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Original Research Article

Value-Added Contribution of Mango Processed Products: A Case Study of Bojongroreng, Putridalem Village, Jatitujuh District, Majalengka Regency

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Abstract: Processing fresh mangoes into value-added products is considered an effective strategy to enhance their economic worth, as processed products generally command higher market prices than fresh fruit. This study aims to analyze the added value and profitability of mango dodol and mango syrup using the Hayami Method, as well as to assess their contribution to the income of small-scale processors. The research was conducted at UMKM ASBORO in Putridalem Village, selected purposively as a representative mango-processing enterprise. A descriptive quantitative approach was employed, focusing on the calculation of raw material costs, labor use, and additional input expenditures. The findings show that mango dodol generates an added value of Rp22,967/kg (55.88%), while mango syrup yields a higher added value of Rp64,834/kg (36.05%). The contribution of added value reaches 400% for dodol and 937.5% for syrup, indicating that income from processed products is 4 to 9 times higher than income from selling fresh mangoes. These results demonstrate the substantial economic potential of mango-based agroindustry in increasing processor income and strengthening local economic development.

Keywords: Value Added, Hayami Method, Mango Dodol, Mango Syrup.

BACKGROUND

The agricultural sector continues to play a strategic role in supporting rural livelihoods, national food security, and economic development in many developing countries, including Indonesia (FAO, 2021; UNIDO, 2019). Agriculture remains the main source of income and employment for rural communities, and its performance is closely linked to poverty reduction and regional economic stability (Hussein & Suttie, 2016). Strengthening the agricultural sector therefore requires not only increased productivity but also the development of resilient value chains that ensure equitable income distribution while maintaining environmental sustainability (Adams & Mahallati, 2020).

One of the key pathways for improving agricultural competitiveness is the development of agro-industry. Agro-industry integrates agricultural production with processing activities, enabling the transformation of raw materials into higher-value products. This integration contributes to product diversification, expanded market access, and reduced post-harvest losses (Rasul & Neupane, 2021). Previous studies highlight that agro-processing plays a crucial role in enhancing product quality, generating employment, and increasing the overall added value within the agribusiness system (Zhou & Li, 2020).

Mango is one of Indonesia's leading horticultural commodities with high economic and nutritional value. West Java is among the country's major production centers, with districts such as Indramayu, Cirebon, Majalengka, Kuningan, and Sumedang contributing substantially to national output (BPS, 2019). Despite its strong production base, the mango value chain faces structural challenges. Mango is a climacteric and seasonal fruit, causing oversupply during the peak harvest period and leading to significant price declines. Large quantities of fruit often remain unsold or are discarded due to perishability and limited storage technology, resulting in considerable economic losses for farmers (Purwanto *et al*., 2020).

These constraints highlight the urgency of developing mango-based agro-industry as a strategy to stabilize farmer income and reduce post-harvest waste. Processing mango into products such as syrup and dodol

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(traditional confectionery) extends shelf life, increases product value, and creates new market opportunities. Small-scale processing enterprises (UMKM) in rural areas have shown potential in generating local employment, strengthening rural economies, and contributing to regional development (Rasul & Neupane, 2021; UNIDO, 2019).

UMKM ASBORO, located in Putridalem Village, Majalengka District, is one of the local enterprises actively engaged in mango processing. Its production of mango syrup and mango dodol represents a promising model of rural agro-industry. Understanding the magnitude of value added generated from these products is essential for designing effective development strategies and assessing their contribution to farmer and enterprise income. According to Hamidah (2015), added value reflects the increase in economic worth resulting from processing, storage, and transport activities within the production system (Hayami *et al*., 1987). Quantifying this value is therefore critical for evaluating economic feasibility and identifying opportunities for agro-industry upgrading.

Given this context, the present study aims to analyze the added value generated from mango processing into syrup and dodol at UMKM ASBORO, as well as to assess its contribution to enterprise income. The findings are expected to provide insights into the economic potential of mango-based agro-industry, support post-harvest loss reduction efforts, and contribute to the development of competitive and sustainable rural agribusiness models.

