

DETERMINANTS OF LABOR ALLOCATION IN LONTAR FARMING IN OETUTULU VILLAGE, NORTHWEST ROTE DISTRICT, ROTE NDAO REGENCY
(Faktor Penentu Terhadap Curahan Kerja Usahatani Lontar Di Desa Oetutulukecamatan Rote Barat Laut Kabupaten Rote Ndao)

Maria Eresta Sinar¹, Johanna Suek², Aplonia Bani³, Ernantje Hendrik⁴
Agribusiness Department, Faculty of Agriculture, University of Nusa Cendana
Corresponding Author: restasinar29@gmail.com

Received: 11th August, 2025Accepted: 19th August, 2025

ABSTRACT

Lontar palm is a leading commodity in Rote Ndao Regency, particularly for rural communities that depend on its products, such as palm sugar, palm wine, and handicrafts. However, lontar farming is still carried out traditionally and faces various constraints, including limited equipment, labor availability, and market access that remains suboptimal. The basic method used in this study was descriptive quantitative research. This study aimed to identify the profile of lontar farming, describe the profile of lontar farming, and estimate the determinants of labor allocation in lontar farming. Respondents were selected randomly using a simple random sampling method, involving 55 lontar tappers. The analytical techniques used were man-days (HOK) analysis and multiple linear regression analysis. The results showed that the average labor allocation of lontar farmers was 28.6 man-days per season, with tapping being the activity that absorbed the greatest amount of labor. Based on the multiple linear regression analysis of the seven variables examined, namely age, education, number of family members, labor, farming experience, number of trees, and number of inflorescence clusters per tree, only the number of trees had a significant effect on labor allocation. This means that the more trees tapped by farmers, the greater the labor required.

Keywords: Lontar, farming, labor allocation

ABSTRAK

Lontar Lontar merupakan komoditas unggulan di Kabupaten Rote Ndao, terutama bagi masyarakat pedesaan yang mengandalkan hasilnya seperti gula, tuak dan kerajinan tangan. Namun, kegiatan usahatani lontar masih dilakukan secara tradisional dan menghadapi berbagai kendala, seperti keterbatasan alat, tenaga kerja, serta akses pasar yang belum optimal. Metode dasar penelitian ini adalah deskriptif kuantitatif. Penelitian bertujuan untuk mengetahui profil usahatani lontar, mendeskripsikan profil usahatani lontar, mengestimasi faktor penentu terhadap curahan kerja usahatani lontar. Penentuan responden dilakukan secara acak menggunakan metode simple random sampling dengan jumlah 55 petani penyadap lontar. Teknik analisis menggunakan Hari Orang Kerja (HOK) dan analisis linear berganda.

Hasil penelitian menunjukkan bahwa rata-rata curahan kerja petani lontar adalah 28,6 Hari Orang Kerja (HOK) per musim, dengan kegiatan penyadapan menjadi aktivitas yang paling banyak menyerap tenaga kerja. Berdasarkan analisis linear berganda dari tujuh variabel yang diteliti (umur, pendidikan, jumlah anggota keluarga, tenaga kerja, pengalaman usahatani, jumlah pohon, jumlah malai rangkai per pohon), hanya jumlah pohon yang menunjukkan pengaruh signifikan terhadap curahan kerja. Artinya semakin banyak pohon yang disadap oleh petani maka semakin tinggi pula tenaga kerja yang diperlukan.

Kata Kunci: Lontar, Usahatani, Curahan Kerja

INTRODUCTION

Agriculture is the main sector with the highest labor absorption in Indonesia. The high level of labor absorption is caused by several key factors, including the agricultural sector gross regional domestic product, land area, minimum wage, farmers' terms of trade, and unemployment rate (Fauziyah et al., 2023). Labor absorption is needed to balance the growth rate of the young working-age population entering the labor market. An imbalance between labor-force growth and job creation can lead to an increase in unemployment. High unemployment can result in the waste of existing

resources and labor-force potential, thereby becoming a major source of poverty, encouraging increased social unrest, and hampering long-term economic development (Departemen Tenaga Kerja dan Transmigrasi, 2004).

