Vol. 14, No. 2 (2025): 657 - 665 http://dx.doi.org/10.23960/jtep-l.v14i2.657-665

JURNAL TEKNIK PERTANIAN LAMPUNG

ISSN 2302-559X (print) / 2549-0818 (online)
Journal homepage : https://jurnal.fp.unila.ac.id/index.php/JTP

Efficiency and Profitability of Rice Farming: Comparison of Transplanting (TAPIN) and Direct Seeding (TABELA) Systems

Moh. Shofiyur Rohman[1], Rosihan Asmara[2], Fahriyah[1,✉]

[1] Brawijaya University, Malang, INDONESIA.

Article History:

Received : 11 June 2024
Revised : 22 August 2024
Accepted : 20 November 2024

Keywords:

Direct seeding system (TABELA),
Transplanting system (TAPIN),
Rice farming income,
Yield.

Corresponding Author:
✉ fahriyah.fp@ub.ac.id
(Fahriyah)

ABSTRACT

Farmers play an essential role in producing food and meeting the community's food needs. However, they often face various obstacles and challenges in efforts to increase crop yields to boost agricultural income. One approach to increasing agricultural productivity is by understanding the Efficiency and Profitability of Rice Farming with the transplanting system (TAPIN) and the direct seeding system (TABELA) in Padang Mentoyo Village, Kapas District, Bojonegoro Regency. This study used the Data Envelopment Analysis (DEA) method, with 74 respondents consisting of 37 TAPIN farmers and 37 TABELA farmers, to determine the level of efficiency and profitability between TAPIN and TABELA. The results showed that TABELA farmers are more efficient than TAPIN farmers because as many as 97.3% of TABELA farmers are included in the High and Full Efficient categories. This is because implementing the TABELA system is able to reduce the time needed to move seedlings, so that the planting process is faster.

1. INTRODUCTION

The agricultural sector plays a crucial role in the economy of developing countries. Agriculture has several roles in economic development, such as providing food, being a source of labor for other economic sectors, a source of capital for modern economic growth, especially in the early stages of development, a source of foreign exchange, and improving the living standards of farming communities through sustainable agricultural development, which is also a market for products produced by the industrial sector in urban areas (Suryahani *et al.*, 2024). Sustainable agricultural development is characterized by the continuity of production that provides benefits and the freedom for farmers to determine the best choices in farming. This development is expected to involve most economic actors in producing, enjoying, and preserving development results.

Rice farming is one of the cultural heritages of ancestors from thousands of years ago, especially the through transplanting (locally called as *Tanam Pindah* or TAPIN) system. Paddy cultivation through TAPIN system has been long implemented by farmers, in which farmers first carry out nursery planting, either dry or wet (Siregar *et al*., 2015). The direct seeding system (locally called as *Tanam Benih Langsung* or TABELA) involves planting rice using dry or pre-germinated grains directly through sowing or broadcasting (Farooq *et al*., 2011; Rizwan *et al*., 2022). The TABELA system is promoted as an alternative for conventional rice cultivation (TAPIN). It is suitable for conditions of water shortages and limited labor (Ahmad *et al*., 2025; Devi *et al*., 2024; Kumar & Ladha, 2011)), low cost (Srilatha & Vani, 2015), and sustainable (Singh & Singh, 2024). The TABELA system has several advantages, namely, efficient and effective cultivation because of fast planting time, minimal labor, and reduced production costs. In addition, the TABELA system also reduce methane emission from rice field (Hafeez-ur-Rehman *et al*., 2019; Kumar *et al*., 2024).

The management of rice farming with the transplanting system (TAPIN) and the direct seeding system (TABELA) is essentially the same. The principal difference between the two systems of direct seeding and transplanting is in the physical form of the seedlings to be planted in the paddy field. The seedlings used in the direct seeding system are still in the form of germinating seeds, while the seedlings used for paddy field transplanting are rice plants from the nursery, which are around 20-24 days old. Research from non-technical aspects is very necessary to support that the results of the solutions provided are not only technically effective, but also relevant and acceptable to the community.