METHODS

This study was conducted at UMKM ASBORO, located in Bojong Roreng, Putridalem Village, Jatitujuh District, Majalengka Regency, West Java, Indonesia. The research site was selected purposively based on two main considerations: (1) the presence of an active small-scale agro-processing enterprise specializing in mango-based products, and (2) the area's status as one of Majalengka's key mango production centers. The fieldwork was carried out from January to August 2024.

A descriptive quantitative design was employed to analyze the economic value generated from mango processing. This approach is suitable for describing production characteristics, cost structures, and value-added calculations using numerical data obtained directly from the enterprise. The study did not involve hypothesis testing but focused on measuring and describing economic indicators related to the processing activities.

Primary data were obtained through: Structured interviews with the owner and workers of UMKM ASBORO, Direct observation of production processes, including preparation, processing, and packaging stages, Questionnaires documenting raw material quantities, labor use, production costs, input utilization, and selling prices. Secondary data, such as regional mango production statistics, were collected from the Central Statistics Agency (BPS) and relevant institutional reports.

Analytical Methods

1. Value-Added Analysis (Hayami Method)

The Hayami Method (Hayami *et al*., 1987) was applied to calculate value added generated from processing fresh mangoes into dodol and syrup. This method was selected because it is widely used for agro-industrial value chain assessment and allows the calculation of: Conversion factors, Labor coefficient, Output value, Value added per unit of raw material, Labor income, Profit margins and distribution among production factors.

Value-added analysis was conducted for a single production cycle, covering the stages from raw material input to final product packaging. All financial components—including raw material cost, labor wages, and other inputs—were quantified to ensure accurate calculations.

2. Contribution of Value Added to Income

The contribution of value added to enterprise income was measured using the Contribution of Value Added (CVA) formula:

CVA (%) = (Income from Processed Product / Income from Fresh Mangoes) × 100%

This indicator reflects how much higher the income from processed products is compared to selling fresh fruit under similar raw material quantities.

The analysis focused exclusively on the production of two products: mango dodol and mango syrup. Each product was assessed individually to determine differences in value added, cost structure, and economic contribution resulting from processing activities.

RESULT AND DISCUSSION

Productivity and Conversion Factors of Mango Processing

The productivity of mango processing at UMKM ASBORO reflects the efficiency of transforming fresh Harum Manis mangoes into value-added products. Because output is measured in units of finished goods (pieces of dodol and bottles of syrup), the conversion factor represents the number of product units obtained per kilogram of raw mango, a commonly used measure in agro-processing efficiency (Hayami *et al*., 1987; FAO, 2021).

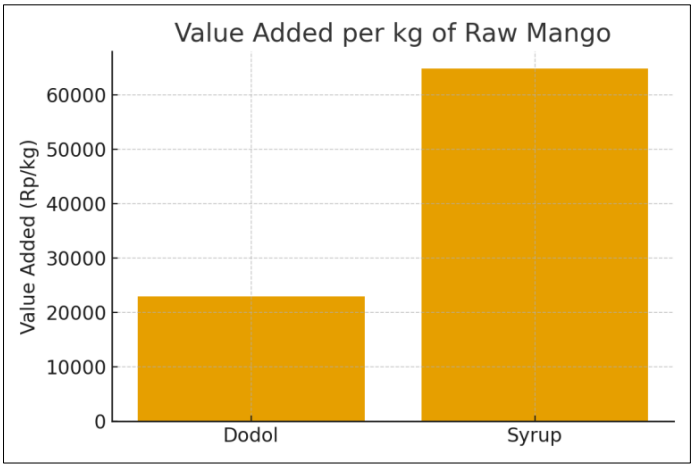
a. Dodol: 30 kg of mango → 80 pcs
   Conversion factor = 2.67 pcs/kg
b. Syrup: 12 kg of mango → 75 bottles
   Conversion factor = 6.25 bottles/kg

The significantly higher conversion factor for syrup indicates greater volumetric expansion, primarily due to the addition of sugar, water, citric acid, and stabilizers. According to Rasul & Neupane (2021), liquid or semi-liquid agro-industrial products tend to generate higher conversion values because inexpensive supplementary inputs extend the volume of final output without proportionally increasing cost. This dynamic is also observed in puree and jam industries (Royanti & Sulistyowati, 2018; Zhou & Li, 2020), where water and sugar act as multipliers of product volume.

