were 28 factors belonging to 7 groups. The test results show that 25 factors affect income, and 03 factors do not. The group of COVID-19 pandemic factors has the strongest impact, followed by the groups of agricultural product market factors, land factors, capital factors, production cost factors, labor factors, and climatic factors. The impact rate of COVID-19 pandemic factors is the largest (23.00%); The impact rate of climatic factors is the smallest (6.04%). Proposals to increase income include good implementation of disease prevention and control; increasing the land lease term; accurately forecasting the supply and demand of the agricultural market; raising the level of the household head; ensuring sufficient production capital, and adapting to the climate.

**Keywords:** Income, Public Agricultural Land, Yen Khanh, Vietnam

**JEL Classification Code:** F61, F43, H27, H25

## 1. Introduction

In Vietnam, public agricultural land is agricultural land managed by the commune-level People's Committee for the purposes prescribed by law. The area of public agricultural land must not exceed 5% of the total land area for growing annual crops, perennial crops, and aquaculture land of commune-level administrative units. When the commune-level People's Committee has not yet used it, it shall be leased to households to use for agricultural production purposes with a lease term of not more than 5 years. Land tenants can continue to lease for up to 5 years if there is a need and the State has not yet needed to use it for public purposes (National Assembly of Vietnam, 2013). Public farmland has a smaller area than other agricultural land, and its lease term is short. Plots of public land are often scattered and interspersed in residential areas and among other agricultural land plots. Households rent out public agricultural land to grow annual crops, perennial crops, and aquaculture to generate income (Yen Khanh People's Committee, 2022).

To date, there have been many studies related to the factors affecting income from agricultural land use in general. The studies evaluated the impact of one factor or several factors on the income from agricultural land use of households. Tran and Vu (2019) studied the impact of agricultural land fragmentation on the income from its use. Several other studies indicated the impact of education level on rural household income, including income from agricultural land (Le & Le, 2020; Vu et al., 2019; Nguyen et al., 2021). Other studies pointed out the factors affecting income from using certain types of agricultural land, but there is no research evaluating the factors affecting income from using public agricultural land. Especially the impact of its specific factors

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such as a short term land use, small area of a land plot, and dispersion and interlacing in residential areas. Studies have not assessed the impact of land tenure on income from land use. Therefore, this study aims to answer the following questions: *What are the factors affecting income from using public agricultural land, and to what extent do they affect income? What policy implications are needed to increase income from land use and contribute to improving the living standards of agricultural households?*

The study selected Yen Khanh district, Ninh Binh province, Vietnam as a test point for the research model because, by the end of 2021, the total area of leased public agricultural land is 422.67 ha belonging to 2,908 land plots with a total of 1,958 leased households (Yen Khanh People's Committee, 2022). To date, there have been no studies evaluating the factors affecting income from using this type of land. The main contents of this paper include a literature review, data and methods, results and discussion, conclusion, and recommendations to increase income from using public agricultural land.

## 2. Literature Review

Households' income from agricultural land use is the total amount earned by households after deducting expenses (Le & Nguyen, 2020; Monsura, 2020). The total proceeds, including cash and other assets, are converted into cash. Expenses include land rent, labor wages, mechanization costs, costs of plant varieties, livestock, fertilizer costs, plant protection drugs, asset depreciation costs, and interest. Credit, etc. (General Statistics Office of Vietnam, 2021). In other words, income from using public agricultural land is the amount remaining after taking total revenue minus total cost per unit area for a certain period. The unit of income calculation is usually millions of VND per hectare per year (Nhem et al., 2018). Income from agricultural land, in general, is affected by many different factors and also varies in the study areas and at different times in the same area. The researchers focused on assessing the impact of one or more factors on income from agricultural land use. Tran and Vu (2019) studied the impact of agricultural land fragmentation on income and pointed out the negative effects of this problem on land use and reduced land income. In addition, the study also shows the impact of household head on income. Nguyen et al. (2021) studied the impact of education level on the income of rural households, including income from agricultural land. In particular, the heads of households with a longer study period have a higher income than other households with a shorter education period. This finding is also similar to that of some previous studies (Le & Le, 2020; Nguyen et al., 2021; Venniker, 2000; Vu & Le, 2019).

