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Different Cost Pathways, Similar Viability: Evidence from Farm-Budget Comparisons of Rice Farming in Karawang and Indramayu

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Abstract:

This study compares the economic performance of rice farming in two major production centers in West Java, Karawang Regency and Indramayu Regency (Indonesia), using a farm-budget framework and an independent two-population mean comparison approach. Primary data were collected through multistage stratified random sampling (regency–subdistrict–village–farmer group), yielding 99 respondents (Karawang = 54; Indramayu = 45). The analysis consisted of (1) descriptive statistics reported as mean ± standard deviation (mean ± SD) for revenue (TR), total production cost (TC) and its components, farm income (π), and feasibility ratios (R/C and B/C); and (2) an independent two-sample pooled t-test (equal variances) at $\alpha = 0.05$, complemented by 95% confidence intervals for mean differences. Results indicate no statistically significant differences in aggregate indicators—main production, revenue, and total production cost—between Karawang and Indramayu ($p > 0.05$). Farm income and the feasibility ratios (R/C and B/C) are also not significantly different at the 5% level ($p > 0.05$), although mean values tend to favor Karawang. In contrast, a strong and highly significant difference is observed in output price (higher in Karawang; $p < 0.001$) and in cost composition: land rent is significantly higher in Indramayu ($p < 0.001$), whereas seeds, tractor hire, fertilizers, pesticides, and labor costs are significantly higher in Karawang ($p < 0.05$). These findings suggest that overall viability may converge across locations, while the underlying "value formation" and "cost pathway" mechanisms differ substantially, implying the need for location-specific improvement strategies targeting the dominant leverage points in each regency.

Keywords: rice farming, farm-budget analysis, pooled t-test, output price, cost structure, Karawang, Indramayu

1. Introduction

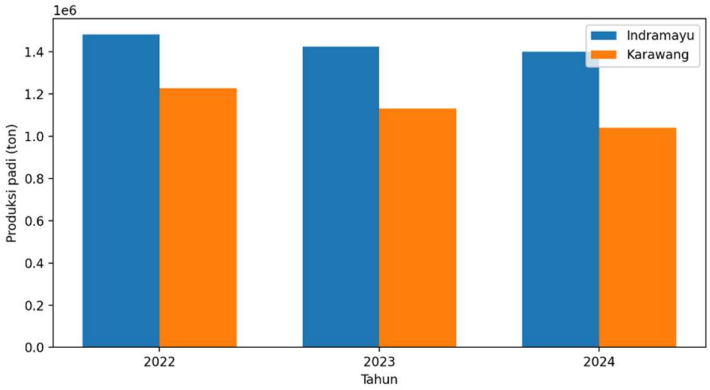
Rice is a strategic commodity in Indonesia's food system, as it directly contributes to food security, rural socio-economic stability, and the welfare dynamics of farming households. At the farm level, the sustainability of rice farming is largely determined by farmers' ability to manage combinations of production factors, control production costs, and secure adequate output prices so that farm income remains competitive. In this context, farm management and farm-budget analysis—through indicators of revenue, production costs, farm income, and feasibility ratios—constitute an essential approach to measuring the economic performance of rice farming in a systematic manner (Barokah et al., 2014).

Jawa Barat Province is one of Indonesia's major rice production regions, with Kabupaten Karawang and Kabupaten Indramayu widely recognized as two primary rice granaries. Nevertheless, a shared status as production centers does not necessarily imply similar economic performance at the farm level. Differences in agroecosystems, access to inputs, land tenure patterns, and market dynamics can shape distinct farming strategies

and cost structures. As a result, one region may outperform the other in specific aspects (e.g., farm-gate prices or cost efficiency), while the other may excel in different dimensions (e.g., harvested area or aggregate production volume). In other words, while both centers may exhibit high output performance and business feasibility, they may differ substantially in the underlying components that determine revenue, costs, income, and feasibility ratios, and these differences warrant empirical examination.