There is a quite significant difference in profits between farmers using the TAPIN and TABELA systems, although the inputs used, such as land area, capital, and labor, also differ. However, the factors influencing this difference in profits are not yet known for certain. According to Berutu *et al*. (2023), factors that affect profits consist of production costs, product quality, and resource management as internal elements, as well as market conditions, competition levels, and regulations as external elements. However, there are still shortcomings in the research, such as the lack of integration of non-economic factors, little attention to rapid changes in preferences, and limited comparative studies of systems between agricultural sectors. Therefore, this study aims to analyze the difference in profits between farmers using the TAPIN and TABELA systems, identify the factors influencing these differences, and determine the more efficient and profitable planting system for rice farmers in Padang Mentoyo Village. The results of this study are expected to provide useful information for farmers and stakeholders in efforts to increase the productivity and income of rice farmers in research site and contribute to national food security.

2. METHODS

Research was conducted in Padang Mentoyo Village, Kapas District, Bojonegoro Regency. The location was chosen purposively because it was the center of rice production in Kapas District and had farmer groups with a considerably large agricultural land area. In addition, rice farmers in Padang Mentoyo Village have implemented both the TAPIN and TABELA planting systems. According to Nurhayati *et al*. (2024), purposive sampling is a qualitative technique where researchers deliberately choose specific criteria to increase understanding of the observed phenomena. Two farmer groups in Padang Mentoyo Village were involved in this research, namely the Cipto Gumilang Farmer Group and Padang Tirto Farmer Group with active members of 118 ha and 156, respectively.

Sampling from the population for each farmer group was carried out by simple random sampling where all members of each farmer group had an equal opportunity to be sampled to represent their population without distinguishing between member or management status (Sugiyono, 2017). The population in the research area is 274 people, where a total 74 respondents consisting of 37 TAPIN farmers and 37 TABELA farmers, to determine the level of efficiency and profitability between TAPIN and TABELA (Pemerintah Desa Padang Mentoyo, 2023).

2.1. Technical Efficiency Analysis Method for TAPIN and TABELA Rice Farming Systems

In the DEA method, efficiency measurement does not calculate the average value but measures the relative efficiency value of input production use. The input variables used were land area, rice seeds, N fertilizer, P fertilizer, K fertilizer, S fertilizer, pesticides, and labor. Meanwhile, the output variable used in this study was rice production. In the DEA model, multiple inputs and multiple outputs are linearly aggregated with weighting. If u_i is the weight for input x_i, and v_j is the weight for y_j, then the inputs used by farmers are a linear sum of all inputs used and formulated as follows:

$$\text{Aggregate input} = \sum_{i=1}^{I} u_i x_i \quad (1)$$

$$\text{Aggregate output} = \sum_{j=1}^{J} v_j y_j \quad (2)$$

$$\text{Efficiency} = \frac{\sum_{i=1}^{I} u_i x_i}{\sum_{j=1}^{J} v_j y_j} \quad (3)$$

The assumption used in the DEA model is Variable Return to Scale (VRS) because farmers do not work at an optimal scale. Mathematically, as a requirement for minimization the calculation of technical efficiency with the VRS model is as follows (Asmara, 2017):

$$\text{Min } \theta_0; \quad \text{subject to:}$$

$$\sum_{j=1}^{N} \lambda_j + Y_{rj} > Y_{r0};$$
$$\theta_0 X_{i0} - \sum_{j=1}^{N} \lambda_j + Y_{rj} > 0;$$
$$\sum_{j=1}^{N} \lambda_j = 1$$
$$\lambda_j \geq 0 \quad (4)$$

where θ is the score of technical efficiency (TE), y_i is the total production of the i^{th} farmer, x_i is the N×1 vector of the number of inputs used by the i^{th} farmer, Y is the 1×M vector for production, X is the N×M matrix of the number of inputs used, λ is the M×1 vector, and θ is a scalar. $\sum_{j=1}^{N} \lambda = 1$ is the convexity constraint that ensures that the efficiency level is only a reference from the Decision Making Unit (DMU) with the same scale (Asmara, 2017). Sunarto (2010) states that there are two factors influencing the selection of DMUs, including DMUs must be homogeneous units with the same objectives, and the inputs and outputs characterizing DMU performance must be identical. The next factor is the relationship between the number of DMUs to inputs and outputs determined based on the rule of thumb.