One agricultural subsector with potential for labor absorption is lontar palm farming. Lontar palm has relatively high economic value; therefore, its optimal management can serve as an alternative solution for creating new employment opportunities and supporting unemployment reduction, particularly in rural areas. Lontar palm (*Borassus flabellifer*) is one of the plantation crops growing in Indonesia and is distributed in several regions, especially Southeast Asia and South Asia. This plant predominantly grows in areas with relatively hot and dry temperatures, such as East Nusa Tenggara, Sulawesi, and Central Java (Husaini et al., 2020). One region in eastern Indonesia that has abundant lontar resources is East Nusa Tenggara (NTT), where lontar palms are widely found in several areas such as Rote, Sabu, and Timor.

Northwest Rote District is one of the largest lontar-producing areas in Rote Ndao Regency, with the largest number of lontar palms and an area of 3,146 ha (BPS Rote Ndao, 2023). This area borders the Savu Sea to the north, Southwest Rote District to the south, Lobalain District to the east, and West Rote District to the west. The district capital is Busalangga, and the area covers 98.53 km², consisting of 12 villages and 1 urban village (BPS Rote Barat Laut, 2023).

The availability of labor in lontar farming in Rote Ndao Regency plays an important role in supporting the production and management of lontar palms. Lontar palms require substantial labor in various processes, such as sap tapping, processing into sugar, and product marketing. In this region, the labor force is relatively large; however, many farmers still use traditional and less efficient methods in processing lontar. This condition keeps productivity low. In addition, many young people prefer to work in urban areas rather than in the fields, thereby reducing the labor supply. Therefore, training is needed so that laborers can master modern techniques for managing lontar farming more effectively.

Lontar farming in Rote Ndao Regency faces various problems that hinder its growth. One of the main problems is the very limited use of technology, meaning that many processes are still carried out manually. This causes the production of lontar sugar and other products to be less than optimal. In addition, many farmers do not know better processing methods and effective marketing strategies, making it difficult to sell harvested products at favorable prices. Another problem is the low interest of the younger generation in working in the agricultural sector, which further reduces the number of available workers. These constraints need to be addressed so that lontar farming can develop better in the future. Therefore, this paper aims to identify the profile of lontar farming, describe the profile of lontar farming, and estimate the determinants of labor allocation in lontar farming.

METHODS

This research was conducted in February 2025 in Oetutulu Village, Northwest Rote District, Rote Ndao Regency. The sample was selected randomly from 355 lontar tappers using a proportion of 15%, resulting in 55 respondents. The data used consisted of primary data obtained through direct observation and interviews in the field, as well as secondary data sourced from relevant institutions such as the Central Bureau of Statistics (BPS) and journals. Data collection techniques included interviews, documentation, and observation.

The data analysis method used to answer the second objective of this study, namely to determine the value of labor allocation in lontar farming, was man-days (HOK) analysis. Meanwhile, to answer the third objective, namely to estimate the determinants of the labor allocation value in lontar farming, multiple linear regression analysis was applied. This analysis was used to determine the magnitude of the influence of X1 (age), X2 (education), X3 (number of family members), X4 (labor), X5 (farming experience), X6 (number of trees), and X7 (inflorescence clusters per tree) on labor allocation (Y). The analytical model was formulated as follows:

$$\text{HOK} = (\text{number of workers} \times \text{working days} \times \text{working hours}) / \text{standard working hours}$$

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

where:

Y = Labor allocation

X1 = Farmer age

X2 = Education

X3 = Number of family members

X4 = Labor

X5 = Farming experience

X6 = Number of trees

X7 = Number of inflorescence clusters per tree

a = Intercept (constant)

b = Regression coefficient

Before conducting the regression test, classical assumption tests were first performed to avoid uncertain estimates. The classical assumption tests included the normality test, multicollinearity test, heteroscedasticity test, partial test (t-test), and simultaneous test (F-test).

