DRAGON FRUIT AS A LEADING LOCAL COMMODITY: STRATEGIES FOR REGIONAL ECONOMIC DEVELOPMENT AND COMPETITIVENESS IN SAMBAS REGENCY

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ABSTRACT

Sambas Regency is the largest dragon fruit production centre in West Kalimantan, accounting for 92.7 per cent of the province's total production in 2022. However, this dominance in production has not been fully matched by a commensurate improvement in farmers' welfare, as the relatively simple structure of the supply chain places farmers in the position *of price- takers,* with selling prices ranging from Rp3.000 to Rp8.000 per kilogram. This study aims to analyse strategies for developing dragon fruit as a leading local commodity to strengthen regional competitiveness and the economic sovereignty of border communities. The method used is a literature review based on descriptive-analytical analysis. The literature search was conducted via the Google Scholar database, covering publications from the last ten years. Selection criteria included reputable scientific articles and official documents specifically addressing horticultural supply chains and border economies. The findings indicate that interventions through *zero-waste-based* product downstreaming, the implementation of *Good Agricultural Practices* (GAP) certification, and the strengthening of vertical and horizontal supply chain integration have the potential to enhance farmers' bargaining power and support the transition towards more favourable pricing. This strategy, grounded in *endogenous development* theory, has the potential to drive the development of Sambas dragon fruit from merely aprimary commodity into

an instrument for more self-reliant and sustainable economic development in the border region.
Keywords: Dragon Fruit; Flagship Commodity; Border Region

INTRODUCTION

Regional economic development based on local potential is a strategic approach that is becoming increasingly relevant in an era of intensifying inter-regional competition. Each region is required to identify unique competitive advantages that are difficult for other regions to replicate, and then harness these to drive sustainable community welfare (Nourmalasari, 2020). This approach is in line with the *endogenous development* paradigm, which emphasises that sustainable economic growth stems from the exploration of a region's internal resources, rather than mere dependence on external investment (Putri, 2021). It is within this context that Sambas Regency, in West Kalimantan Province, occupies a highly strategic yet challenging position. As a regency bordering the Malaysian state of Sarawak, Sambas Regency is not merely an ordinary border region; rather, it possesses a unique opportunity to integrate cross-border market dynamics into its local economic development strategy (Purnamasari et al., 2016). One of the local assets that constitutes a distinctive strength of Sambas Regency is the dominance of dragon fruit (*Hylocereus costaricensis*) production, which to date has not been fully optimised as a means of enhancing the region's competitiveness (Dedi, 2023).

Sambas Regency, particularly Jawai Sub-district, has become the main centre for dragon fruit production in West Kalimantan, contributing 13,260 tonnes out of the province's total production of 14.304 tonnes in 2022, equivalent to 92.7 per cent of West Kalimantan's total dragon fruit production (Hartono et al., 2025). These official figures confirm Sambas Regency's position as the single most dominant producer at the regional level, whilst also serving as a strong foundation for building competitiveness based on local commodities. The Sambas Regency local government has even designated Jawai Sub-district as the icon of the "Dragon Fruit Village" through the *One Village One Product* (OVOP) programme, with approximately 350 hectares of land already under cultivation out of a total potential area of
1.000 hectares (Hermawan, 2024).

The strengths of this production are reinforced by the exceptional quality of the dragon fruit produced, namely its very sweet taste, attractive colour and large size, resulting in high demand for this commodity both in the West Kalimantan market and across the border in Sarawak, Malaysia (Hemawati, 2020). This fact demonstrates that Sambas dragon fruit is not merely a local agricultural product, but possesses real potential as a regionally and even internationally competitive commodity, in line with its position as a border region. The value of agricultural exports via the Aruk International Border Crossing (PLBN) in Sambas Regency in 2025 was recorded at Rp4.674.909.973, with dragon fruit featuring among the

leading agricultural commodities driving this surge in exports amidst high demand from Malaysia (Marilitua, 2025). This cross-border trade gateway is, in fact, a strategic asset that can serve as the vanguard for accelerating dragon fruit-based economic development, provided it is managed with an appropriate and well-planned approach.