Thus, the productivity structure of UMKM ASBORO is consistent with findings from other rural agro-processing studies: products with higher dilution or expansion capacity tend to yield higher conversion factors and greater opportunities for value creation.

Value Added Generated by Mango Processed Products

Value-added analysis using the Hayami Method shows that both dodol and syrup generate substantial economic value over the base value of raw mangoes.



Dodol: Rp22,967/kg (Value-added ratio: 55.88%)
Syrup: Rp64,834/kg (Value-added ratio: 36.05%)

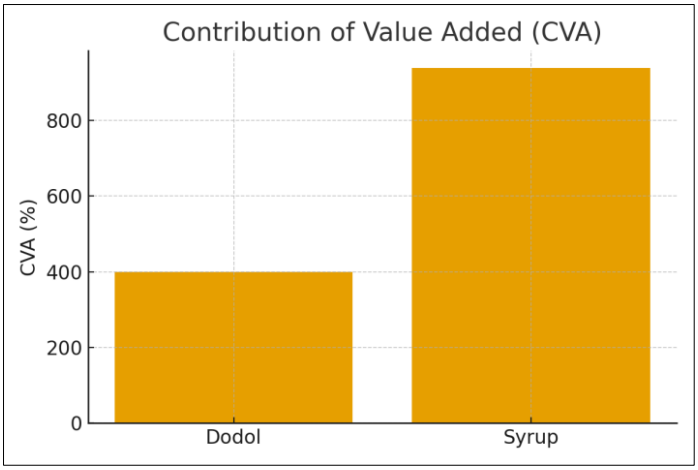
The higher percentage of value added in dodol emerges because mango itself contributes a larger share to the final product's intrinsic value. Dodol is more mango-intensive, relying less on low-cost auxiliary materials. This pattern mirrors findings from fruit candy industries where the raw commodity retains a dominant share of product identity (Rahman, 2020; Fitria, 2019).

However, syrup achieves the highest absolute value added, driven by: Output volume expansion (conversion factor 6.25), Low-cost supplementary ingredients such as water and sugar, High selling price relative to production cost, Greater labor efficiency, consistent with global observations that liquid agro-products often scale more economically (Rasul & Neupane, 2021; UNIDO, 2019).

This indicates that, economically, syrup is the stronger product in terms of value-added generation per kilogram of mango.

Contribution of Value Added to Enterprise Income

The contribution of value added (CVA) measures how much higher the income from processed mango products is compared to selling raw mangoes:



These extremely high CVA values indicate that processed products generate 4 to 9 times more income than selling fresh mangoes. Such results are consistent with studies highlighting that fruit-processing SMEs significantly outperform fresh fruit marketing in terms of profitability (Rasmikayati *et al*., 2020; Adams & Mahallati, 2020).

Factors driving the high CVA values include:

a. **High Price Differential:** Processed products carry premium prices due to branding, packaging, and consumer preference for ready-to-use products.
b. **Input Dilution and Cost-Efficiency:** Syrup production uses sugar and water—low-cost ingredients that dramatically increase product volume. This phenomenon is well documented in fruit juice and concentrate industries (Zhou & Li, 2020).
c. **Low Labor Cost Structure:** ASBORO uses household labor, consistent with rural agroindustry cost economies (Hussein & Suttie, 2016), reducing overall production costs and increasing net income.
d. **Reduction of Post-Harvest Losses:** Processing allows mangoes to be stored in processed form far beyond their natural shelf life, preventing wastage during peak harvest seasons (Purwanto *et al*., 2020).
e. **Product Diversification and Market Expansion:** Processed mango products access broader markets compared to raw mangoes, which are constrained by seasonality and perishability.

CONCLUSION

This study demonstrates that processing mangoes into dodol and syrup generates substantial economic value for small-scale agroindustries. Both products show significant value added, with syrup producing the highest absolute value due to greater volumetric expansion and efficient input use. The contribution of value added to income is remarkably high—400% for dodol and 900% for syrup—indicating that processed mango products can generate four to nine times more income than selling fresh fruit. These findings highlight the strong potential of mango-based agroindustry to enhance rural livelihoods, reduce post-harvest losses, and strengthen local agribusiness development.

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