Thus, income in general and income from using public agricultural land, in particular, are affected by many different factors, including land, people, natural conditions, socio-economic conditions, policies, laws of the state, natural disasters, epidemics, wars, etc. (DFID, 1999). The credit factor also affects household income (Afroz et al., 2019). An increase in credit increases the possibility of technical investment in production and increases labor productivity and, ultimately income. According to Calkins and Ngo (2010) and Vuong et al. (2021), the factor of participation in cooperatives also affects the income of households from using agricultural land because cooperatives facilitate members to access wider markets and sell products at a lower cost and buy seedlings, seeds, and fertilizers, pesticides at lower prices due to buying in bulk. The results of other studies show that the main factors affecting income from agricultural land include land area, level of loans from credit institutions, number of employees engaged in production, education level of the household head, biological costs, mechanization costs, and rice yield (Otsuka, 1996; Siêng, 2021). In addition, agricultural market factors, including supply and demand for agricultural products, also affect income from farmland (Démurger et al., 2011; Tao, 2004). Besides, a household's agricultural land area, education level, age of household head, and productive investment influence household income (Xinh et al., 2017). In addition to the day factor, according to (Nhi et al., 2011), the experience of the household head in agricultural production also has an impact on income. Households with more experience are often able to respond to changes in the production process more quickly and efficiently, so their income is higher than that of less experienced households.

The above studies have shown that factors affecting income from agricultural land include agricultural land area, number of employees, age, education level of household head, production costs, and labor productivity. activities, gender of the household head, etc. Even so, studies have not shown the impact of lease term, COVID-19 pandemic, climate, and other factors on income from using public farmland. Therefore, it is necessary to study their effects simultaneously with the impact of other factors.

## 3. Data and Methods

### 3.1. Data

Data on natural, socio-economic conditions and public agricultural land in the 2017–2021 period was collected at the Sub-Department of Statistics and the Department of Natural Resources and Environment of Yen Khanh district. Primary data is investigated through 2 steps. Step 1: conducted a random direct survey using pre-printed questionnaires on households using public agricultural land to identify factors that may affect income from using public agricultural land. The content of the questionnaire includes 19 hypothetical

factors affecting income from agricultural land inherited from previous studies, including production costs, number of employees, degree of mechanization, investment capital, etc. Each factor has 2 options respectively (affecting and not affecting income from using public agricultural land) for survey respondents to choose one of two options. In addition to 19 hypothetical factors, respondents are also suggested to add other influencing factors to the survey questionnaire. The number of respondents to the survey is determined by formula 1.

$$n = N/(1 + N * e^2) \qquad \text{(1) (Yamane, 1967)}$$

Where: $n$ - number of respondents (households) responding to the survey; $N$ - number of households renting public land; $e$ - allowable error ($e = 5$–$15\%$). In Yen Khanh district, since 2021, 1,958 households have been renting public land (Table 1), so with an error of 10% (the average value of the allowed error), the number of calculated respondents is 95.14. To increase the reliability of the evaluation results, the study investigated 150 people.

The results of data processing showed that 41 factors might have an impact, of which 22 factors were added by survey respondents, including a forecast of supply and demand for agricultural products, land lease term, shape, size of the land plot, soil quality, the impact of the COVID-19 pandemic, preventive measures, repetition cycle of the pandemic, etc. The study selected 28 factors with an assessment rate above 50% of the total respondents to increase the reliability of test results. The remaining 13 factors with an assessment rate of less than 50% were excluded, including participation in cooperatives, gender of the household head, etc. The selected factors are classified according to their characteristics into 7 groups (*Group of agricultural product market factors, Group of production cost factors; Group of land factors; Group of labor factors; Group of climatic factors; Group of capital factors; Group of COVID-19 pandemic factors*).