However, this extraordinarily large production potential has not yet been matched by a commensurate increase in economic value for farming communities. The majority of farmers still sell their harvest in the form of fresh, unprocessed fruit to middlemen at highly volatile prices, ranging from Rp 3.000 to Rp 8.000 per kilogram, thereby placing farmers in the position *of 'price takers'* who are vulnerable to market pressures (Dedi, 2023). This situation illustrates a significant *loss* of *value* at the producer level, even though processed dragon fruit products such as dodol, syrup, tea and jam can be sold for tens to hundreds of times the price of the raw fruit. Within the framework of regional economic development, this disparity reflects a failure to capitalise on local advantages to create tangible and sustainable competitiveness. The Ministry of Industry itself has been promoting the downstream processing of tropical fruit commodities as a strategy to increase local value-added whilst expanding export markets for processed food products, in line with the agenda to strengthen the competitiveness of the national small and medium-sized enterprises sector (Trimahanani, 2026). These challenges are crucial issues that must be addressed through institutional intervention and post -harvest processing (Irmayani et al., 2019).

From an academic perspective, the gap between production potential and the economic value received by the community in Sambas Regency is a relevant issue warranting in-depth study. Previous research on dragon fruit in Sambas Regency has generally been limited to two separate areas. On the one hand, Situmorang's study has identified the potential for dragon fruit to become a flagship commodity; however, this study remains descriptive in nature and has not yet empirically addressed the mechanisms of supply chain integration or the feasibility of downstream processing (Situmorang et al., 2024). On the other hand, research on the added value of dragon fruit processing by Fertiasari has identified that processing dragon fruit into functional products increases economic added value and reduces production waste ; however, this study has also not addressed the mechanisms of supply chain integration (Fertiasari et al., 2019). In contrast, Irmayani's research, available at , has identified the agribusiness-based development of dragon fruit as a local commodity (Irmayani et al., 2019).

Based on the above, it is clear that none of the previous studies have yet integrated this analysis with the specific context of the national border region, including the Aruk Border Crossing Point (PLBN Aruk) as a distribution and export hub. It is this gap that this article aims to address. Regional economic development based on local potential will not yield genuine competitiveness if it merely focuses on increasing production volumes without being accompanied by value chain transformation, the strengthening of human resource capacity, and cohesive policy support.

Therefore, this article aims to analyse how the local potential of dragon fruit in Sambas Regency, as a border region, can be strategically developed into an instrument for enhancing sustainable regional competitiveness—one that is not only economically beneficial but also strengthens the identity and economic sovereignty of border communities.

RESEARCH METHODS

This study employs a qualitative approach using the *literature review* method. A literature review is a research method that involves collecting, identifying and analysing various scientific sources relevant to the research topic, without the collection of direct data in the field (Snyder, 2019). The data and information in this study were sourced from the Central Statistics Agency (BPS), the West Kalimantan Food Crops and Horticulture Agency, and relevant scientific literature. The literature search was conducted via Google Scholar and Garuda on 20 June 2026, using the keywords “dragon fruit”, “regional competitiveness”, “border area economy”, and “local commodity value chain”. The criteria for selecting literature included the relevance of the research topic to the development of dragon fruit as a commodity, regional competitiveness, and the border region economy, with publications spanning the last ten years. The screening process was carried out in stages, identifying seven documents; following in- depth analysis, six primary sources were selected from national journals, including Situmorang (2024), Fertiasari (2019), Lambertus (2023), Syavitri (2022), Pasaribu (2023), and Irmayani (2019). These six studies were collated and analysed using a descriptive-analytical approach, a method designed to yield in-depth and meaningful data capable of significantly influencing the substance of the research (Adiningrat et al., 2025). The descriptive-analytical method employed in this study aims to identify patterns and findings across studies relating to the potential of dragon fruit in Sambas Regency as a means of strengthening regional competitiveness. The literature review was conducted by comparing findings from previous studies in order to construct a coherent argument regarding strategies for the development of local commodities based on comparative advantage in border regions.

RESULT AND DISCUSSION

A. Analysis of Local Potential and the Dragon Fruit Supply Chain in Sambas Regency

Sambas Regency, particularly Jawai Sub-district, has enormous potential to become a major centre for dragon fruit production in West Kalimantan. Dragon fruit production in Sambas Regency is projected to reach 13,260 tonnes, or approximately 92.7 per cent of West Kalimantan’s total dragon fruit production, by 2022 (Hartono et al., 2025). In addition to being supported by a suitable climate, Jawai dragon fruit boasts superior quality, such as a sweeter taste, larger size and attractive colour.