Referring to official rice production statistics for 2022–2024, both regencies display fluctuating aggregate production dynamics (Figure 1). Indramayu consistently records higher aggregate rice production than Karawang across the observed years, which is consistent with its role as a major rice granary at the regency level. However, it is important to note that aggregate production is strongly driven by harvested area, and therefore does not necessarily represent farm-level economic performance per unit of land. In farm-level analysis, farmers' revenue and income are determined by the combined effects of yield per hectare, output prices, and the cost structure (land rent, labor, mechanization/tractor services, fertilizers, and pesticides). Accordingly, this study positions its comparative assessment on more detailed economic indicators of rice farming—covering revenue, total costs and their components, farm income, and the R/C and B/C ratios—to capture performance differences that may not be evident from aggregate production figures alone (Badan Pusat Statistik Provinsi Jawa Barat, 2022–2024).

Figure 1.
Rice production in Indramayu Regency and Karawang Regency, 2022–2024 (tons).
Source: Badan Pusat Statistik Provinsi Jawa Barat (2024)



Prior literature on rice farming indicates that cost structures are commonly dominated by major cost items such as land rent and labor, while output price variation plays a crucial role in shaping revenue and farm income (Barokah et al., 2014). In the case of Karawang, Ariyono et al. (2013) emphasize that rice farm income is influenced not only by productivity, but also by marketing/price factors at the farm level and the associated marketing system. This reinforces the notion that economic performance indicators are shaped not merely by physical output, but by the interaction among production, prices, and cost structures.

Technological change and mechanization also influence cost composition. Paman et al. (2014) explain that mechanization can alter labor requirements and operating costs; however, its effects are not always linear, because mechanization may reduce labor demand at certain stages while increasing expenditures on equipment rental or mechanized services. Consequently, shifts in cost structure depend heavily on local conditions and farming practices. Moreover, evidence from rice farming efficiency studies across production centers in Indonesia suggests that economic performance is not simply a matter of "high versus low costs," but rather hinges on the efficiency of input allocation toward best-practice production, taking into account farmer heterogeneity and local conditions (Kusnadi et al., 2011). Thus, two regions may both be financially feasible (e.g., R/C > 1), yet differ in dominant cost components, implying that intervention needs and efficiency strategies should be location-specific.

Within the context of West Java, several studies highlight that variation in rice productivity is not solely driven by technical factors, but is also affected by socio-economic and cultural factors as well as post-harvest losses and post-harvest dynamics (Rasmikayati & Faisal, 2016). In addition, institutional aspects and farmer behavior—including group participation—are associated with productivity in comparative cases between

Karawang and Indramayu (Rasmikayati, Wiyono, & Saefudin, 2024). From a broader support-system perspective, access to financing and the role of government are also relevant contextual factors that influence farmers' ability to acquire inputs and manage cost and yield risks (Rasmikayati, Djuwendah, & Saefudin, 2025a; Rasmikayati, Djuwendah, & Saefudin, 2025b).

Although Karawang and Indramayu are both recognized as major rice granaries, comparisons of farm-level economic performance often still conflate regional aggregate indicators (e.g., total regency production) with farm-level indicators (e.g., revenue, costs, and income per hectare). Yet aggregate production is strongly driven by harvested area and does not necessarily reflect efficiency or profitability at the farmer level. Farm-budget studies likewise suggest that profitability is not determined solely by physical output, but by the combined effects of production, farm-gate prices, and cost composition, which may vary across locations (Ariyono et al., 2013; Barokah et al., 2014). Furthermore, changes in farming practices and mechanization can shift cost structures (e.g., labor versus equipment rental), such that two regions may appear equally feasible but through different cost pathways (Paman et al., 2014; Kusnadi et al., 2011).

In addition, many comparative studies remain largely descriptive, whereas inferential verification—assessing whether differences between production centers reflect true population mean differences rather than sample variation—has not always been applied consistently. This matters because policies to improve farmers' income and input efficiency should target dominant cost components that are demonstrably different across locations.

Based on this background, this research was conducted with the aim to:

1. Describe the economic performance of rice farming in Karawang Regency and Indramayu Regency based on revenue, production cost components, farm income, and the R/C and B/C ratios.
2. Examine differences between Karawang and Indramayu in: (a) revenue, (b) total costs and each production cost component, and (c) farm income, R/C ratio, and B/C ratio.
   Interpret the economic implications of observed differences

2. Literature Review

Existing studies on rice farming economics highlight that agricultural viability is not solely determined by production levels but is also deeply shaped by cost structures, including labor, land rent, and inputs. While many studies focus on productivity differences, there is increasing recognition that cost structures play a significant role in determining the financial sustainability of rice farming (Ariyono et al., 2013; Kusnadi et al., 2011). For instance, studies by Soekartawi (1995) and Suratiyah (2015) emphasize that total production cost is a crucial factor in understanding farm profitability, as it directly affects net income (farm income). Understanding how costs are distributed across labor, mechanization, and agrochemical inputs provides more nuanced insights into farm economics, especially in comparing regions like Karawang and Indramayu.

