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Comparative Study Of Coffee Harvesting Systems In Banjit District, Way Kanan Regency

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Abstract

The low quality of coffee beans caused by indiscriminate harvesting systems remains a primary constraint in optimizing farmers' income in the Banjit District of Way Kanan Regency. This study aims to analyze and compare the profitability of coffee farming implementing selective red-pick, rainbow-pick, and combined-pick harvesting systems, as well as to determine the harvesting system that yields the highest profit. This quantitative study, employing a descriptive-analytical basic method, was conducted purposively in Argomulyo Village within the Sri Rejeki Farmers Group. From a population of 117 farmers, samples were selected using the Slovin Formula with a 5% margin of error, resulting in 90 respondents (30 farmers for each harvesting system) who possessed a minimum of 5 years of farming experience. Primary data collection was carried out through observation, in-depth interviews, and structured questionnaires. The data were analyzed using cost-and-profit analysis, the One-Way ANOVA statistical test, and the Post Hoc LSD follow-up test. The descriptive analysis results showed that the highest average profit was obtained by the red-pick system (IDR 44,389,809/Ha), followed by the combined-pick system (IDR 33,419,654/Ha), and the rainbow-pick system (IDR 21,614,860/Ha). However, the Post Hoc LSD test demonstrated that there was no significant difference in profit between the red-pick and rainbow-pick systems (Sig. 0.656 > 0.05). Conversely, the profit of the combined-pick system was significantly different from both the red-pick (Sig. 0.004 < 0.05) and rainbow-pick (Sig. 0.001 < 0.05) systems. It is concluded that the combined-pick system is statistically the most superior and effective harvesting method because it provides more stable profits through an optimal balance between premium coffee bean quality acquisition and harvesting labor cost efficiency. Farmers are recommended to transition to the combined-pick system to maximize the economic efficiency of coffee farming.

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INTRODUCTION

Coffee is one of Indonesia's major plantation commodities and an important source of foreign exchange for the national economy. During the 2022–2025 period, Indonesia ranked as the world's fourth-largest coffee producer, with a production volume reaching 789,000 tons per year. Sumatra Island is the epicenter of national coffee production, particularly for the robusta variety, where the southern part of Sumatra (including Lampung Province) is known as part of the "Robusta Golden Triangle" (Oktoyoki, 2023). Way Kanan Regency is one of the largest contributors to robusta production in Lampung, with Banjit District as its main center, covering a coffee plantation area of 7,820 hectares and a production volume of 3,135 tons per year.

The main determinant of dried coffee bean quality is strongly influenced by post-harvest handling, which begins with the fruit-picking process in the field. In Argomulyo Village, Banjit District, three harvesting system variations are widely practiced by farmers in the Sri Rejeki Farmers Group: the red-pick system (selective harvesting of fully ripe fruit), the rainbow-pick system (mass harvesting of fruit of all colors), and the combined-pick system (an adaptive method combining red-pick and rainbow-pick). These quality differences trigger fairly significant variations in selling price at the collector level. On one hand, the red-pick system offers a higher price but requires a large labor input, while the rainbow-pick system can reduce labor costs but lowers the selling price due to the high defect value of the coffee beans according to the SNI 01-2907-2008 quality standard.

Although previous literature has discussed coffee quality standardization (Afrizon, 2020; Oktoyoki & Siswahyono, 2023), a research gap remains regarding the analysis of real cost efficiency and profitability stability from applying the combined-pick harvesting system in smallholder coffee farming. Most previous studies have focused only on comparing pure red-pick and indiscriminate picking (Kresmonanda et al., 2024), and therefore have not addressed the dilemma faced by smallholder farmers with limited capital to pay full daily labor wages. This study is therefore important to provide farmers with recommendations regarding the most profitable harvesting system.

Based on this issue, the specific objectives of this study are to analyze and compare the profit levels of coffee farmers under each harvesting system and to determine which harvesting system provides the highest profit for farmers.