Consequently, this fruit is highly competitive in both the local and international markets in Malaysia. A study by Situmorang et al. (2024) found that government support, cultivation technology and improved marketing significantly influence the competitiveness of dragon fruit as a commodity. These findings are relevant to the situation in Sambas, which has a strong production base but still requires improvements in the downstream sector and marketing.

From a *supply chain* perspective, the dragon fruit supply chain in Sambas Regency is currently still relatively simple, namely

Farmers → Middlemen/Collectors → Wholesalers → Local/Malaysian Markets → Consumers

Within this structure, farmers sell fresh fruit at prices ranging from Rp3.000 to Rp8.000 per kilogramme (Dedi, 2023), whilst the value added in the downstream sector has not yet been empirically measured for the case of Sambas. Due to this supply chain structure, the majority of the value added is captured by downstream traders, whilst farmers derive their profits solely from the sale of fresh fruit. This situation is consistent with issues identified in numerous studies on horticultural agribusiness, namely the position of farmers as *price-takers* who are highly dependent on market price fluctuations. Fertiasari et al. (2019) state that the production of processed dragon fruit products, such as syrups, jams, teas and other functional products, has the potential to increase economic value-added whilst reducing waste generated. Consequently, Sambas's local potential lies not only in the production of fresh fruit but also in the opportunity to develop a dragon fruit processing industry. Furthermore, the geographical location of Sambas Regency, which shares a direct border with Malaysia, provides a logistical advantage not possessed by other dragon fruit-producing regions. The presence of the Aruk International Border Crossing Point (PLBN) facilitates faster and cheaper export access, thereby enabling the supply chain to be expanded as follows:

Farmers → Farmers' Groups/Cooperatives → Processing Industry → Distributors → Domestic and Malaysian Markets → Consumers

This expanded supply chain model is the scenario proposed in this study. This supply chain model enables improved distribution efficiency whilst increasing the value added received by the local community. Research by Syavitri et al. (2022) shows that dragon fruit has the potential to drive the local economy whilst meeting the demands of the export market. These findings reinforce the argument that Sambas dragon fruit serves not only as an agricultural commodity but can also act as an instrument for economic development in the border region. Furthermore, the findings of Lambertus et al. (2023) indicate that continuous market growth and an increasing market share position dragon fruit as a potential flagship commodity for the region. This is relevant given the high demand

for Sambas dragon fruit in both West Kalimantan and Malaysia, which has not yet been fully met.

However, the main challenges in *the* Sambas dragon fruit *supply chain* still include farmers' dependence on middlemen, high price fluctuations during the peak harvest season, a lack of storage and post-harvest processing facilities, low product diversification, weak farmer organisations, and sub-optimal integration of the export market via the Aruk Border Crossing Point (PLBN). Analysis of previous research indicates that local dragon fruit from Sambas Regency has enormous potential to develop into a flagship commodity that is competitive at both regional and international levels. However, its development is heavily dependent on a shift in the supply chain from a system focused on the sale of raw materials to an integrated agribusiness system. This system can create added value, strengthen farmers' bargaining power, and effectively capitalise on the strategic advantages of the border region.

B. The Potential for Strengthening the Dragon Fruit Supply Chain

The dragon fruit industry in Sambas Regency holds significant potential for enhancing competitiveness and adding value. A fundamental challenge facing the dragon fruit industry in Sambas Regency is the persistently low price; consequently, the appropriate strategy to boost the competitiveness of Sambas Regency's dragon fruit is to transition from being *a 'price taker'* to *a 'price maker'*. All figures relating to costs, selling prices and margins are derived from two distinct categories of sources: empirical findings, estimates from previous studies, and the author's projections. The figures compiled by the author are based on logical reasoning and have not yet been tested in the field. This classification is presented in Table 1 as follows:

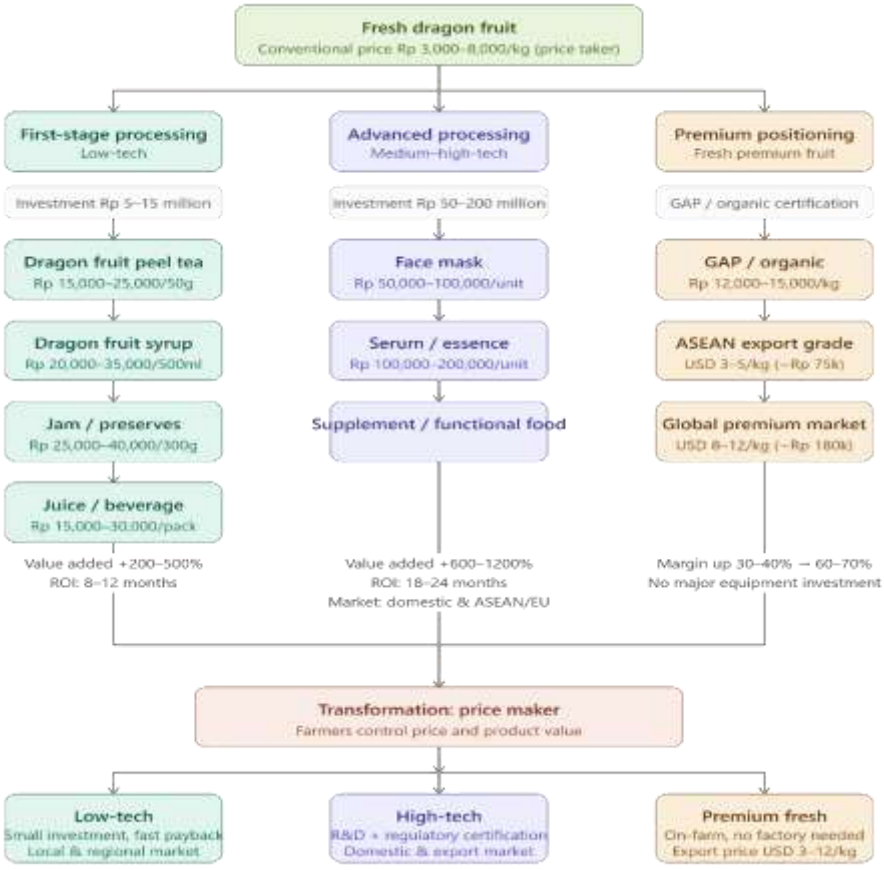
Table 1. Price Classification and Sources

No	Variable	Value (Price)	Source Category
1	First-tier downstream	Rp. 5,000,000 – 15,000,000	Author's Projection
2	Selling price of dragon fruit peel herbal tea	Rp15,000–25,000 per pack	Author's estimate, based on comparable prices for similar functional herbal
3	Retail price of dragon fruit syrup	Rp20,000–35,000 per bottle	Author's projection (based on market
4	Selling price of dragon fruit jam	Rp25,000–40,000 per jar	Author's projection (based on the market)
5	Selling price of ready-to-drink juice	Rp15,000–30,000 per pack	Author's projection (based on the market)
6	Capital required for advanced downstream	Rp50,000,000–200,000,000	Author's projection

7	Selling price of face masks / facial serums	Rp50,000–100,000 (face masks); Rp100,000–200,000 (serums)	Author's projection (based on the market prices of herbal cosmetics from SMEs)
8	Local-ASEAN-international premium prices following GAP certification	Rp12,000–15,000/kg (local), USD 3–5/kg (ASEAN), USD 8–12/kg (international)	Author's projection

Source: (Author's own elaboration, 2026)

Based on these price classifications and sources, this study projects a downstream processing flowchart to strengthen the dragon fruit supply chain, as illustrated in Figure 1 below:



Source: (Author's own elaboration, 2026)

Figure 1. Downstream Processing Flowchart for Dragon Fruit in Sambas Regency

Based on this downstream processing flowchart, the transformation from *a 'price taker'* to *a 'price maker'* can be achieved by focusing on processing dragon fruit into products using technology that

can be adopted by farmers and MSME business groups. *Firstly*, there is a first-stage downstream processing strategy projected to require funding of around Rp. 5.000.000–15.000.000, which can be obtained from the local government. Previous research by Fertiasari indicated that processing dragon fruit peel into herbal tea presents the most promising opportunity. Dragon fruit peel is not generally consumed by the public; consequently, once the fruit has been eaten, the peel is immediately discarded and treated as waste. However, if processed into herbal tea, it can offer high added value, with a selling price of around Rp. 15.000–25.000 per-pack. In addition to herbal tea, dragon fruit can also be made into syrup, utilising the fruit's natural colour, which is rich in nutrients and sells for around Rp. 20.000–35.000 per-bottle. Dragon fruit can also be made into jam, priced at Rp. 25.000–40.000 per- jar, whilst ready-to-drink juice can be sold by MSME operators at a selling price of Rp. 15.000–30.000 per- pack. This first-stage downstream processing still requires relatively low to moderate capital, simple technology, few resources, and offers opportunities in the local market.