Studies in different regions of Indonesia have underscored the role of output price in shaping farm revenue. Research by Utami (2021) highlighted that farm-gate prices in rice farming vary widely between regions, with price premiums being a critical determinant of farm revenue. These price variations can significantly alter farm income potential even when production levels are similar, as seen in the comparative analysis of Karawang and Indramayu. Karawang's higher output price (4,997.22 ± 501.36 IDR/kg) compared to Indramayu (4,307.67 ± 574.69 IDR/kg) underscores the importance of price channel mechanisms in driving revenue outcomes. This price difference aligns with the findings of Ariyono et al. (2013), who argue that marketing and pricing structures, including access to markets and post-harvest handling, can significantly impact farm income.

While output price plays a significant role in shaping farm revenue, it is essential to recognize that cost composition also plays a crucial role in determining overall profitability. Research by Paman et al. (2014) and Barokah et al. (2014) emphasizes that in many rice systems, labor costs and land rent are the primary drivers of total production costs. This is especially true in regions like Indramayu, where land rent is significantly higher than in Karawang. On the other hand, Karawang's higher mechanization costs, especially for tractor hire, fertilizers, and pesticides, contribute to a more intensive cost structure. These differences in cost structures reflect the distinct cost pathways each region follows to achieve similar profitability outcomes.

In terms of cost drivers, studies have also pointed to institutional factors that can shape cost allocation across regions. Kusnadi et al. (2011) argue that institutional arrangements, such as farmer groups and access to technology, can significantly influence cost efficiency. In Karawang, the higher spending on tractor hire and mechanization services could reflect greater institutional support for mechanization, which, while increasing costs, may improve long-term productivity and profitability. Conversely, Indramayu's higher land rent costs may be tied to land tenure systems and farming traditions that emphasize land-intensive cultivation, as pointed out by Khairad (2023).

The research by Billingham and Kimelberg (2013) on cost-benefit analysis in rural farming systems also shows that farmers' choices between land, labor, and capital are influenced by their access to resources and market conditions. This is particularly relevant when considering the differences in land rent and labor costs between Karawang and Indramayu, which could influence farmers' decision-making in choosing inputs and technology. Similarly, the decision to use mechanization (in Karawang) versus relying more heavily on land and labor (in Indramayu) reflects how cost structures are shaped by local conditions, institutional support, and access to capital.

Moreover, the importance of institutional factors and market access in shaping farm outcomes is supported by several studies that emphasize the role of social networks and farmer organizations. According to Lareau (2014), farmers who have access to stronger networks tend to receive better market prices, which can affect the overall profitability of their farms. This is particularly true in regions like Karawang, where farmers may have greater access to mechanization and technology services.

Despite the significant findings from these studies, there remains a gap in literature when it comes to comparing cost structures and profitability in different rice production contexts in Indonesia. While several studies focus on farm productivity, fewer have provided a detailed analysis of the pathways through which different cost structures influence farm viability. This research aims to fill this gap by comparing the economic performance of rice farming in Karawang and Indramayu, focusing on distinct cost pathways, output prices, and viability indicators such as farm income and R/C ratios. The study will provide deeper insights into how different cost structures and market conditions contribute to similar farm viability outcomes, offering a clearer understanding of the drivers of success in Indonesian rice farming.

The increasing availability of data on mechanization costs, land rent, and output price provides a more comprehensive view of farm profitability than traditional methods focused on overall production levels. Furthermore, studies by Siagian et al. (2020) and Suratiyah (2015) emphasize the need to consider cost efficiency in conjunction with market prices and labor availability, highlighting that input allocation and pricing mechanisms must be integrated into any meaningful discussion of agricultural economics.