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RESEARCH METHOD

This study used a quantitative approach with a basic descriptive-analytical method to analyze and compare profits across several coffee harvesting systems. The study was conducted purposively in the Sri Rejeki Farmers Group, Argomulyo Village, Banjit District, Way Kanan Regency. This location was selected because the area is one of the main robusta coffee production centers whose farmers apply a variety of harvesting systems. Primary data collection was carried out through field observation, in-depth interviews, and the distribution of structured questionnaires to respondents (Sugiyono, 2018).

Population and Sample

The population in this study consisted of all 117 coffee farmers belonging to the Sri Rejeki Farmers Group. The sample size was determined using the Slovin Formula (Sugiyono, 2018) with a 5% margin of error, resulting in a sample of 90 respondents. Sampling was carried out based on the three harvesting system groups applied, namely 30 farmers using the red-pick system, 30 farmers using the rainbow-pick system, and 30 farmers using the combined-pick system. An additional criterion for respondents was a minimum of 5 years of coffee farming experience to ensure the validity of the operational data provided.

Data Analysis Method

The data analysis technique in this study was divided into three main stages. First, descriptive economic analysis was used to calculate the total production cost, revenue, and net profit level obtained by farmers under each harvesting system (Sukartiyah, 2015). Second, hypothesis testing to examine profit differences between harvesting systems was carried out using the One-Way ANOVA statistical test at a 5% (0.05) significance level (Lestari, 2025). Third, if the test results showed a significant difference (Sig. < 0.05), the analysis was continued with the Post Hoc Least Significant Difference (LSD) follow-up test to specifically identify which pairs of harvesting systems had significant profit differences (Lestari, 2025).

RESULTS AND DISCUSSION

Research Area Profile

This study was conducted in the Sri Rejeki Farmers Group, Argomulyo Village, Banjit District, Way Kanan Regency. This area is one of the main robusta coffee plantation production centers in Way Kanan Regency, with ideal agroclimatic conditions for coffee cultivation. Coffee is the economic backbone for most of the community in Argomulyo Village. The Sri Rejeki Farmers Group was selected as the research locus because its members

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display a unique dynamic in applying various harvesting system variations (red-pick, rainbow-pick, and combined-pick) in managing their plantation farming.

Result Analysis

Table 1. Average Total Cost, Revenue, and Profit per Harvesting System (IDR/Ha)

No	Description	Red-Pick	Rainbow-Pick	Combined-Pick
1	**Fixed Cost**			
	Tax	IDR 32,167	IDR 35,333	IDR 34,333
	Equipment Depreciation	IDR 152,789	IDR 107,226	IDR 116,857
2	**Variable Cost**			
	Fertilizer	IDR 1,590,367	IDR 1,123,325	IDR 1,608,967
	Pesticide	IDR 757,250	IDR 686,743	IDR 720,022
	Labor	IDR 6,633,039	IDR 4,084,972	IDR 4,594,389
	Transportation and Milling	IDR 1,218,840	IDR 921,110	IDR 1,182,205
Total Cost		**IDR 10,384,452**	**IDR 6,958,709**	**IDR 8,256,773**
Revenue		**IDR 54,774,261**	**IDR 28,573,569**	**IDR 41,676,427**
Profit		**IDR 44,389,809**	**IDR 21,614,860**	**IDR 33,419,654**

Source: Processed Primary Data (2025)

Based on the tabulated data, the red-pick system descriptively generated the highest profit (IDR 44,389,809/Ha) because the price sensitivity of the premium commodity was able to compensate for the high variable cost (IDR 10,199,496/Ha) resulting from the labor wage allocation for selective picking. In contrast, the rainbow-pick system recorded the lowest profit (IDR 21,614,860/Ha); the savings in variable input costs under this system were unable to offset the revenue deficit caused by price cuts due to the low quality of the coffee beans. Meanwhile, the combined-pick system achieved a competitive profit of IDR 33,419,654/Ha through labor cost efficiency during peak harvest (the 2nd and 3rd harvests) while still maintaining quality standards at the beginning and end of the season (the 1st and 4th harvests). On the other hand, the fixed cost (TFC) component across the three systems tended to be homogeneous and stable within the range of IDR 140,000 to IDR 185,000/Ha, confirming that the differentiation in profit margins among farmers was purely

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determinedby the choice of harvesting management and the efficiency of variable cost (TVC) allocation, rather than inequality in farm asset ownership.

