Jurnal Ilmu Ilmu Agribisnis: Journal of Agribusiness Science, 13(2): 121-129, Mei 2025 *ISSN(p): 2337-7070*
Accredited S4 based on DGHE, RTM Republic of Indonesia, No. 204/E/KPT/2022 *ISSN(e): 2620-4177*
Available Online: https://jurnal.fp.unila.ac.id/index.php/JIA

COMPARISON OF PRODUCTIVITY AND INCOME BETWEEN CASSAVA FARMERS ADOPTING AND NOT ADOPTING TECHNOLOGY OF DOUBLE-ROW CULTIVATION IN SUKADANA DISTRICT, LAMPUNG TIMUR REGENCY

Aricha Dian Perdana, Dwi Haryono, Dyah Aring Hepiana Lestari

Jurusan Agribisnis, Fakultas Pertanian, Universitas Lampung
**e-mail*: dwi.haryono@fp.unila.c.id

ABSTRACT

The objective of this research is to examine the differences variations in cassava productivity between farmers who adopted the technology of double-row cultivation and those who did not, as well as the income derived from cassava farming in Sukadana District. This study was carried out in Muara Jaya Village, Sukadana District, East Lampung Regency, using a survey approach as the village is the sole place where the technology of double-row cultivation has been implemented for the first time. Among the samples, 21 farmers were adopted whereas 58 were not. The analytical tool used to answer the first aim of the analysis was the calculation of Revenue/Cost (R/C), and the different tests. According to the findings, farmers who implemented the technology of double-row cultivation are able to grow cassava with 16.56 percent higher production. The income from cassava farming obtained by farmers who adopted the technology of double-row cultivation is 16.25 percent higher than those who did not adopt the technology of double-row cultivation.

Keywords: *cassava, double-row, production, revenue*

Received: 14 Oktober 2024 *Revise: 24 November 2024* *Accepted: 10 February 2025* *DOI: http://dx.doi.org/10.23960/jiia.v13i2.9832*

INTRODUCTION

Indonesia is one of the fourth largest cassava producers in the world after Nigeria with 57 million tons, Thailand with 30 million tons, Brazil with 23 million tons, and Indonesia with 19-20 million tons (Food and Agriculture Organization, 2018). In Indonesia, cassava production is mainly distributed in 13 provinces. The top five cassava-producing provinces are Lampung Province, Central Java, East Java, West Java, and North Sumatra. Lampung Province's cassava production averaged more than 6.6 million tons from 2013 to 2018. This fact makes Lampung Province the province with the national cassava producer with its contribution reaching more than 32.67 percent.

The amount of productivity produced is inseparable from the technology used by farmers. Fatchiya *et al*., (2016) and Waje *et al*., (2024) indicated that technology adoption can increase farm productivity. The application of technology is positively related to farm productivity (Windiyani & Rusdianto, 2021). The adoption of cassava technology applied by farmers in East Lampung Regency to increase cassava productivity is the double-row cultivation technique.

The application of the double-row planting technique has several advantages, including the use of less plant material and the producing cassava productivity of 40-50 tons/ha. If in most cases farmers apply a tight cropping system with a spacing of 60 x 70 cm or 70 x 70 cm, it requires 17,800 cassava seeds with a productivity of 19-26 tons/ha, but with the double-row technique it is more efficient, only requiring 11,200 seeds but able to produce productivity of 49-50 tons/ha, or an increase in productivity of 90-100 percent (Asnawi, 2007; Hafif *et al.*, 2024).

Sukadana District is one of the areas where most cassava farmers work and is the only area where farmers apply the technology of double-row cultivation in East Lampung Regency. In addition, Sukadana District was the first pilot area to implement double-row technology in Lampung Province. This technology has been applied for over a decade (Ibnu, 2023). However, not all regions of Sukadana District use double-row technology. Most farmers still predominantly use conventional planting patterns, in addition to using local seed varieties with simple service and guidance activities.