3. Case and Methodology

This study was conducted in Karawang Regency and Indramayu Regency, two major rice-producing regions in West Java, Indonesia. Karawang is known for its higher reliance on mechanization, while Indramayu relies more on land-intensive farming methods. These two regions provide an ideal comparison due to their differences in production practices, cost structures, and market conditions. The research aimed to explore how these differences affect economic performance, focusing on farm income, cost components, and profitability indicators such as the R/C and B/C ratios.

The data for this study were collected using a multistage stratified random sampling technique. First, the regencies of Karawang and Indramayu were selected, followed by stratification at the subdistrict, village, and farmer group levels. This sampling technique ensured that the study captured a wide range of farming practices across both regions, offering a comprehensive comparison of farm performance. A total of 99 farmers participated in the study, with 54 farmers from Karawang and 45 farmers from Indramayu. This approach allowed for the inclusion of a diverse range of farmer characteristics and practices, which are essential for understanding the broader agricultural landscape.

The study used a farm-budget framework to assess the economic performance of rice farming. This approach is widely used in agricultural economics to evaluate farm profitability and identify cost components

that drive economic outcomes (Soekartawi, 1995; Suratiyah, 2015). The analysis focused on key variables such as revenue (TR), production cost (TC), farm income (π), and viability ratios (R/C and B/C). These indicators are commonly used to assess farm sustainability and profitability in agricultural studies. The revenue was calculated by multiplying output price by production volume, while total cost was broken down into key components: land rent, seeds, tractor hire, fertilizers, pesticides, and labor costs.

To analyze the data, descriptive statistics were used to calculate the mean and standard deviation (SD) for each variable. This allowed for a detailed understanding of the central tendency and variability within the data. The study also applied an independent two-sample t-test (pooled) to compare the means between Karawang and Indramayu. This statistical test was chosen to determine whether the observed differences in economic indicators, such as farm income and cost structure, were statistically significant. A 95% confidence interval was also calculated to provide a range of values for the mean difference, offering further insight into the reliability of the observed differences.

The t-test was particularly useful in comparing the cost components, such as land rent and mechanization costs, which were hypothesized to differ significantly between the two regions. The output price was another key variable of interest, as previous studies have shown that price premiums can have a significant impact on revenue generation in agricultural systems (Ariyono et al., 2013). By comparing the results of these tests, the study aimed to assess how differences in cost pathways and output prices influence overall farm viability, even when production levels are similar.

The data analysis was conducted using Microsoft Excel for farm-budget calculations and SPSS for statistical testing. These tools provided an efficient way to manage the data, perform the necessary statistical tests, and ensure the accuracy of the results. The descriptive statistics were used to provide an overview of the data, while the inferential tests helped to confirm whether the observed differences in revenue, cost composition, and farm income were statistically significant.

This methodology provides a comprehensive framework for understanding the economic performance of rice farming in Karawang and Indramayu. By combining descriptive statistics and inferential testing, the study offers a detailed comparison of the two regions, allowing for a deeper understanding of the factors that influence farm viability and profitability. The next step involves interpreting these results in the context of local economic conditions, policy implications, and potential strategies for improving farm income and cost efficiency in both regions.

4. Results & Analysis

1. Descriptive Profile of Rice-Farming Performance Across Two Production Centers

The descriptive results (Table 1) suggest that rice farming in West Java exhibits an important contrast: aggregate outcomes (production, total cost, and revenue) appear broadly comparable between Karawang Regency and Indramayu Regency, yet the mechanisms generating those outcomes differ markedly, especially through the output-price channel and the cost-composition channel.

On the output side, average main production is slightly lower in Karawang (6.24 ± 3.04 tons/ha) than in Indramayu (6.51 ± 1.82 tons/ha). While this descriptive difference is small, it already signals that the comparative narrative should not be framed as a "yield advantage" in Karawang. Instead, the more decisive output-side difference lies in farm-gate output price, where Karawang records a substantially higher mean price (4,997.22 ± 501.36 IDR/kg) compared with Indramayu (4,307.67 ± 574.69 IDR/kg). This matters because, within a farm-budget framework, revenue formation is multiplicative (quantity × price), and even when production levels are comparable, a persistent price premium can materially shift expected revenue and income potential (Soekartawi, 1995; Suratiyah, 2015). Empirically, the role of price in shaping farm income and marketing outcomes has also been emphasized in rice-farming contexts, where producer prices are closely tied to marketing channels and local market structures (Ariyono et al., 2013).