Each group of factors is considered as a latent variable (independent variable) and includes from 3 to 5 observed variables (factors that might impact) (Table 1). The dependent variable is the income from public agricultural land affected by the independent variables. The multivariable regression function showing the impact of factors on income from public agricultural land has the form of formula 2. The hypothetical model of factors affecting income from using public agricultural land is shown in Figure 1.

$$Y = \beta_0 + \beta_1 * MA + \beta_2 * PC + \beta_3 * LA + \beta_4 * LB + \beta_5 * CL + \beta_6 * CA + \beta_7 * CO + \varepsilon \qquad (2)$$

**Table 1:** Hypothetical Factors Affecting Income from Using Public Agricultural Land

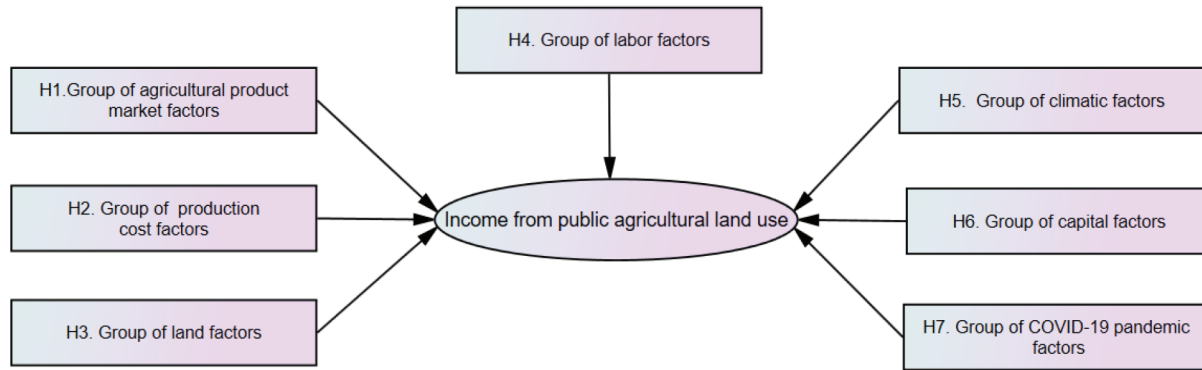| Hypothetical Factors | Hypothetical Factors |
|---|---|
| H1. Group of agricultural product market factors (MA) | Ability to judge the market (LB2) |
| Agricultural product demand (MA1) | Education level of the household head (LB3) |
| Supply of agricultural products (MA2) | Number of main labourers of the household (LB4) |
| Prices of agricultural products (MA3) | H5. Group of climatic factors (CL) |
| H2. Group of production cost factors (PC) | Temperature (CL1) |
| Land rent (PC1) | Number of sunny days (CL2) |
| Cost of crops and livestock (PC2) | Amount of rain (CL3) |
| Fertilizer cost (PC3) | Wind (CL4) |
| Labor cost (PC4) | H6. Group of capital factors (CA) |
| Other costs (PC5) | Equity capital (CA1) |
| H3. Group of land factors (LA) | Loans from credit institutions (CA2) |
| Land lease term (LA1) | Contributed capital of partners (CA3) |
| Area of a land plot (LA2) | Support capital (CA4) |
| Location of the land plot (LA3) | H7. Group of COVID-19 pandemic factors (CO) |
| The shape of the land plot (LA4) | Level of impact (CO1) |
| Soil quality (LA5) | Preventive Measures (CO2) |
| H4. Group of labor factors (LB) | Repeat cycle (CO3) |
| Gender of household head (LB1) | |

**Figure 1:** Hypothetical Model of Factors Affecting Income from Using Public Agricultural Land

Where: $Y$ is the dependent variable showing the level of impact of income from public agricultural land; $\beta_0$: constant; $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, $\beta_5$, $\beta_6$, $\beta_7$, regression coefficients of the corresponding latent variables that are Group of agricultural product market factors, Group of production cost factors; Group of land factors; Group of labor factors; Group of climatic factors; Group of capital factors; Group of COVID-19 pandemic factors; MA; PC; LA; LB, CL, CA, CO: independent latent variables that are Group of agricultural product market factors, Group of production cost factors; Group of land factors; Group of labor factors; Group of climatic factors; Group of capital factors; Group of COVID-19 pandemic factors. Ɛ: impact value of the factors that have not been determined.