RESULT AND DISCUSSION

Overview of the Research Location

Oetutulu Village is one of the villages in Northwest Rote District, Rote Ndao Regency, East Nusa Tenggara, located approximately 3 km from the district capital and 13 km from the regency capital. Administratively, the village borders Daudolu Village to the west, Ingguinak to the south, East Busalangga to the east, and Saindale to the north. Oetutulu Village covers an area of 3,960 hectares (39.6 km²) and has a population of 1,471 people, consisting of 754 males and 717 females distributed across 9 hamlets, 9 community units (RW), and 18 neighborhood units (RT). The majority of the population is Protestant Christian (1,465 people), with a small Muslim minority (6 people). The education level of the community is dominated by elementary school graduates, while access to higher levels of education remains limited. The population density is recorded at 634 people/km² with a sex ratio of 105.

Profile of Lontar Farming

Rote Ndao Regency is one of the largest lontar palm (*Borassus flabellifer*) producing regions in Indonesia. Lontar palms play an important role in the economic and social life of the community, particularly as a source of raw materials for food products, beverages, and handicrafts. One of the main products produced is lontar sugar, which has advantages in terms of nutritional content and a low glycemic index. In addition, sap is also fermented into palm wine, a traditional beverage with local cultural value. Meanwhile, lontar leaves and stems are used to make house roofing, mats, baskets, and furniture.

Oetutulu Village, located in Northwest Rote District, is one of the centers of lontar farming in Rote Ndao. With lowland topography (0-174 meters above sea level) and a dry climate, this village is highly suitable for lontar palm growth. Most of the population works as lontar farmers through traditional, intergenerational systems. Sap tapping is carried out twice daily during two main seasons, namely the Timu season (April-July) and the Fanduk season (August-November). On average, farmers tap approximately 15 lontar palms, with an average spacing between trees of approximately 4.93 meters. Labor comes from household members, where tapping is performed by the household head or sons, while sap transportation is carried out by wives and children.

Lontar production and processing in Oetutulu Village still use simple equipment, such as knives, buckets, jerry cans, and ropes. Nevertheless, lontar products have high demand from both local markets and tourists. The main challenges in developing lontar enterprises include limited technology, marketing, and the lack of human resource skills in product processing and packaging.

Respondent Characteristics

Based on the research results, the average age of lontar tappers in Oetutulu Village was 49 years, with a standard deviation of 12. The oldest respondent was 77 years old, while the youngest was 25 years old. It can be concluded that respondents of productive age outnumbered those of nonproductive age. According to Law Number 13 of 2003, the productive age group consists of individuals aged 15 to 64 years.

Based on respondent data, the average length of formal education of lontar tappers in Oetutulu Village was 6 years, equivalent to elementary school. The lowest education level was 6 years

(elementary school), and the highest was 12 years (senior high school). This indicates that most farmers still had relatively low education levels. However, low formal education does not prevent individuals from having broad knowledge and insight. Farmers with low education levels can obtain additional information from other activities, such as agricultural extension.

Based on the research results, the average tapping experience in Oetutulu Village was 26 years, with a standard deviation of 13. The highest variation in farming experience was 59 years, while the lowest was 3 years. Farming experience in Oetutulu Village was relatively long, which may contribute to farmers' skills and knowledge in managing lontar farming.

Based on the research results, the average number of family members in Oetutulu Village was 5 people, with a standard deviation of 1. The highest number of family members was 8 people, and the lowest number of family dependents was 3 people. This shows that most farmers bear considerable family responsibilities, which can influence economic needs, labor availability, and productivity. Meanwhile, the average number of trees tapped by farmers in Oetutulu Village was 15.31 trees, with a standard deviation of 6.52. There was variation in the number of trees, with the highest number being 30 trees and the lowest number being 4 trees. Furthermore, the average number of inflorescence clusters tapped by farmers in Oetutulu Village was 4.27 clusters, with a standard deviation of 1.35. There was also variation in the number of inflorescence clusters, with the highest number being 7 clusters and the lowest number not specified in the source document.