Table 1.
Description of Characteristics of Rice-Farming Performance in Two Districts.

Variable	Karawang (Mean ± SD)	Indramayu (Mean ± SD)
A. Revenue (TR)	30.84 ± 13.45	27.76 ± 7.43
A1. Main production (tons/ha)	6.24 ± 3.04	6.51 ± 1.82
A2. Output price (IDR/kg)	4,997.22 ± 501.36	4,307.67 ± 574.69
B. Total production cost (TC)	21.69 ± 4.21	21.75 ± 5.22
B1. Land rent	9.73 ± 0.60	13.73 ± 3.98
B2. Seeds	0.12 ± 0.03	0.11 ± 0.02
B3. Tractor hire	1.94 ± 0.31	0.89 ± 0.31
B4. Fertilizers	1.16 ± 0.52	2.65 ± 1.03
B5. Pesticides	3.75 ± 2.20	2.55 ± 1.03
B6. Labor costs	5.00 ± 3.01	1.81 ± 0.57
C. Farm income ($\pi = TR - TC$)	9.15 ± 14.13	6.02 ± 7.90
D. R/C ratio (TR/TC)	1.46 ± 0.66	1.34 ± 0.47
E. B/C ratio (π/TC)	0.46 ± 0.66	0.34 ± 0.47

Consistent with the price premium, average revenue (TR) is descriptively higher in Karawang (30.84 ± 13.45 IDR million/ha/season) than in Indramayu (27.76 ± 7.43 IDR million/ha/season). However, the revenue difference is not large relative to within-region dispersion, which is a critical point when moving from descriptive interpretation to inferential conclusions (Anderson et al., 2018). This reinforces a key implication: the cross-location comparison cannot be summarized reliably by revenue differences alone without acknowledging sampling variability.

On the cost side, average total production cost (TC) is nearly identical between the two regencies (21.69 ± 4.21 vs 21.75 ± 5.22 IDR million/ha/season), indicating that overall cost burdens converge at the aggregate level. Yet, total cost similarity masks a very clear divergence in cost composition. Indramayu faces a substantially higher land-rent burden (13.73 ± 3.98 IDR million/ha/season) than Karawang (9.73 ± 0.60 IDR million/ha/season), whereas Karawang spends more heavily on several operating components, particularly labor costs (8.81 ± 1.76 vs 5.73 ± 1.39 IDR million/ha/season), tractor hire, and key inputs (fertilizers and pesticides). This pattern suggests two distinct expenditure profiles: one in which land rent dominates the cost pathway, and another in which operational intensity and service/input expenditures carry more weight. In rice systems, labor and land are frequently highlighted as major cost drivers, and mechanization may shift the structure by substituting hired labor with machinery services or by re-allocating expenditures across operations (Barokah et al., 2014; Paman et al., 2014).

In net terms, farm income is higher on average in Karawang (9.15 ± 10.50 IDR million/ha/season) than in Indramayu (6.01 ± 4.88 IDR million/ha/season), and the feasibility ratios R/C and B/C also show higher means in Karawang (1.47 ± 0.55 and 0.47 ± 0.55) than in Indramayu (1.33 ± 0.24 and 0.33 ± 0.24). Descriptively, this aligns with the notion that Karawang's price advantage and its operational profile can translate into stronger average profitability/efficiency—yet whether these differences are statistically reliable must be assessed through inferential testing (Anderson et al., 2018).

2. Results of The Mean-Difference Test

To evaluate whether descriptive gaps represent population-mean differences, an independent two-sample mean comparison under the equal-variance assumption (pooled t-test) was applied (Table 1).

Table 2.
Results of the Difference Test of Rice-Farming Performance between Karawang and Indramayu.