Step 2 investigated the opinions of users of public agricultural land on the level of impact of each factor on income from using agricultural land fairly using pre-printed questionnaires. The content of the questionnaire included 28 selected impact factors and 5 levels of impact corresponding to each factor according to the Likert scale for respondents to choose one of 5 levels. Corresponding rating points for each respective level: (*Very impactful - 5 points; fairly impactful – 4 points; medium impactful – 3 points; little impactful – 2 points; very little impactful – 1 point*) (Likert, 1932).

The number of survey respondents was determined based on the minimum sample requirement for factor analysis to explore and test the multivariate regression model. Specifically, According to Hoang Nguyen (2008), each observed variable (influential factor) needs at least 5 samples for exploratory factor analysis. Therefore, with 28 observed variables (hypothetical impact factors) 28 * 5 = 140 people should be investigated. In addition, to test the multivariate regression model, the minimum number of votes is 50 + 8 * $p$ ($p$ – number of latent variables ($p = 7$)) (Tabachnick & Fidell, 1996), so the number of votes is 50 + 8 * 7 = 106. To simultaneously satisfy both requirements on the minimum number of votes and increase the reliability of the results, the study investigated 150 land users who responded to the survey in step 1.

### 3.2. Statistical Analysis

The impact level of each factor is determined according to the value of the impact index according to 5 levels (Very impactful - *the impact index ≥ 4,20*; quite impactful - *the impact index 3.40 ÷ 4.19*; medium impactful - *the impact index 2.60 – 3.39*; little impactful - *the impact index 1.80 ÷ 2.59*; not impactful - *the impact index < 1.80*) (Likert, 1932). The impact index of each factor is determined according to formula 3.

$$G_i = \frac{1}{n} * \sum_{i=1}^{q}\sum_{j=1}^{n} x_{ij} \tag{3}$$

Where $G_i$ is impact index of the $i$ factor; $n$: number of respondents; $q$: number of impact factors; $x_{ij}$: the $j^{th}$ respondent's score for factor $i$. The impact index of $k^{th}$ factor group is determined according to formula 4.

$$\text{Gav}_k = \frac{1}{p} * \sum_{k=1}^{m}\sum_{z=1}^{p} G_{kz} \tag{4}$$

Where $\text{Gav}_k$ is average impact index of $k^{th}$ factor group; $m$: number of factor groups; $p$: number of factors of group $k$; $G_{kz}$ the impact index of the $z^{th}$ factor in the $k^{th}$ group. The general impact level on income is determined by formula 5.

$$\text{Gav} = \frac{1}{m} * \sum_{k}^{m} \text{Gav}_k \tag{5}$$

Where Gav is the average impact index of all the factor groups (*general impact level on income*); $m$: number of factor groups; $\text{Gav}_k$ average impact index of the $k^{th}$ factor group.

The testing of the reliability of the scale by Cronbach's Alpha coefficient was to measure the internal consistency of variables in the same group (Cronbach, 1951). The scale can be used when the Cronbach Alpha coefficient is greater than or equal to 0.6, and the variables have a total correlation coefficient greater than 0.3 (Hoang & Nguyen, 2008; Hair et al. al., 2009).

According to Hair et al. (2009), the exploratory factor analysis (EFA) is used to shorten many measurement variables into a set of variables (factors) to make them more meaningful but still contain most of the information of the original set of variables. The EFA was assessed through KMO appropriate coefficient, Bartlett test, Eigenvalues coefficient, total explanatory variance, and load factor. Variables are only accepted when KMO is in the range from 0.5 to 1.0, and its weight factors in other factors are less than 0.35 (Igbaria et al., 1995) or the distance between two load weights. According to Hair et al. (2009), with a sample size of about 100, weights of 0.55 should be chosen, so for a sample size of 150, in this study, a load weight must be greater than 0.60. Besides, the scale is only accepted when the total variance explained is greater than 50%; Barlett's coefficient with Sig significance level less than 0.05 to ensure the factors are correlated with each other; Eigenvalue coefficients are valued from 1 to ensure the groups of factors are different.