The average yield of lontar sap was 5.36 liters/tree/day/farmer. During the Fanduk season, the average sap production was 6.9 liters/tree/day. The study by Suek et al. (2025) also stated that sap production during the Fanduk season was higher than sap obtained during the Timu season. The study found that sap production was 31.88 liters/farmer/day during the Timu season, while the average production during the Fanduk season was approximately 61.31 liters/farmer/day. Meanwhile, when calculated for one year, a farmer was able to produce 93.22 liters of lontar sap/farmer/day in one year, based on the sum of daily sap production per farmer in the two seasons. Tapping days totaled 106.2 days during the Timu season and 83.05 days during the Fanduk season, making the annual total 189.25 tapping days. Accordingly, the average sap production per farmer per season was 956.34 liters during the Timu season, while the average sap production per farmer during the Fanduk season was 5,094.37 liters. The annual accumulated sap from average sap production per farmer per season was 6,050.71 liters. Furthermore, the average price of sap per liter during the Timu season was Rp2,000, the average price during the Fanduk season was Rp2,000, and the average annual price of sap per liter was Rp2,000.00. Further details are presented in Table 1.

Table 1. Average Production of Lontar Sap Farmers in Oetutulu Village, Northwest Rote District

| Description | Timu Season (106.2 days) | Fanduk Season (83.05 days) | Year (189.25 days) |
|-------------------------------|--------------------------|----------------------------|--------------------|
| Tapped trees/farmer/season | 6.44 | 8.89 | 15.33 |
| Sap/tree/one tapping | 2.48 | 3.45 | 5.93 |
| Sap/tree/day | 4.95 | 6.91 | 11.85 |
| Sap/farmer/day | 31.88 | 61.31 | 93.22 |
| Sap/farmer/month | 956.34 | 1,840.23 | 2,796.57 |
| Number of tapping days/season | 106.2 | 83.05 | 189.25 |
| Sap/farmer/season | 956.34 | 5,094.37 | 6,050.71 |
| Sap price/liter | 2,000 | 2,000 | 2,000 |

Source: Primary Data, Processed 2025

Labor Allocation in Lontar Farming

To determine the magnitude of labor allocation in lontar farming in Northwest Rote District, Rote Ndao Regency, man-days (HOK) analysis was conducted. This aimed to determine the value of labor allocation in lontar farming in activities such as tree cleaning, tapping, and sap transportation. The labor allocation in lontar farming is presented in Table 2.

Table 2. Labor Allocation in Lontar Farming

| No. | Activity | Total HOK | Average per Season |
|-----|--------------------|-----------|--------------------|
| 1 | Tree cleaning | 1,188.07 | 17.84 |
| 2 | Tapping | 1,813.31 | 1,416.36 |
| 3 | Sap transportation | 1,525.60 | 1,801.38 |

Source: Primary Data, Processed 2025

Tree cleaning is an important initial stage in lontar farming in Oetutulu Village, Northwest Rote District, Rote Ndao Regency. This activity aims to clean the trunk and the area around the tree from moss, shrubs, and other debris to support the smoothness and safety of the tapping process. Conducted manually using simple tools such as machetes or sickles, this activity requires precision and caution because it is directly related to the quality and quantity of sap produced. Clean trees tend to produce more hygienic and higher-quality sap. Labor in this activity generally comes from farmer family members, especially the household head or sons who are sufficiently strong and trained. This work is usually carried out in the morning before tapping or in the afternoon after tapping is completed. During one season, the total labor used reached 1,188.07 HOK, with an average of 17.84 HOK, consisting of men, women, and children.

Tapping is the main stage in lontar farming in Oetutulu Village, where farmers obtain sap to be processed into products such as sugar and palm wine. This process is carried out twice daily, in the morning (04.00-07.00 WITA) and in the afternoon (16.00-18.00 WITA), by slicing the lontar palm inflorescence using traditional tools. Tapping is performed by the household head or adult sons because it requires skill, precision, and courage to climb the tree. Each session lasts 2-3 hours and is performed manually without modern equipment. Sap is collected in jerry cans or buckets to be brought home and processed. In one season, tapping involved male labor of 1,813.31 HOK, with an average of 1,416.36 HOK.

Sap transportation in Northwest Rote District is carried out manually by family members, especially wives and children, by carrying jerry cans or buckets filled with sap from the garden or tapping location to the house or processing site. This activity is performed immediately after tapping to maintain sap quality and prevent rapid fermentation. It requires punctuality, physical endurance, and family cooperation. During one season, sap transportation involved male, female, and child labor amounting to 1,525.60 HOK, with an average of 1,801.38 HOK.