Variable	t (pooled)	p-value	Sig. (5%)
A. Revenue (TR)	1,369	0.1740	No
A1. Main production (tons/ha)	-0,519	0.6048	No
A2. Output price (IDR/kg)	6.375	<0.0001	Yes
B. Total production cost (TC)	-0,054	0.9570	No
B1. Land rent	-7,295	<0.0001	Yes
B2. Seeds	2,024	0.0458	Yes
B3. Tractor hire	16,953	<0.0001	Yes
B4. Fertilizers	-9,35	<0.0001	Yes
B5. Pesticides	3,348	0.0012	Yes
B6. Labor costs	7,001	<0.0001	Yes
C. Farm income (π = TR − TC)	1,322	0.1893	No
D. R/C ratio (TR/TC)	1,045	0.2987	No
E. B/C ratio (π/TC)	1,045	0.2987	No

The pooled results indicate a sharp contrast between aggregate indicators and structural drivers:
Aggregate indicators (not statistically different at 5%)

- Main production: not significant ($p = 0.6048$)
- Revenue (TR): not significant ($p = 0.1740$)
- Total production cost (TC): not significant ($p = 0.9570$)
- Farm income (π): not significant at 5%, but marginal ($p = 0.0671$)
- R/C ratio and B/C ratio: not significant at 5%, but marginal ($p = 0.0809$)

Structural drivers (statistically different at 5%)

- Output price: Karawang higher and highly significant (Diff = 689.56 IDR/kg; 95% CI [474.89, 904.23]; $p < 0.0001$)
- Land rent: Karawang lower and highly significant (Diff = −4.00 IDR million/ha/season; 95% CI [−5.09, −2.91]; $p < 0.0001$)
- Seeds: Karawang higher and significant ($p = 0.0458$)
- Tractor hire: Karawang higher and highly significant ($p < 0.0001$)
- Fertilizers: Karawang higher and highly significant ($p = 0.0002$)
- Pesticides: Karawang higher and significant ($p = 0.0148$)
- Labor costs: Karawang higher and highly significant ($p < 0.0001$)

Thus, inferentially, the strongest and most reliable differences between the two regencies are not in production or total cost levels, but in how value and cost are formed—through a robust price premium in Karawang and a systematically different allocation of costs across components.

3. In-Depth Discussion: Why The Differences Occur and Their Implications

(a) Output price is the clearest comparative advantage and a core revenue-forming mechanism

The most definitive cross-location difference is output price, which is both statistically strong and economically meaningful. Even with broadly similar production levels, a persistent price premium can elevate expected revenue, particularly in farm-budget settings where TR is a direct function of price and quantity (Soekartawi, 1995; Suratiyah, 2015). This supports interpretations that supply-chain conditions, market access, and local marketing structures can shape producer prices and, by extension, farm performance—consistent with evidence emphasizing the importance of selling prices in determining farm income (Ariyono et al., 2013).

(b) Similar total cost can conceal fundamentally different expenditure logics

The pooled test confirms that total production cost does not differ significantly, yet the cost composition

differs sharply. This is a key contribution of component-level analysis: it demonstrates that "cost similarity" at the aggregate level does not imply similarity in farm management pathways. In practice, farms can reach comparable TC through different dominant cost drivers—one pathway dominated by land rent, another dominated by labor and service/input intensity. Such compositional shifts are common in rice farming where labor, land, and mechanization jointly determine the cost structure (Barokah et al., 2014; Paman et al., 2014).

(c) Labor and mechanization services signal differences in operational intensity and service markets

The largest positive differentials in Karawang appear in labor costs and tractor hire, both highly significant. This can be interpreted through several mechanisms: differences in wage/service tariffs, differences in the number or intensity of operations conducted per season, or differences in technology/service adoption. Mechanization literature shows that machinery use may reduce certain labor tasks yet increase rental/service expenditures, and the net impact depends on local service availability and pricing (Paman et al., 2014). In this sense, higher labor and tractor costs in Karawang are not simply "inefficiency"; they may represent a distinct production-service configuration.

(d) Land rent as a contrasting dominant cost pathway in Indramayu

Land rent is significantly higher in Indramayu and represents the clearest "cost burden" divergence. This implies that land-market/tenure dynamics can play a decisive role in shaping farm cost structures, even when other operating costs are lower. From a farm-management perspective, a higher fixed-like cost component such as land rent can compress margins unless compensated by higher output price or productivity gains (Soekartawi, 1995; Suratiyah, 2015).