## 4. Results and Discussion

During the 2017–2021 period, the area of public agricultural land in Yen Khanh district decreased year by year, from 901.22 ha to 495.40 ha due to being acquired for the construction of technical infrastructure works, social infrastructure, and land compensation for some households whose agricultural land has been acquired. The area of leased land also decreased from 691.95 ha to 422.67 ha (Table 2). The ratio of leased land area and the number of leased land plots also fluctuate from year to year due to changes in land area and the number of leased land plots. The total number of households renting land also decreased because public land was acquired for project implementation or allocated to households whose agricultural land was acquired, or because some households did not need to continue renting land (Yen Khanh People's Committee, 2022).

The average area of land plots in communes and towns also changed markedly from 565.49 m² to 4786.52 m² (8.46 times of difference). The annual land rent also decreased from VND

4705.292 million in 2017 to VND 2578.287 million in 2021 (29,945 VND = 1 USD). The lease term for public agricultural land ranges from 1 to 3 years. According to the assessment of households renting public agricultural land, the level of impact of different groups of factors on income from using public agricultural land is different (Table 3). The group of COVID-19 pandemic factors has the strongest impact (impact index of 4.26) due to the requirement of social distancing to prevent the spread of disease, so the production process is suspended, so the income from the land decreases markedly. Also, due to the impact of the COVID-19 pandemic, the weakness of the agricultural product market affects income because agricultural products are difficult to consume because they have to go through many quarantine steps, and the Government applies the main restriction on the circulation of goods. Government. The land factor also affects income (impact index of 3.77). Specifically, the current land lease term does not meet the requirements of investment to expand production to reduce production costs and meet the needs of the larger market. Land tenants want to lease land with a term of up to 10 years, equal to the duration of Vietnam's land use planning to have enough time to recover the investment capital and make a profit. The group of capital factors also has a strong impact on income (impact index of 3.49), in which the loan factor has the strongest impact (impact index of 4.74) because households mainly depend on loans from credit institutions (Table 3).

The results of assessing the reliability of the scale through Cronbach's alpha coefficients for 7 groups of factors in Table 4 show that Cronbach's alpha coefficients range from 0.755 to 0.863. The coefficient of total variable correlation ranges from 0.241 to 0.890 (Table 4). Some variables with correlation coefficients that do not meet the requirements (<0.60) should be excluded, including the gender of the household head, air temperature, and wind with correlation coefficients 0.467, 0.241, and 0.526, respectively.

After removing the variables that did not meet the requirements, the study re-tested the model and the test requirements had been met. The final results are shown in Table 5. The research results have determined that KMO =

**Table 2:** Changes in the Public Agricultural Land Area During the 2017–2021 Period

| Year | Total Land Area (ha) | Total Leased Areas | | Total Plots | Total Leased Plots | | Total Number of Households Renting Land |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Area (ha) | Percentage (%) | | Number of Plots | Percentage (%) | |
| 2021 | 495.40 | 422.67 | 85.32 | 3,092 | 2,908 | 94.05 | 1,958 |
| 2020 | 554.85 | 464.91 | 83.79 | 3,754 | 3,023 | 80.53 | 2,063 |
| 2019 | 593.69 | 488.66 | 82.31 | 3,986 | 3,698 | 92.77 | 2,310 |
| 2018 | 682.74 | 548.38 | 80.32 | 4,301 | 3,844 | 89.37 | 2,654 |
| 2017 | 901.22 | 691,95 | 76.78 | 4,552 | 4,029 | 88.51 | 3,503 |