2.2. TAPIN and TABELA Profit Analysis

The profit received by farmers is the result of the amount of rice production per season multiplied by the selling price of rice during the harvest season with a unit price of IDR 4,200/kg minus the total cost. The profit of TAPIN and TABELA system respondents in this study was calculated using the following formula:

$$\pi = TR - TC \quad (3)$$

where π is profit (farm income), *TR* is total farm revenue, and *TC* is total farm expenditure or costs.

2.3. TAPIN and TABELA Feasibility Analysis

To determine the feasibility of rice farming, it is necessary to improve the welfare of farmers. In this study, the feasibility of rice farming with the TAPIN and TABELA systems, was evaluated from revenue-cost ratio (R/C) calculated as the following (Suratiyah, 2006):

$$R/C = \frac{TR}{TC} \quad (3)$$

The criteria is as follows:
• *R*/*C* > 1, means the income is greater than the costs, implying the project or investment is profitable.
• *R*/*C* = 1, means that income and costs are balanced, indicating the break-even point.
• *R*/*C* < 1, means that costs exceed income, implying the project is not profitable

In addition to the *R*/*C* ratio, the feasibility of a farming business can also be seen based on the *B*/*C* ratio value by comparing profit with total costs. If the *B*/*C* ratio value is more than 1, the farming business is said to provide benefits to the farming business, the greater the *B*/*C* ratio value, the higher the value of the benefits obtained by the farming business (Sheliena *et al*., 2024).

3. RESULTS AND DISCUSSION

3.1. Technical Efficiency

The technical efficiency analysis of rice farming in this study used the Data Envelopment Analysis (DEA) method. Technical efficiency illustrates the ability of farmers or business actors to reduce excessive use by maximizing the amount of output produced by minimizing the amount of input used (Arifin *et al*., 2021). Soekartawi (1989) suggests that the benefits of measuring efficiency in farming, including: (1) As a benchmark for obtaining relative efficiency, making it easier to compare one economic unit with another; (2) If there is a variation in efficiency levels from several existing economic units, research is conducted to answer what factors determine the differences in efficiency levels; and (3) Efficiency information has policy implications because managers can determine appropriate company policies.

The ratio indicates the percentage of inputs that must be reduced to achieve technical efficiency in production, so the technical efficiency level of a producer is usually measured by a ratio (Asmara, 2017).

The technical efficiency based on data processing using Data Envelopment Analysis (DEA), results of TAPIN and TABELA rice farmers will be described in Tables 1 and 2. The average technical efficiency obtained by rice farmers on rainfed paddy fields is 0.608, with values ranging from 0.143 to 1.000. TAPIN rice farmers in Padang Mentoyo Village have, on average, achieved a technical efficiency level of 60.8%. Thus, these farmers have the opportunity to achieve maximum technical efficiency with an increase of 39.2% through a more optimal combination of input use. The lowest efficiency value is 0.143 and the highest value is 1 (fully efficient), implying that if the average TAPIN system rice farmer respondents are able to achieve the highest technical efficiency level, they can make a cost saving of 1 – (0.857/1) or 14.3%, while for the most inefficient farmer respondents, they can make a cost saving of 85.4% or 1 – (0.143/0.98).