Manihuruk *et al.* (2018) explained that the application of conventional planting patterns has low average cassava productivity. From the formulation of the above problems, the purpose of this study is to determine the level of cassava productivity, and the level of farm income between farmers adopting and non-adopting technology of double-row cultivation.

RESEARCH METHOD

This research was based on a survey method conducted in Muara Jaya Village, Sukadana District, East Lampung Regency. The decision of the research location was purposive with the consideration that the village is one of the largest cassava producers in East Lampung Regency (BPS Lampung Tengah, 2018). This research was conducted for 3 months starting from September 2022 to November 2023.

The population who applied the technology of double-row cultivation in cassava plants as many as 100 farmers and those who did not adopt the technology of double-row cultivation in cassava plants as many as 274 farmers in Muara Jaya Village, Sukadana District, so the total population amounted to 374 people. Based on the determination of the number of samples referring to Yamane's theory (Rakhmat, 2007), and proportional allocation, the sample results for farmers applying the adoption of the double-row cultivation technique in cassava plants were 21 farmers and those who did not apply the adoption of double-row cultivation technique in cassava plants were 58 farmers.

The primary and secondary data are the two types of data used in this research. Primary data is collected directly from respondent interviews through research questionnaires. Secondary data comes from related institutions or agencies, or may also be from other literature and the internet related to the research. This research uses quantitative and qualitative analysis.

Productivity t-test

Productivity is the ratio of output to input. Increased productivity will contribute positively to economic improvement. Productivity is not the same as production, but productivity is a combination of effectiveness and efficiency. Productivity can be expressed as the ratio of output to input (Isyanto *et al*., 2020).

Furthermore, to find out the difference in the productivity of cassava farms of adopting and non-adopting farmers, a different test was conducted between the productivity of cassava farms of adopting and non-adopting farmers with the following hypothesis:

H_0 : $\mu_1 = \mu_2$; means that the average productivity of cassava farming between adopting and non-adopting farmers is the same.
H_1 : $\mu_1 \neq \mu_2$; means that the average productivity of cassava farming between adopting and non-adopting farmers is different

The hypothesis above is tested with a two-sample t-test, where the formula used is as follows (Sugiyono, 2006):

$$t \text{ hitung} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad \text{..... (1)}$$

Description:
$\bar{x}_1$ = Average productivity of cassava farms adopting farmers
$\bar{x}_2$ = Average productivity of cassava farming of non-adopting farmers
S_1 = Standard deviation of productivity of cassava farming productivity of adopted farmers
S_2 = Standard deviation of cassava farmer productivity of non-adopting farmers

The criteria for testing this income states that if the calculated t value is greater than the t table or real at the 90% confidence interval ($\alpha = 0.10$) then Ho is rejected. Conversely, if the calculated t value is smaller than the t table or not significant at the 90% confidence interval ($\alpha = 0.10$), then Ho is accepted.

Farm Income Analysis

To calculate the farm income of adopted and non-adopted cassava farmers, the following formula was used (Soekartawi, 2003):

$\pi = TR - TC$ …… (2)

$\pi = (Y.Py) - (X.Px)$…….…… (3)

Description:
Π = Farmer's Income
Y = Total production from farm i (i = 1, 2, 3,….., n)
Py = Price/Unit of Production
X = Factor of Production

Px = Price per unit of production factor

The R/C calculation is carried out to determine the feasibility of farming. The following is the formula used in this research (Soekartawi, 2003):

$$\frac{R}{C} = \frac{TR}{TC} \quad \text{..... (4)}$$

Description:
R/C = Ratio of revenue and cost
TR = Total Revenue or total revenue (IDR)
TC = *Total Cost* (IDR)

t-Test for Income Difference

Furthermore, the difference test between farm income of adopting and non-adopting farmers was tested with the following hypothesis:

H_0 : $\mu 1 = \mu 2$; means the average income between farmers adoption and non-adoption is the same
H_1 : $\mu 1 \neq \mu 2$; means that the average income of farmers adoption and non-adoption is different