**Table 3:** Impact of Factors on Income from Using Public Agricultural Land

| Group of Factors | Impact Index | Impact Level | Average Impact Index | Average Impact Level |
|---|---|---|---|---|
| I. Group of agricultural product market factors (PM) | | | 4.21 | VI |
| Agricultural product demand | 4.20 | VI | | |
| Supply of agricultural products | 3.93 | QI | | |
| Prices of agricultural products | 4.51 | VI | | |
| II. Group of production cost factors (PC) | | | 3.44 | QI |
| Land rent | 3.98 | QI | | |
| Cost of crops and livestock | 3.75 | QI | | |
| Fertilizer cost | 3.61 | QI | | |
| Labor cost | 3.02 | MI | | |
| Other costs | 2.84 | MI | | |
| III. Group of land factors (LA) | | | 3.77 | QI |
| Land lease term | 4.68 | VI | | |
| Area of a land plot | 4.23 | VI | | |
| Location of the land plot | 3.32 | MI | | |
| Shape of the land plot | 2.96 | MI | | |
| Soil quality | 3.64 | QI | | |
| IV. Group of labor factors (LB) | | | 3.15 | MI |
| Gender of household head | 2.35 | LI | | |
| Ability to judge the market | 4.08 | QI | | |
| Education level of the household head | 3.71 | QI | | |
| Number of main laborers of the household | 2.47 | LI | | |
| V. Group of climatic factors (CL) | | | 2.27 | LI |
| Temperature | 2.01 | LI | | |
| Number of sunny days | 2.64 | MI | | |
| Amount of rain | 1.95 | LI | | |
| Wind | 2.46 | LI | | |
| VI. Group of capital factors (CA) | | | 3.49 | QI |
| Equity capital | 4.63 | VI | | |
| Loans from credit institutions | 4.74 | VI | | |
| Contributed capital of partners | 2.65 | MI | | |
| Support capital | 1.94 | LI | | |
| VII. Group of COVID-19 pandemic factors (CV) | | | 4.26 | VI |
| Level of impact | 4.21 | VI | | |
| Preventive Measures | 4.53 | VI | | |
| Repeat cycle | 4.05 | QI | | |

VI: Very impactful; QI: Quite impactful; MI: Medium impactful; LI: Little impactful.

**Table 4:** Results of Analyzing the Reliability of the Scale

| Group of Factors | Total Variable Correlation | Group of Factors | Total Variable Correlation |
|---|---|---|---|
| H1. Group of agricultural product market factors (PM – Alpha = 0.883) | | Ability to judge the market | 0.804 |
| Agricultural product demand | 0.758 | Education level of the household head | 0.742 |
| Supply of agricultural products | 0.867 | Number of main laborers of the household | 0.624 |
| Prices of agricultural products | 0.793 | H5. Group of climatic factors (CL – Alpha = 0.863) | |
| H2. Group of production cost factors (PC – Alpha = 0.791) | | Temperature | *0.241* |
| Land rent | 0.890 | Number of sunny days | 0.667 |
| Cost of crops and livestock | 0.739 | Amount of rain | 0.674 |
| Fertilizer cost | 0.768 | Wind | *0.526* |
| Labor cost | 0.816 | H6. Group of capital factors (CA – Alpha = 0.819) | |
| Other costs | 0.697 | Equity capital | 0.772 |
| H3. Group of land factors (LA – Alpha = 0.803) | | Loans from credit institutions | 0.814 |
| Land lease term | 0.761 | Contributed capital of partners | 0.734 |
| Area of a land plot | 0837 | Support capital | |
| Location of the land plot | 0.768 | H7. Group of COVID-19 pandemic factors (CV – Alpha = 0.755) | |
| Shape of the land plot | 0.834 | Level of impact | 0.864 |
| Soil quality | 0.674 | Preventive Measures | 0.751 |
| H4. Group of labor factors (LB – Alpha = 0.864) | | Repeat cycle | 0.873 |
| Gender of household head | 0.467 | | |

**Table 5:** Results of Regression Analysis

| Factor Group | Standardized Regression Coefficient | t | Multi-Collinear Statistics | | Impact Rate (%) | Impact Rate Order |
|---|---|---|---|---|---|---|
| | | | Error (Sig.) | VIF | | |
| Constant | 4.510 | | | | | |
| MA | 0.453 | 5.521 | 0.000 | 1.662 | 12.97 | 3 |
| PC | −0.391 | 4.603 | 0.000 | 1.983 | 11.20 | 6 |
| LA | 0.749 | 6.751 | 0.000 | 1.557 | 21.45 | 2 |
| LB | 0.452 | 4.432 | 0.000 | 1.320 | 12.94 | 4 |
| CL | −0.211 | 3.503 | 0.000 | 1.628 | 6.04 | 7 |
| CA | 0.433 | 2.821 | 0.002 | 1.229 | 12.40 | 5 |
| CO | −0.803 | 2.339 | 0.000 | 1.872 | 23.00 | 1 |

Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.984. Sig. $F = 0.000$; $R^2 = 0.883$; Coefficient $R^2$ adjusted = 0.821. Durbin-Watson = 1.904.