Post Hoc LSD Test Results

Table 2. Post Hoc LSD Test Results (Multiple Comparisons, Dependent Variable: Profit)

(I) Picking System	(J) Picking System	Mean Difference (I-J)	Sig.
Red-Pick	Rainbow-Pick	2,846,109.700	.656
	Combined-Pick	-18,790,879.833*	.004
Rainbow-Pick	Red-Pick	-2,846,109.700	.656
	Combined-Pick	-21,636,989.533*	.001
Combined-Pick	Red-Pick	18,790,879.833*	.004
	Rainbow-Pick	21,636,989.533*	.001

** The mean difference is significant at the 0.05 level.*

The Post Hoc LSD (Least Significant Difference) test is a follow-up test used after the ANOVA test shows a significant difference. This test aims to identify which pairs of groups have a significant mean difference. The LSD test compares the means between harvesting systems in pairs at a significance level of 0.05. If the Sig. value is < 0.05, there is a significant difference between the groups being compared.

Discussion

Descriptively, the red-pick system produced the highest average nominal profit of IDR 44,389,809/Ha, followed by the combined system (IDR 33,419,654/Ha) and the rainbow-pick system (IDR 21,614,860/Ha). This nominal advantage of the red-pick system is rooted in the optimization of the physical quality of fully ripe coffee beans, which provides a stronger bargaining position in the premium market. However, the Post Hoc LSD follow-up test showed that the net profit between the red-pick and rainbow-pick systems was not statistically significantly different. This is because the premium price of red-pick coffee cannot be continuously enjoyed by all farmers; to obtain the highest price, farmers are required to delay sales until the right market timing, while the farmers' economic structure is highly dependent on liquidity or a fast cash turnover to meet daily needs. This is further compounded by global price fluctuations and the narrow price margin at the local middlemen level, which has not been able to compensate for the risk of fruit weight loss.

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This dilemma causes the majority of farmers in Banjit District to psychosocially choose to remain with the rainbow-pick system, which is considered more practical, faster, and more economical in terms of labor costs.

On the other hand, the combined-pick system proved to be statistically significantly different and is considered superior as a sustainable income model for farmers. However, its implementation in the field is still spontaneous and situational, aimed solely at meeting daily liquidity needs. Therefore, in order to multiply net profit through a cost reduction strategy, a Four-Phase Structured Combination Formula was developed across the harvest season. In the first harvest, rainbow-pick is applied to secure initial capital with a low wage burden when the volume of ripe fruit is still small. Entering the second harvest (peak season), picking shifts to full manual red-pick, a phase that generates the largest revenue because daily labor productivity increases amid the abundance of ripe fruit on the trees, allowing the wage cost per kilogram to be significantly reduced.

Next, in the third harvest, farmers are directed to tactically return to the rainbow-pick system in order to maintain the family's cash flow while minimizing labor wage costs after the harvest peak. Finally, in the fourth harvest, an aggressive join-cost strategy is executed by integrating the picking of remaining fruit with post-harvest branch-pruning activities into a single time frame. The elimination of duplicate costs from merging these two expenditure components into a single financing activity cumulatively boosts the net profit margin to its highest point. The application of this structured harvest management has been proven to significantly improve the economic efficiency of smallholder coffee farming, consistent with the findings of Manurung & Wiraguna (2025) and Lutfiani et al. (2025), who emphasized the importance of harvest management choices for the sustainability of farmers' income.