Then the hypothesis above is tested with a two-sample t-test. The following formula is used (Sugiyono, 2006):

$$\text{t-hitung} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad \text{.....(5)}$$

Description :
$\bar{x}_1$ = Mean income of adopting farmers
$\bar{x}_2$ = Mean income of non-adopting farmers
S_1 = Standard deviation of income of adopting farmers
S_2 = Standard deviation of income of non-adopting farmers adoption

The criterion for testing this income states that if the calculated t value is greater than the t table or significant at the 90% confidence interval ($\alpha = 0.10$) then Ho is rejected. Conversely, if the calculated t value is smaller than the t table or not real at the 90% confidence interval ($\alpha = 0.10$), then Ho is accepted.

RESULTS AND DISCUSSION

Farmer Characteristics

The average age of cassava farmers who adopted the technology of double-row cultivation was dominated by farmers aged between 35 and 44 years with a total of 9 farmers out of a total of 21 farmers or in percentage of 42.86%. Meanwhile, farmers who did not adopt the double-row cultivation technique were dominated by farmers aged between 55-64 years with a total of 36.21%.

Cassava farmers who adopted double-row planting system were dominated by farmers who have high school / vocational high school education (40%) or as many as 8 people, while farmers who did not adopt double-row planting system were dominated by farmers who had junior high school education level which was 48.28% or as many as 28 farmers.

The average number of family dependents of cassava farmers ranged from 1-4 people. Farmers who adopt the technology of double-row cultivation and non-adopted dominated by the same number of family dependents ranging from 3-4 people with a percentage of 61.90% or as many as 13 people and 68.97% or as many as 40 people, respectively.

Cassava farmers who adopt and non-adopt the technology of double-row cultivation mostly had jobs outside the cassava farm, with a percentage of 61.90% and 65.52%. Off-farm work done by farmers was like farm laborers, where not every day farmers went to the fields to take care of the cassava plants planted, so that could meet their daily needs farmers also do daily farm labor work. Non-farm work done by farmers was construction laborers, motorcycle taxis, and self-employed.

The study showed that cassava farmers who had 5 - 21 years of experience were farmers who adopted the double-row cultivation technique (47.62%) or as many as 10 farmers and cassava farmers who did not adopt the double-row cultivation technique were dominated by farming experience ranging from 15-24 years with a percentage of 62.07% or as many as 36 farmers.

The results showed that the majority of cassava farmers who adopted the technology of double-row cultivation were farmers who had land areas ranging from 1.25 to 2.25 ha (52.38%), while the average land area of farmers who did not adopt the technology of double-row cultivation ranged from 0.25 to 1.25 ha (44.83%). Most of the land ownership status of cassava farmers, both those who adopted the technology and those who did not, was self-owned, with a percentage of 80.95 percent and 75.86 percent.

Planting Pattern

Cassava is an annual crop that can only be harvested once a year. The types of varieties used by farmers adopting the technology of double-row cultivation are UJ-5 and Cassesart varieties, while the types of cassava varieties used by non-adopting farmers are Thai, Cassesart, UJ-5, Buto Ijo, and Garuda.
The results showed that the majority of cassava farmers who adopted the technology of double-row cultivation planted cassava plants from May to June 2021, while farmers who did not adopt the technology of double-row cultivation planted cassava plants from May to June 2021. The average harvest time of farmers adopting the technology of double-row cultivation and non- adopting was the same, its 6 months.

Production Factor Costs

Seed and fertilizer costs
Cassava farmers who adopted the technology of double-row cultivation on average used 187.62 bundles per land area (99.12 bundles/ha) while farmers who used the non-adopted system used 161.81 bundles per land area, (101.46 bundles/ha). Based on the results of this research, the average price of seedlings in cassava farmers who adopted the double-row cultivation system and non-adoption of the double-row system respectively amounted to IDR 12,857.00/bundles and IDR 10. 983.00/bundles.