To identify the factors influencing lontar farming labor allocation, testing was conducted using classical assumption tests in multiple linear regression analysis.

Normality Test

The normality test is one of the classical assumption tests used to determine whether the data are normally distributed. One method is the One-Sample Kolmogorov-Smirnov normality test, which was used in this study. Under the classical assumption, the data must be normally distributed.

Table 3. Normality Test

| One-Sample Kolmogorov-Smirnov Test | Unstandardized Residual |
|---|-------------------------|
| N | 55 |
| Normal Parameters ^{a,b} : Mean | 0.000000 |
| Normal Parameters ^{a,b} : Std. Deviation | 2.10574523 |
| Most Extreme Differences: Absolute | 0.073 |
| Most Extreme Differences: Positive | - |
| Most Extreme Differences: Negative | -0.058 |
| Test Statistic | 0.073 |
| Asymp. Sig. (2-tailed) | 0.200c,d |

Source: SPSS 26 Regression Output

In the normality test using the One-Sample Kolmogorov-Smirnov method, the value used as the benchmark for determining data normality is Asymp. Sig. (2-tailed). Based on the One-Sample

Kolmogorov-Smirnov Test results, a significance value of 0.200 was obtained, which is greater than 0.05. This indicates that the residual data were normally distributed and did not show a significant difference from the normal distribution.

Multicollinearity Test

The multicollinearity test was used to examine the relationship or correlation among independent variables in the regression model. A good regression model should not have correlation among independent variables. The absence of multicollinearity can be detected from the variance inflation factor (VIF) value of less than 10 and tolerance value greater than 0.10.

Table 4. Multicollinearity Test

| Model | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
|--------------------------|--------|------------|--------|--------|-------|-----------|-------|
| (Constant) | 1.056 | 0.531 | | 1.991 | 0.052 | | |
| Age | 0.147 | 0.129 | 0.140 | 1.141 | 0.260 | 0.516 | 1.938 |
| Education | -0.105 | 0.118 | -0.081 | -0.886 | 0.380 | 0.936 | 1.068 |
| Number of family members | 0.042 | 0.058 | 0.070 | 0.725 | 0.472 | 0.841 | 1.190 |
| Labor | 0.029 | 0.083 | 0.032 | 0.348 | 0.729 | 0.910 | 1.099 |
| Farming experience | -0.017 | 0.045 | -0.047 | -0.379 | 0.706 | 0.508 | 1.967 |
| Number of trees | 0.424 | 0.051 | 0.780 | 8.305 | 0.000 | 0.884 | 1.131 |
| Inflorescence clusters | 0.059 | 0.061 | 0.087 | 0.961 | 0.341 | 0.951 | 1.052 |

Source: SPSS 26 Regression Output

The multicollinearity test showed that there were no symptoms of multicollinearity, as shown in Table 4, where the variance inflation factor (VIF) values were less than 10 and tolerance values were greater than 0.10. The highest VIF value was found in farming experience at 1.967, while the lowest VIF value was 1.052 for inflorescence clusters, with a tolerance value of 0.951. The lowest tolerance value was 0.516 for age.

Heteroscedasticity Test

The heteroscedasticity test aimed to examine whether the regression model experienced unequal variance of residuals from one observation to another. The heteroscedasticity test used in this study was the Glejser test. If the significance value (Sig.) was greater than 0.05, no heteroscedasticity occurred; conversely, if the significance value was less than 0.05, heteroscedasticity occurred.

Table 5. Heteroscedasticity Test Using the Glejser Test

| Model | B | Std. Error | Beta | t | Sig. |
|--------------------------|--------|------------|--------|--------|-------|
| (Constant) | 2.047 | 4.754 | | 0.431 | 0.669 |
| Age | 0.762 | 1.152 | 0.129 | 0.661 | 0.512 |
| Education | 0.978 | 1.056 | 0.134 | 0.926 | 0.359 |
| Number of family members | -0.013 | 0.522 | -0.004 | -0.025 | 0.980 |
| Labor | 0.181 | 0.744 | 0.036 | 0.243 | 0.809 |
| Farming experience | -0.108 | 0.403 | -0.053 | -0.267 | 0.790 |
| Number of trees | 0.231 | 0.457 | 0.075 | 0.505 | 0.616 |
| Inflorescence clusters | -0.792 | 0.545 | -0.209 | -1.451 | 0.153 |

Source: SPSS 26 Regression Output

The heteroscedasticity test showed that there were no symptoms of heteroscedasticity. This was proven by significance values (Sig.) greater than 0.05, with the highest value of 0.980 and the lowest

value of 0.153. Therefore, the regression equation was considered to have passed the classical assumption tests and was feasible for further statistical analysis.