CONCLUSION

Although the red-pick system descriptively produced the highest nominal profit (IDR 44,389,809/Ha), the Post Hoc LSD follow-up test proved that its net profit was not significantly different from the rainbow-pick system. This is due to the liquidity constraints faced by smallholder farmers, who require fast cash turnover and are therefore unable to hold their commodity until it reaches a premium price momentum in the market. In contrast, the combined-pick system proved to be the most superior and statistically significant income model. Through the application of the Four-Phase Structured Combination Formula (tactical allocation of rainbow-pick and red-pick), farmers can maintain daily cash flow while simultaneously multiplying net profit through an operational cost reduction strategy and the merging of duplicate costs (join cost) at the end of the harvest season.

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Recommendations

1. For Farmers: It is recommended that farmers begin shifting from the conventional harvesting pattern (pure rainbow-pick) toward the application of the Structured Combination Formula to balance daily cash liquidity needs with achieving an optimal farm profit margin.
2. For Agricultural Extension Institutions: Field Agricultural Extension Officers (PPL) are expected to educate farmers on this periodic harvest-scheduling management.

REFERENCES

Afrizon, A., Ishak, A., & Mussaddad, D. (2020). Upaya Peningkatan Produksi Kopi Dengan Panen Petik Merah Di Kabupaten Rejang Lebong. AGRITEPA: Jurnal Ilmu Dan Teknologi Pertanian, 7(1), 31–40. https://doi.org/10.37676/agritepa.v7i1.1001

Alamri, M. H., Rauf, A., & Saleh, Y. (2022). Analisis faktor-faktor produksi terhadap produksi padi sawah di Kecamatan Bintauna Kabupaten Bolaang Mongondow Utara. AGRINESIA: Jurnal Ilmiah Agribisnis, 6(3), 240–249.

Anggarawati, S., Mustopa, M., & Eka Suwarnata, A. A. (2023). Perbedaan Cara Petik Buah Kopi Terhadap Pendapatan dan Nilai Tambah di Gapoktan Jaya Bakti Kecamatan Pamijahan - Kabupaten Bogor. Jurnal Ilmiah Respati, 14(1), 64–77. https://doi.org/10.52643/jir.v14i1.3134

Arzia, F. S. (2019). Faktor-Faktor yang Mempengaruhi Produksi Industri Manufaktur di Indonesia. Jurnal Kajian Ekonomi dan Pembangunan, 1(1), 1–6.

Astuti, S. (2022). Analisis Keuntungan dan Kelayakan Bisnis Kurma Tomat di Kota Bengkulu [Skripsi]. UIN Fatmawati Sukarno Bengkulu.

Azhar, A. (2010). Peranan Total Quality Manajemen (TQM) dalam Meningkatkan Daya Saing. Pekbis Jurnal, 2(1), 254–260. https://pekbis.ejournal.unri.ac.id/index.php/JPEB/article/view/388

Dopi, U. B. (2022). Analisis Usahatani Kopi Robusta di Desa Sungai Medang Kecamatan Air Hangat Timur Kabupaten Kerinci Provinsi Jambi [Skripsi].

Ela Fatmawati A. I., Fitriani, Y., Rahman, A., Sepriyani, Y., Khan, M. U., & Fatima, A. (2025). Pengumpulan Data Untuk Analisis Praktik Berbahasa Di Kelas. Jurnal Pembahsi (Pembelajaran Bahasa Dan Sastra Indonesia), 15(2), 234–244. https://doi.org/10.31851/pembahsi.v15i2.17514

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Firdaus, N. A. (2021). Pengelolaan Prapanen Tebu (Saccharum officinarum L.) di Pusat Penelitian Perkebunan Gula Indonesia (P3GI) Pasuruan-Jawa Timur.

Hariyono. (2015). Analisis Sistem Pemetikan Kopi Selektif dan Racutan Terhadap Pendapatan Petani Kopi di Kabupaten OKU Selatan. Jurnal Bakti Agribisnis, 1(01), 39–48. https://doi.org/10.53488/jba.v1i01.105

Kacaribu, B., Sarah, J., Tarigan, K., et al. (2013). Analisis Perbandingan Pendapatan Petani Jagung yang Menjual Biji Basah dengan Menjual Biji Kering (Studi Kasus: Desa Tuppak Raja, Kecamatan Gunung...). Journal of Agriculture and ..., 1–14.