Based on the average price, the total cost of cassava seedlings in double-row system adoption farmers amounted to IDR 1,274,400/ha, while the total cost of cassava seedlings for non-adopting double-row technique farmers amounted to IDR 1,114,311/ha.
The study showed that the largest fertilizer costs incurred by the adoption and non-adoption farmers were NPK fertilizers. The total cost of fertilizer for farmers adopting the double-row system was IDR 458,195.43/ha, while for farmers not adopting the double-row system was IDR 430,032.45/ha.

Pesticide cost
The largest use of pesticides by farmers who adopted the technology of double-row cultivation was insecticide, which was used in as many as 0.74 bottles at a cost of IDR 118,871.25/ha. In contrast, non-adopting farmers spent an average of 1.52 bottles/ha of herbicides for IDR 124,275.53/ha.

Labor cost
The average labor of cassava farmers who adopt the technology of double-row cultivation was 95.24 Man-day/ha with a total cost of IDR 6,667,094.34/ha. Different from the labor of cassava farmers who did not adopt the technology of double-row cultivation of 91.67 / ha with a total cost of IDR 6,372,845.41 / ha. According to (Fitriana *et al.*, 2019) labor had a significant effect on cassava production. Budiawati *et al.* (2016) found that the use of labor was not efficient in cassava farming in the Garut Regency.

Tool depreciation costs
Cassava farmers, both those who adopted and those who did not adopt the technology of double-row cultivation, use tools such as hand prayers, machetes, hoes, and sickles. The amount of tool depreciation costs of farmers who adopt the technology of double-row cultivation was smaller than that of farmers who did not adopt the technology, namely IDR 211,984.13/year for adopted farmers and IDR 247,402.30/year for non-adopted farmers.

Production and Revenue

The results of this research showed that the average productivity of cassava farmers who adopt the technology of double-row cultivation is greater than that of farmers who do not adopt the technology. The productivity of cassava in farmers who adopted double-row systems amounted to 27,876.73 kg/ha, while cassava farmers who did not adopt the technology of double-row cultivation had a cassava productivity of 23,919.06 kg/ha. This was also found in Anggraini *et al.*, (2017) research which stated that the productivity of adopted cassava farms in Sukadana District, East Lampung Regency was greater than that of non-adopted farmers. The productivity of cassava farmers who adopt the technology of double-row cultivation in Central Lampung Regency was IDR 23,060.65 kg/ha per season.

Prabowo *et al.* (2015) and Supangkat *et al.* (2018), stated that the production variable was an important component in the cassava development strategy, while the price of cassava was a factor that posed a threat to farmers. Therefore, this shows that farmers can utilize their strengths to increase their income through increased wood production. Based on the results of the productivity difference test, the F-statistic was 10.325 with a significance value of 0.002, so reject H0, which means that the variation in productivity of cassava farming per hectare in 2022 for adopted and non-adopted farmers was different at the 99% confidence level.

Table 1. Average revenue, costs and income of cassava farming farmers who adopt double-row planting system per land area and per hectare in Sukadana District, East Lampung Regency, 2022.