Table 1. Frequency distribution of technical efficiency of rice farming in the TAPIN system in Padang Mentoyo Village

Efficiency Level	Efficiency Distribution	Number of Farmers	Percentage (%)
Very low	0.143-0.357	10	27.03
Low	0.358-0.571	10	27.03
Medium	0.572-0.785	4	10.81
High	0.786-0.999	3	8.11
Full Efficiency	1	10	27.03
Total		37	100
Average	0.608		
Maximum	1.00		
Minimum	0.143		

Table 2. Frequency distribution of technical efficiency of rice farming in the TABELA system in Padang Mentoyo Village

Efficiency Level	Efficiency Distribution	Number of Farmers	Percentage (%)
Very low	0.312-0.484	1	2.70
Low	0.485-0.656	0	0
Medium	0.657-0.827	0	0
High	0.828-0.999	21	56.76
Full Efficient	1	15	40.54
Total		37	100
Average	0.944		
Maximum	1		
Minimum	0.312		

The results of technical efficiency research with Data Envelopment Analysis (DEA) with the VRS assumption in Table 1 also show that the respondent farmers who are at full technical efficiency (TE = 1) are 10 people or 27.03% of the total number of farmer respondents. Farmers who have not achieved full technical efficiency are divided into 4 categories. The category with the highest number of farmers is farmers in the low and very low efficiency levels, with 10 farmers or 27.03% of the total number of farmer respondents, respectively. It is known that the lowest technical efficiency value for rice farmers is found in the 24th respondent farmer (DMU) with a technical efficiency value of 0.143. This research is in line with the research by Fatah *et al*. (2021) analyzing the technical efficiency of semi-organic rice farming using the Data Envelopment Analysis (DEA) method in Badas District, Barito Kuala Regency. The research results show that the average technical efficiency level of semi-organic rice farmers is still quite low, so it is necessary to increase the efficiency of input production use.

Based on Table 2, it shows that the average technical efficiency value obtained by rice farmers on rainfed paddy fields is 0.944 with values ranging from 0.312 to 1.000. Rice farmers on rainfed paddy fields in Padang Mentoyo Village have, on average, achieved a technical efficiency level of 94.4%. These farmers have the opportunity to achieve maximum technical efficiency with an increase of 5.6% through a more optimal combination of input use. The lowest efficiency value is 0.312 and the highest value is 1 (fully efficient), implying that if the average rice farmer respondents are able to achieve the highest technical efficiency level, they can make a cost saving of 1 - (0.688/1) or 31.2%, while for the most inefficient farmer respondents, they can make a cost saving of 1 - (0.312/0.98) or 68.2%.

The results of technical efficiency research with Data Envelopment Analysis (DEA) with the VRS assumption in Table 7 also show that the respondent farmers who are at full technical efficiency (TE = 1) are 15 people or 40.54% of the total number of farmer respondents. Respondent farmers who have not achieved full technical efficiency are spread across 2 of the 4 categories, namely very low and high. The category with the highest number of farmers is farmers in the very high efficiency level (TE is 0.828 to 0.999), which is 21 farmers or 56.76% of the total number of farmer respondents. It is known that the lowest technical efficiency value for rice farmers is found in the 26th respondent farmer (DMU) with a technical efficiency value of 0.312. It can be seen in Table 1 and Table 2 that TABELA farmers are more efficient than TAPIN farmers because as many as 97.3% of TABELA farmers are included in the High and Full Efficient categories. This is because implementing the TABELA system is able to reduce the time needed to move seedlings, so that the planting process is faster. The TABELA system has a faster harvest life and planting is easy, practical and saves costs and labor so that it can be more efficient in the production process (Rorong *et al*., 2024).

The scale efficiency results show the scale condition of the DMU when producing rice, which is divided into three, namely increasing return to scale (IRS), constant return to scale (CRS), and decreasing return to scale (DRS). The distribution of respondent farmers based on the production scale value is presented in Table 3. It is evident that the majority of rice farmers using the TAPIN and TABELA systems operate under the IRS condition, with 25 and 24 respondents respectively. Rice farmers using the TAPIN and TABELA systems operating under the CRS condition include 4 and 9 farmers respectively from the total number of respondents. Furthermore, rice farmers using the TAPIN and TABELA systems operating under the DRS condition number 8 and 4 farmers respectively from the total number of respondents. Farmers operating at the IRS scale need to increase the number of inputs used in their production. While, at the DRS scale, inefficient farmers who add inputs will achieve a proportionally smaller increase in output.