Kresmonanda, A., Priyono, B. S., & Yuristia, R. (2024). Hubungan Persepsi Dengan Motivasi Petani Kopi Dalam Mengadopsi Metode Petik Merah (Selektif) di Desa Bandung Jaya. Jurnal AGRIBIS, 10(1), 21–33.

Kurniawan, W. M., & Hastuti, K. (2017). Penentuan Kualitas Biji Kopi Arabika Dengan Menggunakan Analytical Hierarchy Process (Studi Kasus Pada Perkebunan Kopi Lereng Gunung Kelir Jambu Semarang). Simetris: Jurnal Teknik Mesin, Elektro dan Ilmu Komputer, 8(2), 519. https://doi.org/10.24176/simet.v8i2.1358

Marbun, D. N. V. D., Satmoko, S., & Gayatri, S. (2019). Peran Penyuluh Pertanian dalam Pengembangan Kelompok Tani Tanaman Hortikultura di Kecamatan Siborongborong, Kabupaten Tapanuli. Jurnal Ekonomi Pertanian dan Agribisnis, 3(3), 537–546. https://doi.org/10.21776/ub.jepa.2019.003.03.9

Maria Alfonsa Ngaku, M. U. (2024). Meningkatkan Mutu Produk di Kabupaten Ngada. 1, 39–47.

Oktoyoki, H., & Siswayono. (2023). Geografi Comparative Study Usaha Tani Kopi Robusta Petik Merah dan Petik Asalan pada Petani-petani Kecil di Rejang Lebong, Bengkulu. Program Studi Kehutanan, Universitas Bengkulu, 2, 114–121. https://doi.org/10.30598/geoforumvol2iss2pp114-121

Reta, D., Sumule, O., & Larekeng, H. (2021). Penerapan Teknik Panen dan Pascapanen Kopi Arabika Kalosi Produk Unggulan Kabupaten Enrekang. Jurnal Dinamika Pengabdian, 6(2), 341–348.

Riduwan. (2015). Rumus Perhitungan Sampel (pp. 50–66).

Sirappa, M. P., Heryanto, R., & Silitonga, Y. R. (2024). Standardisasi Pengolahan Biji Kopi Berkualitas. Warta BSIP Perkebunan, 2(1), 18–25.

Suherman, R. F., Hikmah, S. Q., & Firmansyah, R. (2023). Analisis Faktor-Faktor yang Mempengaruhi Ekspor Kopi Indonesia di Pasar Internasional. Jurnal Ekonomi

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Manajemen dan Sosial, 6(2), 51–61. https://ojs.ejournalunigoro.com/index.php/JEMeS

Syahril, M. (2021). Strategi Masyarakat dalam Budidaya Tanaman Kopi Penunjang Kepariwisataan (Studi Kasus di Desa Tambora Kecamatan Pekat Kabupaten Dompu) [Skripsi].

Syaputra, R. (2021). Strategi Pengembangan Kopi Robusta di Kabupaten Merangin. Jurnal Khazanah Intelektual, 4(3), 866–888. https://doi.org/10.37250/newkiki.v4i3.79

Thamrin, S., Ashan, M. D., Junaedi, J., Maslam, M., & Ilham, M. N. I. (2023). Penerapan Teknologi Budidaya Tanaman Kopi Secara Berkelanjutan Bagi Petani di Kabupaten Gowa. JatiRenov: Jurnal Aplikasi Teknologi Rekayasa dan Inovasi, 2(1), 34–41. https://doi.org/10.51978/jatirenov.v2i1.567

Zulkifli. (2024). Karakteristik Budidaya Tanaman Kopi Rakyat di Kecamatan Lembah Sorik Marapi Kabupaten Mandailing Natal [Skripsi]. 84.

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