Description	Farm Per Cropping Area (1,89 Ha)			Per Ha		
	Quantity	Unit	Price (IDR/unit)	Quantity	Unit	Value (IDR)
Revenue						
Production	52.766,67	kg				
Net Production	41.238,71	kg	1.090,48	44.801.642,86	21.786,49	23.668.792,45
Production cost						-
I. Cash cost						-
Land lease	0,48	ha	5.000.000,00	1.666.666,67		880.503,14
Seed	187,62	tie	12.857,14	2.197.619,05		1.161.006,29
Urea fertilizer	264,29	kg	2.395,00	632.964,29		334.396,23
NPK fertilizer	266,67	kg	3.252,38	867.301,59		458.197,06
Organic fertilizer	461,9	kg	641,67	296.388,89		156.582,81
Laborers outside family	171,93	man-day	70.000,00	120.034.857,14		6.358.037,74
Pesticide				263.190,48		139.044,03
Tax				127.380,95		67.295,60
Transportation costs				76.666,67		40.503,14
Total cash costs				16.450.428,57		8.690.792,45
II. Calculated Costs						
Land lease	1,42	ha	5.000.000,00	7.437.500,00		3.929.245,28
Shrinkage of tools				211.984,13		111.991,61
Laborer inside family	8,36	man-day	70.000,00	585.000,00		309.056,60
Total Calculate cost				7.880.317,46		4.163.186,58
III. Total Cost				24.330.746,03		12.853.979,04
IV. Income						
Income over cash cost				28.351.214,29		14.978.000,00
Income over total cost				20.470.896,83		10.814.813,42
V. R/C						
Cash cost				2,72		2,72
Total cost				1,84		1,84

Based on the above statement, shows that there are differences in the productivity of cassava farms that adopt double-row systems and non-adoption. The difference in productivity of cassava farms adopting double-row cultivation and non-adoption will certainly affect the difference in the amount of revenue and income of cassava farming. In addition, the type of seeds used was thought to affect cassava production. According to Kementerian Pertanian (2012), the potential production of cassava plants in Lampung Province for UJ-3 (Thai) and UJ-5 (Cassesart) varieties can reach an average productivity of 35-40 tons/ha (Thai) and 45-60 tons/ha (Cassesart).

Based on this, the production produced by cassava farmers adopting and non-adopting the technology of double-row cultivation was still below the potential production that could be produced. According to Anggraini *et al*. (2017), the average farmer who had not optimally allocated production factors by cassava farmers will affect production yields. Another factor that can cause a decrease in production is the inaccurate use of production inputs (Anggraesi *et al*., 2020).

Farm Income

Cassava farmers, both those who adopted and those who did not adopt the technology of double-row

cultivation, each generated income from the deduction of farmer receipts and farming costs. This study divides cassava farmers' income into two categories: income on cash costs and income on total costs. Table 1 explains that the average income of cassava farming per hectare of farmers who adopt the technology of double-row cultivation at cash costs was IDR 14,978,000.00/ha and income at total cost was IDR 10,814,813.42/ha.

The results of this study indicate that the RC value of farmers who adopt the technology of double-row cultivation was 2.72, which means that every IDR 1.00 of cash costs incurred in cassava farming will generate revenue of IDR 2.72. In the ratio of revenue to total costs of cassava farmers who adopt double-row system amounted to 1.84, which means that every IDR 1.00 spent by cassava farmers who adopt double-row system will generate revenue of IDR 1.84. The results also showed that the average income of cassava farming farmers who did not adopt the double-row system on cash costs amounted to IDR 12,389,735.68/ha and income on total costs amounted to IDR 8,221,202.34/ha (Table 2).

The RC value of farmers who do not adopt the double-row system was 2.26, which means that every IDR 1.00 cash cost incurred in cassava farming will generate revenue of IDR 2.26. The ratio of revenue to total costs of cassava farmers who do not adopt the double-row system amounted to 1.59. This shows that every IDR 1.00 spent by cassava farmers who do not adopt a double-row system will generate revenue of IDR 1.59.

t-test on Income

The number of farmers who adopted the technology of double-row cultivation amounted to 21 people and those who did not adopt the double-row system amounted to 58 people. The average cash income of farmers who used the technology of double-row cultivation was IDR 14,944,365.08 while the average cash income of farmers who did not adopt the technology of double-row cultivation was IDR 12,480,502.79. Based on this, it was known that there was a difference between the average cash income of farmers who adopt and do not adopt this technique. Based on research by Lanamana and Nerius Supardi (2020) labor had a real effect on cassava farming income. These results were in line with the research of Anggraesi *et al*., (2020); Haryadi *et al*. (2019); Manihuruk *et al*., (2018), and Anggraini *et al*., (2017) who found that cassava farming was profitable to do.