Coefficient of Determination

The coefficient of determination (Adjusted R²) measures how far the model is able to present the joint influence of the independent variables (X), namely age, education, number of family members, labor, farming experience, number of trees, and inflorescence clusters per tree, on the dependent variable (Y), namely labor allocation.

Table 6. Adjusted R Square Value

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|--------|----------|-------------------|----------------------------|
| 1 | 0.796a | 0.634 | 0.579 | 0.15961 |

Source: SPSS 26 Regression Output

The determination test showed that the Adjusted R Square value was 0.579, indicating that 57.9% of the variation in labor allocation in lontar farming was explained by the independent variables, namely age, education, number of family members, labor, farming experience, number of trees, and inflorescence clusters. Meanwhile, the remaining 42.1% was explained by variables not included in the regression model.

Simultaneous Test (F-Test)

The simultaneous test was used to examine the joint effect of the independent variables on the dependent variable. Simultaneous testing was conducted using the F-test by comparing the probability of the calculated F value with the significance level ($\alpha = 5\%$).

Table 7. Simultaneous Test Results (F-Test)

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|--------|--------|
| Regression | 2.071 | 7 | 0.296 | 11.615 | 0.000b |
| Residual | 1.197 | 47 | 0.025 | | |
| Total | 3.269 | 54 | | | |

Source: SPSS 26 Regression Output

The simultaneous test showed a significance value (Sig.) of 0.000, which was less than 0.05, and a calculated F value of 11.615. This indicates that, simultaneously, the independent variables consisting of age, education, number of family members, labor, farming experience, number of trees, and inflorescence clusters had a significant effect on the dependent variable, namely labor allocation.

Partial Test (t-Test)

The t-test was conducted to examine the individual effect of each variable on lontar farming production in Oetutulu Village, Northwest Rote District, Rote Ndao Regency.

Table 8. t-Statistic Test

| Model | B | Std. Error | Beta | t | Sig. |
|--------------------------|--------|------------|--------|--------|-------|
| (Constant) | 1.056 | 0.531 | | 1.991 | 0.052 |
| Age | 0.147 | 0.129 | 0.140 | 1.141 | 0.260 |
| Education | -0.105 | 0.118 | -0.081 | -0.886 | 0.380 |
| Number of family members | 0.042 | 0.058 | 0.070 | 0.725 | 0.472 |
| Labor | 0.029 | 0.083 | 0.032 | 0.348 | 0.729 |
| Farming experience | -0.017 | 0.045 | -0.047 | -0.379 | 0.706 |

| Model | B | Std. Error | Beta | t | Sig. |
|------------------------|-------|------------|-------|-------|-------|
| Number of trees | 0.424 | 0.051 | 0.780 | 8.305 | 0.000 |
| Inflorescence clusters | 0.059 | 0.061 | 0.087 | 0.961 | 0.341 |

Source: SPSS 26 Regression Output

The partial test showed that, of the seven independent variables tested against the dependent variable of labor allocation (age, education, number of family members, labor, farming experience, number of trees, and inflorescence clusters), only one variable had a statistically significant effect at the 5% significance level, namely the number of trees, with a significance value of $0.000 < 0.05$.

The factors presumed to influence labor allocation in lontar farming are explained as follows.

The number of trees was the only significant variable in this analysis, with a significance value of 0.000 and a positive coefficient of 0.424. This means that the more lontar trees owned, the greater the labor and time required for management. This finding is highly logical because each tree requires maintenance, climbing, tapping, and product processing. Chiarella et al. (2023) also emphasized that the number of production units, such as trees or land, directly increases work intensity in the subsistence agricultural sector due to limited mechanization and high dependence on manual labor.