0.984 and satisfying the condition 0.5 <KMO <1.0, so the exploratory factor analysis is appropriate for actual data. Besides, Barlett test results give a Sig value of less than 0.050 (Table 5). This proves that the measurement variables are linearly correlated with the representative factors. The adjusted $R^2$ value equal to 0.821 (Table 5) shows that the independent variables put into the regression have an impact on income from using public agricultural land with a rate of 82.10%. The remaining 17.90% are due to the non-model variables' random error. In addition, the Durbin Watson coefficient is 1.904, which is in the range of 1.0 to 2.0, so there is no autocorrelation detected in the sample (Table 5). In addition, the Durbin Watson coefficient is 1.904, which is in the range of 1.0 to 2.0, so there is no autocorrelation detected in the sample (Table 5). The variance inflating factor (VIF) for all variables in the model is less than 2, so the model does not exhibit multicollinearity. Moreover, the variables in the study are statistically significant (Sig. = 0.000 and less than 0.050). From standardized regression coefficients, the study has determined the regression equation that has the following form (6):

$$Y = 4.510 + 0.453 * MA - 0.391*PC + 0.749 * LA$$
$$+ 0.452 * LB - 0.211 * CL + 0.433 * CA$$
$$- 0.803 * CO \qquad (6)$$

Income from using public agricultural land is affected by 25 factors belonging to 7 groups, in which 4 groups of factors (MA, LA, LB, CA) have a positive impact on income and 3 groups of factors (PC, CL, CO) have a negative impact on income (Table 5). The group of COVID-19 pandemic factors has the largest impact rate (impact rate of 23.00%). The group of climate factors has the smallest impact rate (impact rate of 6.04%) and is 3.81 times smaller than the impact rate of the COVID-19 pandemic factor group. The soil factor group has an impact rate close to that of the COVID-19 pandemic group (21.45% and 23.00%, respectively). Thus, it can be seen that land factors also have a strong impact on income from land use, in which land lease term has the strongest impact (impact index of 4.68), followed by land parcel area with an impact index of 4.23. The groups of market, labor, and investment capital factors have similar impact rates, respectively 12.97%, 12.94%, and 12.40%. The production cost factor group has a slightly smaller impact rate (11.20%) (Table 3). As such, the income derived from using public agricultural land is influenced by the same factors as in previous studies, such as labor, market, production costs, investment capital, and the education level of the household head. Meanwhile, income from using public agricultural land is influenced by the COVID-19 Pandemic, land lease term, area of a land plot, distribution of land plots, and the ability of household heads to decide on production processes according to market demand. Additionally, the study identified some factors that have not affected income from using public agricultural lands, such as household head gender, participation in cooperatives, war, and climate factors.

## 5. Conclusion and Recommendations

Public agricultural land having a lease period of no more than 5 years, a small area, and a dispersed distribution, like agricultural land in general, should be affected by factors affecting income from agricultural land use in general. However, income from public agricultural land is also affected by other factors such as land lease term, which limits the ability to invest in production expansion and reduces income from land use. The average area of the land plot is small, and the land parcels are scattered, increasing production costs and limiting the application of mechanization to production. To increase income from using public agricultural land, it is necessary to do well in forecasting and responding to pandemics. At the same time, it is necessary to increase the land lease term from 5 years to 10 years (equal to the term of the land-use planning). As a result, tenants are more likely to expand production.

In addition, it is necessary to encourage farmers to accumulate and concentrate agricultural land to facilitate the farming process, reduce costs, and increase income from using agricultural land. In particular, state agencies need to accurately forecast the market's supply and demand for agricultural products so that households can have appropriate production plans. Credit institutions need to have a reasonable credit interest rate policy, simple loan procedures, a loan term suitable for public agricultural land use, and a time to recover investment capital. This study has only evaluated the impact of factors on income from using public agricultural land in Yen Khanh district, so it is necessary to study further their impact on income from using public agricultural land in other localities.

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