Table 3. Distribution of number of farmers by production scale

Production Scale	**TAPIN**		**TABELA**	
	Number of Farmer	**Percentage (%)**	**Number of farmers**	**Percentage (%)**
IRS	25	67.57	24	64.86
CRS	4	10.81	9	24.32
DRS	8	21.62	4	10.81
Total	37	100	37	100

Table 4. Revenue of TAPIN system respondents in Padang Mentoyo

No.	**Respondent**	**Revenue (Rp)**	**Cost (Rp)**	**Income (Rp)**
1	7	50.000.000	11.000.000	39.000.000
2	24	57.150.000	14.750.000	37.000.000
3	26	69.000.000	14.100.000	54.900.000
4	8	68.500.000	13.700.000	54.800.000
	Total	61.162.500	13.387.500	**46.425.000**

Table 5. Revenue of TABELA system respondents in Padang Mentoyo

No.	**Respondent**	**Revenue (Rp)**	**Cost (Rp)**	**Income (Rp)**
1	50	57.500.000	13.550.000	43.950.000
2	51	88.810.000	24.000.000	64.810.000
3	58	44.000.000	12.575.000	31.425.000
4	53	38.500.000	12.000.000	30.400.000
	Total	57.202.500	15.531.250	42.646.250

3.2. Income of TAPIN and TABELA Farmers

Farm income is obtained from the average farmer's revenue minus the average total production costs, including fixed and variable costs (Rahim & Hastuti, 2008). The income of TAPIN and TABELA system respondents can be seen in Tables 4 and 5. The total revenue of all respondents in the TAPIN system was IDR 599,810,000, while in the TABELA system, the total income was IDR 654,740,000. Based on the research results, it is known that the size of the income from TAPIN and TABELA rice farming systems in Padang Mentoyo Village is influenced by revenue and production costs. If rice production and selling prices are higher, it will increase revenue. If production costs are higher than revenue, it will cause losses.

Farm income analysis functions to measure whether farming activities are profitable or not. Therefore, the measure used to determine the amount of income received by farmers is the difference between revenue and the total costs incurred. As seen in Table 6, the total income of respondent farmers applying TAPIN is IDR 599,810,000, while for respondent farmers applying TABELA, the total income is IDR 654,740,000 with a unit price of IDR 5,000/kg. Farmers' income in Padang Mentoyo Village will increase if they can increase production yields, which means the community must increase the land area. Because with an increase in land area, production will also increase. In addition, income in the research area is also influenced by farming management methods. Optimal farming management will minimize costs and greatly assist in increasing productivity, and with increased productivity, income will automatically increase as well.

3.3. Average Income Comparison

The average income is obtained by dividing the total income by the number of farmers. The average income of farmers using the TAPIN and TABELA systems is shown in Table 6. It can be seen from Table 6 that the average income for TAPIN system farmers is IDR 16,211,081 and the average income for TABELA farmers is IDR 17,695,676. Average income is the income received by each farmer in the research area. Based on the results of data analysis, as shown in Table 6, the comparison of the average income of farmers in Padang Mentoyo Village, Kapas District, Bojonegoro Regency for TAPIN system farmers is IDR 16,211,081, while for TABELA farmers, it is IDR 17,695,676. Thus, the TABELA system is more profitable compared to the TAPIN.

Table 6. Average income comparison of TAPIN and TABELA system farmers

No	Plating System	Total Revenue (IDR)	Respondents	Average Revenue (IDR)
1	TAPIN	599.810.000	37	16.211.081
2	TABELA	654.740.000	37	17.695.676

The average income of farmers applying the TABELA is greater than that of farmers applying TAPIN, which may be due to that TAPIN system requiring higher costs compared to TABELA. TAPIN system farmers' income can be improved if farmers can efficiently manage production costs, input usage, and optimize land management, given that TAPIN system shifts to TABELA. This is related to research conducted by Fiansyah *et al*. (2023), where the difference test conducted between productivity, labor, production costs, and income of rice farmers applying the TABELA system was found to be in the high category, while in the TAPIN system, it was in the medium category, meaning that the perception of rice farmers in the TABELA system was better than TAPIN.