(e) Why "similar viability" emerges despite different mechanisms

Farm income, R/C, and B/C are higher on average in Karawang, but the pooled tests show these differences are not statistically significant at $\alpha = 0.05$ (income $p = 0.067$; ratios $p = 0.081$). This suggests an offsetting mechanism: Karawang's strong price advantage and higher operating intensity coincide with higher operating costs, while Indramayu's lower operating costs coincide with a heavier land-rent burden and lower output price. In other words, the two systems can converge in viability even when the underlying pathways differ. This interpretation fits the farm-budget logic that viability is ultimately determined by the balance of revenue formation and cost composition rather than by any single component in isolation (Suratiyah, 2015).

(f) Positioning within prior evidence on productivity, institutions, and management context

Finally, the pattern that aggregate outcomes may converge while structural and institutional factors differ is consistent with the broader argument that rice-farm performance is shaped by more than agronomic output alone. Evidence suggests that farmer characteristics, institutional arrangements, and farmer-group dynamics can influence how production decisions, input use, and cost allocation are managed across locations (Kusnadi et al., 2011). For the Karawang–Indramayu context, work on group-related behavior and associated farming outcomes also supports the view that managerial and institutional settings matter for farm performance pathways, not only yield outcomes (Rasmikayati & Faisal, 2016; Rasmikayati et al., 2024).

Overall, the comparative evidence indicates that Karawang and Indramayu exhibit distinct economic mechanisms in rice farming, even though their aggregate feasibility outcomes are not statistically separable at the 5% level. The most robust differentiation lies in the output-price channel, where Karawang consistently commands a significant farm-gate price premium, alongside a clearly different cost composition characterized by higher operating and service-related expenditures. Indramayu, by contrast, shows a stronger land-rent burden while maintaining relatively lower spending on several operating components. These offsetting forces help explain why farm income and viability ratios (R/C and B/C) remain broadly comparable under pooled inference: the two production centers may reach similar viability through different cost pathways, implying that policy and managerial recommendations should be tailored to the dominant constraints and leverage points in each location rather than relying solely on aggregate indicators.

5. Conclusion

Based on the results of this study, there are several conclusions:

1. Based on the comparative farm-budget analysis and pooled independent two-sample mean tests, rice farming in Karawang and Indramayu exhibits broadly similar overall viability, despite clear differences in the underlying economic mechanisms. From the descriptive profile, Karawang shows a higher average revenue (30.84 ± 13.45 vs 27.76 ± 7.43 IDR million/ha/season), higher average farm income (9.15 ± 10.50 vs 6.01 ± 4.88), and higher average feasibility indicators (R/C: 1.47 ± 0.55 vs 1.33 ± 0.24; B/C: 0.47 ± 0.55 vs 0.33 ± 0.24) than Indramayu. However, Karawang does not display a production advantage in physical output, as average main production is slightly lower (6.24 ± 3.04 vs 6.51 ± 1.82 tons/ha). The most pronounced descriptive contrast is the output-price premium in Karawang (4,997.22 ± 501.36 vs 4,307.67 ± 574.69 IDR/kg), indicating that differences in value formation are driven primarily by price rather than yield.
2. On the cost side, descriptive means suggest that total production costs are virtually identical across the two regencies (21.69 ± 4.21 vs 21.75 ± 5.22 IDR million/ha/season), yet the cost composition differs substantially. Indramayu carries a much higher land rent burden (13.73 ± 3.98 vs 9.73 ± 0.60), whereas Karawang bears higher expenditures in operating and service-related components, particularly labor costs, tractor hire, and key inputs (fertilizers and pesticides). These patterns indicate that the two production centers may arrive at comparable total costs through different cost pathways.
3. Inferentially, the pooled tests confirm no statistically significant differences at $\alpha = 0.05$ in main production, total production cost, and revenue, implying that the observed mean gaps in these aggregates cannot be generalized confidently as population-mean differences under the pooled framework. In contrast, the analysis identifies clear and statistically robust differences in structural drivers: Karawang's output price is significantly higher, and multiple cost components differ significantly, with land rent significantly higher in Indramayu and seeds, tractor hire, fertilizers, pesticides, and labor costs significantly higher in Karawang. Importantly, farm income, R/C, and B/C are not statistically different at the 5% level, although their mean differences directionally favor Karawang. Overall, the evidence supports the central conclusion that similar viability can coexist with distinct pricing and cost-structure mechanisms, underscoring the need for location-specific improvement strategies that target the dominant constraints and leverage points in each regency.

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