The age variable did not have a significant effect, with a significance value of $0.260 > 0.05$. The nonsignificance of farmer age in Oetutulu Village indicates that farmer involvement in lontar farming activities is not limited by age. Although farmers may be elderly, labor allocation can still be fulfilled through the participation of family members. This is based on the findings of Njeru et al. (2020), which indicated that age is not always directly proportional to labor productivity in the context of family farming.

The education variable did not have a significant effect, with a significance value of $0.380 > 0.05$, indicating that education did not significantly affect labor allocation in lontar farming in Oetutulu Village. Farmer education is often viewed as an important factor that can improve efficiency, decision-making ability, and technology use in agriculture. However, in this study, farmer education level was not a determinant of the amount of labor or time devoted to lontar farming. This finding is consistent with Asfaw and Admassie (2004), who stated that although education influences technology adoption, it is not always directly related to field work intensity.

The number of family members did not have a significant effect, with a significance value of $0.472 > 0.05$, indicating that the number of family members did not significantly affect labor allocation in lontar farming in Oetutulu Village. In household labor theory, a larger number of family members implies greater availability of internal labor for agricultural activities. However, the results of this study show that the number of family members did not have a significant effect on labor allocation. This may be explained by the fact that not all family members are directly involved in farming activities; some may still be children or may work in other sectors. This is supported by Kuyvenhoven et al. (2004), who showed that a large family does not always mean a large labor force because family dynamics also include dependency, gender roles, and work preferences. Therefore, simply counting individuals is not sufficient to estimate their contribution to labor allocation.

The labor variable did not have a significant effect, with a significance value of $0.729 > 0.05$, indicating that labor did not significantly affect labor allocation in lontar farming in Oetutulu Village. Theoretically, the more labor available, the higher the intensity of labor allocation. However, the results of this study showed that the labor variable did not have a significant effect on labor allocation. This is reinforced by the findings of Farmasari and Nasir (2023), who found that labor did not significantly affect coffee farmers' income in Bener Meriah Regency because family labor was not formally paid, making its contribution to income difficult to measure directly, particularly in small-scale farming systems.

The farming experience variable did not have a significant effect, with a significance value of $0.706 > 0.05$, indicating that farming experience did not significantly affect labor allocation in lontar farming in Oetutulu Village. Although farming experience is often considered an accumulation of practical knowledge that affects work efficiency and effectiveness, the results of this study showed that farming experience did not have a significant effect on labor allocation. This is based on the findings of Lawal (2014), who stated that long experience does not always correlate positively with

labor allocation because experienced farmers tend to be more efficient and know when to work and when to conserve energy. Farmers who have long been involved in agriculture tend to have work systems that save energy and time.

The inflorescence cluster variable did not have a significant effect, with a significance value of $0.341 > 0.05$, indicating that the number of inflorescence clusters did not significantly affect labor allocation in lontar farming in Oetutulu Village. The number of inflorescence clusters is often associated with labor allocation in lontar farming because the more clusters that emerge and develop, the more work time is required, especially for tapping. However, based on the research results, the number of clusters did not significantly affect labor allocation. Thus, even when many clusters exist, farmers may not conduct tapping. Another reason is that the inflorescence clusters may be immature and not yet tappable because they have not developed sufficiently to produce sap. This explains why the number of clusters did not affect labor allocation; a large number of clusters does not necessarily increase labor and work time when they are not yet productive. This finding is consistent with Indrawati (2018), who showed that in oil palm farming, production potential does not always significantly affect labor absorption. In oil palm farming, the number of bunches or high production does not directly increase labor use because work activities are more determined by the productive phase of the plant, harvest schedule, and farmer decisions in managing the farm.

CONCLUSION AND RECOMMENDATION

Conclusions

1. The profile of lontar farming in Oetutulu Village, Northwest Rote District, still uses traditional and intergenerational methods. Farmers use simple equipment and involve family members in the processes of tree cleaning, tapping, and sap transportation.
2. The average labor allocation of lontar farmers was 28.6 man-days (HOK) per season. The activity that absorbed the greatest amount of labor was tapping, followed by sap transportation and tree cleaning. The labor used came from within the family.
3. Of the seven variables analyzed, namely age, education, number of family members, number of workers, farming experience, number of trees, and number of inflorescence clusters per tree, only the number of trees had a significant effect on labor allocation. This means that the greater the number of trees owned and tapped by farmers, the greater the labor allocation required.