The results of this study indicate the results of the cash income difference test obtained t-test of 3.7375 with a significance value of 0.000. Based on these results, reject H0, which means that the variance of income on cash costs of cassava farming per hectare in 2022 adopting and non-adopting farmers was significantly different with a 99% confidence level. This showed that the income of cassava farmers who adopted the technology of double-row cultivation was greater than farmers who did not adopt the technology. This is in line with research by Asnawi, (2007); Banowati *et al*., (2020); Hafif *et al*., (2024); Paudel, (2016); and Tafese (2016).

Based on these results, the greater income of farmers' adoption is the technology of double-row was due to the greater productivity of cassava farmers. This can be seen in the difference in cash income between farmers who adopted the technology of double-row and those who did not adopt the technology amounted to IDR 2,463,862,294. According to research by Sari *et al.,* (2013) some policy simulations carried out by the government to be able to increase the surplus of cassava producers is to reduce interest rates.

CONCLUSIONS

The productivity of cassava farming by farmers who adopted the technology of double-row cultivation proved to be higher compared to farmers who did not apply the technology. The increase in productivity reached 16.56 percent, which had a direct impact on increasing farmers' income. Farmers who adopted the technology of double-row cultivation earned 16.25 percent more income compared to farmers who did not adopt this technology of cultivation. In addition, there was a significant difference in cash income from cassava farming between the two groups of farmers.

Based on the results of the research that has been obtained, it is expected that cassava farmers use fertilizer in the recommended amount and adopt double-row cultivation technology to increase production and income. In addition, the government is expected to play an active role in socializing and encouraging the wider application of double-row cultivation technology so that the benefits can be felt by more farmers. Then, it is expected that future researchers to further analyze the income aspects of intercropping carried out by cassava farmers who have adopted double-row cultivation so that a more comprehensive understanding of the impact of this technology on the overall farming system can be obtained.

Tabel 2. Average revenue, costs and income of cassava farming farmers who do not adopt double-row planting system per land area and per hectare in Sukadana District, East Lampung Regency, in 2022

Description	Farm Per Cropping Area (1,59 Ha)				Per Ha	
	Quantity	Unit	Price (IDR/unit)	Value (IDR)	Quantity	Value (IDR)
Revenue						
Production	38.146,78	kg				
Net Production	28.442,02	kg	1.258,10	35.452.254,31	17.833,92	22.229.521,62
Production cost						-
I. Cash cost						-
Land lease	0,43	ha	5.000.000,00	2.155.172,41		1.351.351,35
Seed	161,81	tie	10.982,76	1.790.344,83		1.122.594,59
Urea fertilizer	223,79	kg	2.298,28	514.338,29		322.504,01
NPK fertilizer	217,24	kg	3.156,90	658.808,56		430.020,50
Organic fertilizer	575,86	kg	838,10	482.627,26		302.620,33
Laborers outside family	136,93	man-day	70.000	9.585.055,17		6.010.088,65
Pesticide				229.862,07		144.129,73
Tax				159.482,76		100.000,00
Transportation costs				97.586,21		61.189,19
Total cash costs				15.692.762,07		9.839.785,95
II. Calculated Costs						
Land lease	1,16	ha	5.000.000,00	5.818.965,52		3.648.648,65
Shrinkage of tools				247.402,30		155.127,93
Laborer inside family	8,31	man-day	70.000,00	581.724,14		364.756,76
Total Calculate cost				6.648.091,95		4.168.533,33
III. Total Cost				22.340.854,02		14.008.319,28
IV. Income						
Income over cash cost				19.759.492,24		12.389.735,68
Income over total cost				13.111.400,29		8.221.202,34
V. R/C						
Cash cost				2,26		2,26
Total cost				1,59		1,59