3.4. Feasibility Analysis of TAPIN and TABELA

The feasibility analysis of rice farming using the TAPIN and TABELA systems in the study area, based on R/C ratio and B/C ratio analysis, is presented in Table 7 and 8. Based on the research conducted in Padang Mentoyo Village, rice farming carried out by respondent farmers applying the TAPIN system has an average total revenue of IDR 20,900,270 per planting season and an average total cost of IDR 4,958,108 per planting season, resulting in an R/C ratio of 4.2. Meanwhile, rice farming carried out by respondent farmers applying the TABELA system has an average total revenue of IDR 23,551,351 per planting season and an average total cost of IDR 5,855,676 per planting season, resulting in an R/C ratio of 4. This means that for every IDR spent on these rice farming systems, it will generate 4.2

Table 7. Results of R/C ratio analysis

Description	Unit	TAPIN	TABELA
Farm Revenue (R)	IDR/Season	20,900,270	23,551,351
Capital Costs (C)	IDR/Season	4,958,108	5,855,676
R/C Ratio	--	4.2	4.0

Table 8. Results of B/C ratio analysis

Uraian	IDR per planting season	
	TAPIN	TABELA
Benefit (B)	16,211,081	17,695,676
Cost (C)	4,958,108	5,855,676
B/C Ratio	3.3	3.0

(TAPIN) and 4.0 (TABELA) units of revenue. These results are in line with research in Wajo Regency, South Sulawesi, where the (TAPIN) planting system is more profitable than the (TABELA) system with an average income of IDR 19,683,714 for TAPIN and IDR 15,648,000 for TABELA (Musmuliadi, 2018). A similar thing was also reported by Marpaung *et al*. (2021) where the TAPIN system generated an average income of IDR 11,900,000 and a B/C ratio of 1.94, slightly better than the TABELA system with an average income of IDR 11,500,000 and a B/C ratio of 1.88.

Based on the calculation of the R/C ratio > 1 (more than 1) obtained from rice farming in both systems, rice farming and its development in Padang Mentoyo Village are feasible to be cultivated. This research is in line with research by Reddy & Bantilan (2012) on profitability analysis through the revenue-cost ratio, with the results showing that rice production is profitable in all regions, with an overall average revenue-cost ratio of 1.67, meaning that revenue from production significantly exceeds other incurred costs. It can be concluded that this research has positive profits for rice farmers in the studied areas.

Based on the research conducted in Padang Mentoyo Village, rice farming carried out by respondent farmers applying the TAPIN system has an average total income of IDR 16,211,081 per planting season and an average total cost of IDR 4,958,108 per planting season, resulting in a B/C ratio of 3.3. Meanwhile, rice farming carried out by respondent farmers applying the TABELA system has an average total income of IDR 17,695,676 per planting season and an average total cost of IDR 5,855,676 per planting season, resulting in a B/C ratio of 3. This means that for every 1 rupiah spent on these rice farming systems, it will generate 3.3 (TAPIN) and 3 (TABELA) units of income. Based on the calculation of the B/C ratio > 1 (more than 1) obtained from rice farming in both systems, rice farming in Padang Mentoyo Village has provided benefits to farmers, making it feasible to be cultivated. This research is in line with research by Khandker *et al*. (2021) which shows that rice farming is a profitable business with a cost-benefit ratio of 1.8, indicating that rice farming is an economically viable activity.

4. CONCLUSION

Based on the results of data analysis and the discussion that has been presented, the following conclusions are drawn. The average technical efficiency of rice farming in Padang Mentoyo Village is 0.608 (medium) and 0.944 (high), respectively, for TAPIN and TABELA rice farmers. Thus, these farmers have the opportunity to achieve maximum (full) technical efficiency by increasing by 39.2% and 5.6%, respectively. This shows that TABELA system rice farmers are more technically efficient compared to the TAPIN system. The revenue per planting season of TAPIN farmers is IDR 599,810,000 or average IDR 16,211,081, and the income of TABELA farmers is IDR 654,740,000 (average IDR 17,695,676). Based on the analysis, the comparison of the R/C and B/C ratio of farmers for TAPIN system is R/C ratio 4.2 and B/C ratio 3.3, while for TABELA farmers, the R/C ratio is 4.0 and B/C ratio 3.0. Based on the research results, it is suggested for the government to provide counseling on good planting systems to increase rice farming productivity in Padang Mentoyo Village. For farmers, they should improve TAPIN because there is an enough space to increase technical efficiency.