Recommendation

1. For lontar farmers, as the main actors in lontar farming, it is necessary to continuously improve capacity and skills in production, labor management, and product processing. The results of this study show that the number of tapped trees is the main factor influencing labor allocation. Therefore, farmers should be able to allocate labor efficiently so that high labor allocation does not cause fatigue that may affect long-term productivity.
2. For other researchers, this study can serve as a reference or starting point for researchers who wish to examine social, economic, and technical aspects of lontar farming in greater depth. Future research is recommended to further explore the relationship between labor allocation and output productivity, as well as to analyze the influence of other variables such as access to technology, business capital, and farmer institutions.
3. For the government and policymakers, local governments, particularly the Agriculture Office of Rote Ndao Regency, are expected to be more proactive in designing sustainable lontar farmer empowerment programs. The results of this study indicate that lontar farming has great potential for absorbing labor; therefore, government support is very important to improve farmer efficiency and welfare.

REFERENCES

- Asfaw, A., & Admassie, A. (2004). The role of education on the adoption of chemical fertilizer under different socioeconomic environments in Ethiopia. *Agricultural Economics*, 30(3), 215-228.
- Badan Pusat Statistik Kecamatan Rote Barat Laut. (2023). Kecamatan Rote Barat Laut dalam angka 2023. <https://rote-ndaokab.bps.go.id>

- Badan Pusat Statistik Kabupaten Rote Ndao. (2023). Kabupaten Rote Ndao dalam angka 2023. Rote Ndao: BPS Kabupaten Rote Ndao.
- Chiarella, C., Meyfroidt, P., Abeygunawardane, D., & Conforti, P. (2023). Balancing trade-offs between land productivity, labor productivity, and work intensity. *Ambio*, 52(10), 1618-1634. <https://doi.org/10.1007/s13280-023-01887-4>
- Departemen Tenaga Kerja dan Transmigrasi. (2004). Situasi tenaga kerja dan kesempatan kerja. Jakarta: Departemen Tenaga Kerja dan Transmigrasi.
- Farmasari, N., & Nasir, M. (2018). Analisis faktor-faktor yang mempengaruhi pendapatan petani kopi di Kabupaten Bener Meriah. *Jurnal Ilmiah Mahasiswa Fakultas Ekonomi dan Bisnis Universitas Syiah Kuala*, 3(3), 275-283.
- Fauziyah, N., Wahyuni Mustafa, S., & Muhani, M. (2023). Analisis penyerapan tenaga kerja pada sektor pariwisata di Indonesia. *Syntax Literate: Jurnal Ilmiah Indonesia*, 8(7), 5066-5073. <https://doi.org/10.36418/syntax-literate.v8i7.13054>
- Husaini, et al. (2020). Pemanfaatan lontar (*Borassus flabelifer* L.) sebagai bahan baku kerajinan tangan di Desa Watu Lumbang Kecamatan Kalibaru Kabupaten Banyuwangi. *Jurnal Agroteknologi*, 12(2), 110-117.
- Indrawati, E. (2018). Analisis faktor-faktor yang mempengaruhi penyerapan tenaga kerja pada perkebunan kelapa sawit di Kabupaten Kampar. *Jurnal Agribisnis*, 20(2), 115-124.
- Kuyvenhoven, A., et al. (2004). Household dynamics and labor allocation in small-scale farming systems.
- Lawal, A. S., & Okeowo, T. A. (2014). The impact of rural-urban migration on labor availability in cocoa production in Ondo East Local Government Area, Ondo State. *International Letters of Natural Sciences*, 1(18), 1-11.
- Njeru, L. K., Mwangi, J., & Otsuka, K. (2020). The effect of age on labor productivity in family farming systems in Kenya. *Journal of Small-Scale Agriculture*, pages. Doi/url.
- Walpole, R. E. (1995). *Pengantar statistika* (Edisi ke-3). Jakarta: Gramedia Pustaka Utama.