REFFERENCES

Anggraesi, J., Hanung Ismono, R., & Situmorang, S. (2020). Pendapatan Dan Faktor-faktor Yang Memengaruhi Produksi Ubi Kayu Manis dan Ubi Kayu Pahit di Kecamaran Seputih Banyak Kabupaten Lampung Tengah. *Jurnal Ilmu Ilmu Agribisnis (JIIA)*, *8*(2), 228–233. https://jurnal.fp.unila.ac.id/index.php/JIA/article/view/4057

Anggraini, N., Harianto, H., & Anggraeni, L. (2017). Analisis Pendapatan Dan Faktor Produksi Usahatani Ubikayu Berdasarkan Pasar Yang Dipilih Petani (Study Kasus Petani di Kabupaten Lampung Tengah). *Journal of Food System & Agribusiness*, *1*(1), 12–20. https://doi.org/10.25181/jofsa.v1i1.80

Asnawi, R. (2007). Analisis usahatani Sistem Tanam Double-row Pada Tanaman Ubikayu (Manihot esculenta) di Lampung. In *Jurnal*

Pengkajian dan Pengembangan Teknologi Pertanian (Vol. 10, Issue 1, pp. 39–47). https://repository.pertanian.go.id/items/cc436d25-ccb7-4b76-bdec-a4c10aa772c7

Banowati, E., Indriyanti, D. R., Anisykurlillah, I., Pratikto, H. H., & Sari, Y. (2020). Increasing the competency of cassava farmers as a revitalization efforts of tapioca industries for food private realization. *International Journal of GEOMATE*, *19*(72), 117–122. https://doi.org/10.21660/2020.72.ICGEO17

Budiawati, Y., Perdana, T., & Natawidjaya. (2016). Efficiency Analysis of the Use of Factors of Cassava Productio in Garut Regency. *Jurnal Agribisnis Terpadu*, *9*(13), 1–17. https://jurnal.untirta.ac.id/index.php/jat/article/view/2498

Fatchiya, A., Amanah, S., & Kusumastuti, Y. I. (2016). Penerapan Inovasi Teknologi Pertanian dan Hubungannya dengan Ketahanan Pangan Rumah Tangga Petani. *Jurnal Penyuluhan*, *12*(2), 190–197. https://journal.ipb.ac.id/index.php/jupe/article/view/12988

Fitriana, M. D., Zakaria, W. A., & Kasymir, E. (2019). Analisis Efisiensi Produksi Usahatani Ubi Kayu Di Kecamatan Natar Kabupaten Lampung Selatan. *Jurnal Ilmu-Ilmu Agribisnis*, *7*(1), 22. https://doi.org/10.23960/jiia.v7i1.22-27

Food and Agriculture Organization. (2018). *Cassava-Crops (Indonesia Production)*. Food and Agriculture Organization. http://www.fao.org/faostat

Hafif, B., Pujiharti, Y., Yani, A., Sjafrina, N., Asnawi, R., Wibowo, N. A., Frediansyah, A., Nurida, N. L., & Dariah, A. (2024). *Improving Cassava Cultivation as an Industrial Raw Material on Acid Soil in Indonesia*. IntechOpen Limited. https://doi.org/10.5772/intechopen.109709

Haryadi, Nurmayasari, I., & Viantimala, B. (2019). Peranan Kelompok Tani dan Pendapatan Petani Ubi Kayu di Desa Siswp Bangun Kecamatan Seputih Banyak Kabupaten Lampung Tengah. *Jurnal Ilmu Ilmu Agribisnis (JIIA)*, *7*(4), 507–514. https://jurnal.fp.unila.ac.id/index.php/JIA/article/view/3871

Ibnu, M. (2023). East Lampung Cassava Farmers' Decision to Adopt Double-row Cultivation Technique. *Jurnal Agribisains*, *9*(2), 124–137. https://doi.org/10.30997/jagi.v9i2.8085

Isyanto, A. Y., Sudrajat, Aziz, S., & Puspitasari, A. (2020). Faktor-Faktor yang Berpengaruh Terhadap Efisiensi Usahatani Padi Lahan Rawa Di Kabupaten Ciamis. *Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, *6*(2), 784–793. https://jurnal.unigal.ac.id/mimbaragribisnis/article/view/3541

Kementerian Pertanian. (2012). *Pedoman Teknis Pengelolaan Produksi Ubi Kayu Tahun 2012*. Direktorat Aneka Kacang dan Umbi.