REFERENCES

Ahmed, S., Kumar, V., Uz-Zaman, A., Dewan, M.R., Khatun, A., Hossain, K., Singh, S., Timsina, J., Krupnik, T.J. (2025). Dry direct-seeded and broadcast rice: A profitable and climate-smart alternative to puddled transplanted aus rice in Bangladesh. *Field Crops Research*, ***322***, 109739. https://doi.org/10.1016/j.fcr.2025.109739

Arifin, A.M., Fariyanti, A., & Tinaprilla, N. (2021). Efisiensi teknis usahatani kentang di Kabupaten Gowa Sulawesi Selatan. *Forum Agribisnis: Agribusiness Forum*, ***11***(1), 65-74. https://doi.org/10.29244/fagb.11.1.65-74

Asmara, R., & Hanani, N. (2017). *Efisiensi Produksi: Pendekatan Stokastik Frontier dan Data Envelopment Analysis (DEA)*. Jurusan Sosial Ekonomi Pertanian, Fakultas Pertanian, Universitas Brawijaya, Malang.

Berutu, L., Siahaan, R.O., & Nasrida, M.F. (2023). Analisis SWOT upaya pengembangan bisnis kuliner pasar ramadan (Study kasus pada UMKM pasar ramadan food kota Palangka Raya). *Cemerlang : Jurnal Manajemen dan Ekonomi Bisnis*, ***3***(2), 160–175. https://doi.org/10.55606/cemerlang.v3i2.1139

Devi, M.G., Kumar, M.Y., & Meera, S.N. (2024). Direct sowing – Alternate method of transplanting rice. *International Journal of Environment, Agriculture and Biotechnology*, 9(5), 113-116. https://dx.doi.org/10.22161/ijeab.95.12

Farooq, M., Siddique, K.H.M., Rehman, H., Aziz, T., Lee, D-J., & Wahid, A. (2011). Rice direct seeding: Experiences, challenges and opportunities. *Soil and Tillage Research*, ***111***(2), 87-98. https://doi.org/10.1016/j.still.2010.10.008

Fiansyah, M., Kurniati. D., & Suyatno, A. (2023). Persepsi Petani padi sawah terhadap teknologi tanam tebar benih langsung (TABELA) dan tanam pindah (TAPIN) di Kabupaten Kubu Raya. *Jurnal Agrica*, ***16***(1), 15–28. https://doi.org/10.31289/agrica.v16i1.8278

Hafeez-ur-Rehman, Nawaz, A., Awan, M.I., Ijaz, M., Hussain, M., Ahmad, S., & Farooq, M. (2019). Direct seeding in rice: Problems and prospects. In *Agronomic Crops*: *Volume 1*: *Production Technologies*. Springer Singapore: 199-222. https://doi.org/10.1007/978-981-32-9151-5_11

Kumar, V., & Ladha, J.K. (2011). Chapter Six - Direct seeding of rice: Recent developments and future research needs. *Advances in Agronomy*, *111*, 297-413. https://doi.org/10.1016/B978-0-12-387689-8.00001-1

Kumar, A., Verma, R.L., Sah, R.P., Satapathy, B.S., Mohanty, S., Tripathi, R., Chattopadhyay. K., Samantaray, S., & Nayak, A.K. (2024). Direct Seeded Rice: A Technology for Enhancing Climate Resilience. *NRRI Research Bulletin No. 50*. ICAR-National Rice Research, Cuttack-753006, Odisha, India: 32 pp.