Lanamana, W., & Nerius Supardi, P. (2020). Faktor-Faktor yang Mempengaruhi Pendapatan dan Prospek Usaha Tani Ubi Kayu Varietas Lokal Nuabosidi Desa Randotonda Kecamatan Ende Kabupaten Ende. *Jurnal Sosio Agribisnis*, *5*(2), 94–103. http://ojs.uho.ac.id/index.php/JSA

Manihuruk, E. M., Harianto, H., & Kusnadi, N. (2018). Analisis Faktor Yang Memengaruhi Petani Memilih Pola Tanam Ubi Kayu Serta Efisiensi Teknis Di Kabupaten Lampung Tengah. *Jurnal AGRISEP : Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis*, *17*(2), 139–150. https://doi.org/10.31186/jagrisep.17.2.139-150

Paudel, M. N. (2016). Multiple Cropping for Raising Productivity and Farm Income of Small Farmers. *Journal of Nepal Agricultural Research Council*, *2*(December), 37–45. https://doi.org/10.3126/jnarc.v2i0.16120

Prabowo, I. W. H. B., Haryono, D., & Affandi, M. I. (2015). Strategi Pengembangan Usahatani Ubi Kayu (Manihot utilissima) Di Kecamatan Menggala Kabupaten Tulang Bawang. *Jurnal Ilmu Ilmu Agribisnis (JIIA)*, *3*(1), 48–56. https://jurnal.fp.unila.ac.id/index.php/JIA/article/view/1017

Rakhmat, J. (2007). *Metode Penelitian Komunikasi: Dilengkapi Dengan Contoh Analistik Statistik.* Rosdakarya.

Sari, S. I., Ismono, H. R., & Nurmayasari, I. (2013). Pengaruh Kebijakan Pemerintah Terhadap Kesejahteraan Pelaku Ekonomi Ubi Kayu Di Provinsi Lampung. *Jurnal Ilmu-Ilmu Agribisnis*, *1*(1), 13404. https://jurnal.fp.unila.ac.id/index.php/JIA/article/view/134

Soekartawi. (2003). *Ekonomi Pertanian.* Universitas Indonesa Press.

Sugiyono. (2006). *Statistik Untuk Penelitian*. CV Alfabet.

Supangkat, G., Sarjiyah, S., Haryono, H., & Gustami, R. (2018). Study on Agronomic and Economic Performance Characteristics of Cassava (Manihot utillisima L.) in Gunungkidul Regency Special Region of Yogyakarta. *Planta Tropika: Journal of Agro Science*, *6*(1), 9–14. https://doi.org/10.18196/pt.2018.075.9-14

Tafese, T. (2016). Adoption and Intensity of Row-Seeding (Case of Wolaita Zone). *OALib*, *03*(03), 1–12. https://doi.org/10.4236/oalib.1102443

Waje, S. S., Shano, B. K., & Walelign, S. Z. (2024). Exploring key drivers affecting adoption decision and intensity of cassava technology: evidence from cassava growers in Southern Ethiopia. *Cogent Food and Agriculture*, *10*(1). https://doi.org/10.1080/23311932.2024.2428368

Windiyani, H., & Rusdianto, S. W. (2021). Peningkatan Produktivitas Padi Melalui Penerapan Jajar Legowo Di Lombok Barat. *Jurnal IImu-Ilmu Pertanian:Politeknik Pembangunan Pertanian Yogyakarta-Magelang*, *28*(2), 1–8. https://jiip.polbangtanyoma.ac.id/index.php/jiip/article/view/65.