Marpaung, I.S., Sipahutar, T., Siagian, D.R., & Tommy, P. (2021). Teknologi tanaman padi sistem tanam benih langsung dengan hambur di dataran tinggi Sumatera Utara (Studi kasus di Kabupaten Humbang Hasundutan). *Proceedings Series on Physical & Formal Sciences*, ***2***, 344-351. http://dx.doi.org/10.30595/pspfs.v2i.209

Musmuliadi, M. (2018). Perbandingan Sistem Tanam Pindah (TAPIN) dan Sistem Tanam Benih Langsung (TABELA) TERHADAP Pendapatan Usahatani Padi (Desa Tosora, Kecamatan Majauleng, Kabupaten Wajo). [*Undergraduate Theses*]. Department of Economic Science, Faculty of Islamic Economy and Business, UIN Alauddin Makassar.

Nurhayati, N., Apriyanto, A., Ahsan, J., & Hidayah, N. (2024). *Metodologi Penelitian Kualitatif: Teori dan Praktik*. PT. Sonpedia Publishing Indonesia, Kota Jambi: 144 pp.

Pemerintah Desa Padang Mentoyo. (2023). *Profil Desa Padang Mentoyo Kecamatan Kapas Kabupaten Bojonegoro*. Pemdes Padang Mentoyo Kabupaten Bojonegoro

Rahim, A.B.D., & Hastutik, D.R.D. (2008). *Ekonomika Petanian (Pengantar, Teori dan Kasus)*. Penebar Swadaya.

Rizwan, M., Ahmed, K., Bhatti, M.K., Sarfraz, M., Irfan, M., Hussain, S.S., & Naseem, A.R. (2022). Effect of sowing techniques and tillage practices on paddy yield of direct seeded rice in salt affected soils. *Asian J. Agric. Biol*. ***2022***(1), 202101043. https://doi.org/10.35495/ajab.2021.01.043

Rorong, F., Tumewu, P., & Pamandungan, Y. (2024). Kajian Penerapan teknologi budidaya tanaman dan produktivitas padi sawah (*Oryza sativa L.*) di Kecamatan Dumoga. *Agri-Sosioekonomi*, ***20***(1), 13–22. https://doi.org/10.35791/agrsosek.v20i1.52324

Sheliena, E., Hanani, N., & Riana, F.D. (2024). Analisis pendapatan dan kelayakan usahatani kentang granola di Desa Wonokerso Kabupaten Probolinggo. *Jurnal Dinamika Sosial Ekonomi*, ***25***(1), 95–106. https://doi.org/10.31315/jdse.v25i1.12118

Singh, J., & Singh, G. (2024). A review on direct seeded rice: A sustainable approach to paddy cultivation. *International Journal of Scientific Research & Engineering Trends*, ***10***(5), 1769-1777.

Siregar, W.A., Murdy, S., & Saputra, A. (2015). Komparasi usahatani padi sawah sistem TAPIN dan sistem TABELA di Kecamatan Geragai Kebupaten Tanjung Jabung Timur. *Jurnal Ilmiah Sosio-Ekonomika Bisnis*, ***18***(2). https://doi.org/10.22437/jiseb.v18i2.2826

Soekartawi. (1989). *Prinsip Dasar Ekonomi Pertanian, Teori dan Aplikasi*. Rajawali Press.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. CV. Alfabeta.

Srilatha, P., & Vani, C.S. (2015). Direct sown paddy with seed drill – A low cost technology enhancing paddy production in Krishna District of Andhra Pradesh. *International Journal of Science and Research* (*IJSR*), ***4***(9), 966-968.

Suryahani, I., Nurhayati, N., & Gunawan, E.R.S. (2024). *Buku Referensi Dinamika Global Perekonomian Indonesia*. PT. Sonpedia Publishing Indonesia, Kota Jambi: 106 pp.

Sunarto. (2010). Evaluasi kinerja kantor-kantor pelayanan pajak pratama di pulau jawa: penerapan data envelopment analysis (DEA). [*Thesis*]. Universitas Indonesia.

Suratiyah. K. (2015). *Ilmu Usahatani* (Edisi Revisi). Penebar Swadaya, Jakarta: 162 pp.