Secondly, there is a need for more ambitious advanced downstream processing that yields greater benefits. Previous research by Fertiasari has shown that red dragon fruit has great potential as a raw material for natural cosmetics, enabling the creation of safe and reliable products. These products include face masks priced at Rp.50.000–100.000, facial serums at Rp.100.000–200.000, and dietary supplements that help maintain people's immune systems. This advanced downstream processing requires a medium-to-high level of capital, ranging from around Rp.50.000.000 to Rp.200.000.000, enabling access to both national and international markets. *Finally,* as a region bordering Malaysia, Sambas Regency has a unique opportunity to integrate cross-border market dynamics into its dragon fruit *supply chain* development strategy by issuing GAP (*Good Agricultural Practices*) certification to drive price transformation. It is hoped that the issuance of these certificates will raise prices from Rp. 3.000–8.000/kg (*price taker*) to Rp. 12.000–15.000/kg (*local premium*), USD. 3–5/kg (ASEAN), and USD 8–12/kg (premium international market), thereby increasing farmers' profit margins without the need for significant investment in processing. Furthermore, processed products made by local communities can also be marketed globally by opening up cross-border trade access to utilise international trade routes via the Aruk Border Crossing Point (PLBN).

C. Supply Chain Intervention Strategies Based on Local Economic Sovereignty

Strengthening the dragon fruit supply chain in Sambas Regency requires a vertical integration approach—that is, management from upstream to downstream—as well as horizontal integration through collaboration amongst stakeholders at every stage of the supply chain. The flow of these two forms of integration is illustrated in the following figure:

Source: (Author's own elaboration, 2026)

Figure 2. Vertical and Horizontal Integration of the Dragon Fruit Supply Chain in Sambas Regency

As shown in the figure, vertical integration flows from top to bottom, encompassing management from upstream to downstream, starting from the provision of seedlings and production inputs, through cultivation, post-harvest processing, to distribution and marketing as finished, high-value products. Meanwhile, horizontal integration is realised through collaboration amongst farmers within farming groups who share

knowledge, sorting and packaging processes, as well as collaboration between local markets and export markets, thereby establishing dragon fruit as a flagship product capable of competing in the market. Both forms of integration are underpinned by the theory *of endogenous development*, which states that regional economic growth must be based on local resources and capacity, rather than relying solely on external inputs and markets; thus, the economic value derived from dragon fruit can flow and accumulate within the community in Sambas Regency. Sound dragon fruit management practices can strengthen the economic identity and self-reliance of Sambas Regency.

Specifically, the theory of endogenous development underpins each component of the proposed strategy. *Firstly*, *zero-waste* processing by optimising the utilisation of all parts of the dragon fruit (skin, flesh and by-products) using affordable local technology. Endogenous development theory views this as ‘ ’ an effort to maximise the utility of local resources to create a diversification of derivative products (such as processed foods, natural dyes or animal feed) without triggering dependence on raw material supplies from outside the region. *Secondly*, the existence of a marketing cooperative can strengthen the internal capacity of local communities to control the distribution chain and enhance their bargaining power. Cooperatives act as a collective vehicle for the accumulation of local social and economic capital, ensuring that profit margins are not distributed outside the community but are reinvested within the Sambas community. *Thirdly*, product certification aimed at building a territorial identity rooted in Sambas's comparative advantages. Certification (such as Halal, GAP and Food Safety) enhances market confidence based on quality standards managed independently by local institutions.

Strategies to strengthen supply chains in border regions continue to require a more fundamental approach that differs from that used in non-border regions. Sambas Regency, as an area directly bordering Malaysia, faces risks that threaten local economic growth. Although this strategy of supply chain intervention based on local autonomy is theoretically ideal, its effectiveness in practice is hampered by a number of potential risks. *Firstly*, the process of obtaining certification (*Good Agricultural* Practices/GAP, BPOM, Halal, and *Phytosanitary* export certification standards) requires significant initial investment and involves complex administrative procedures, which are often beyond the financial reach of small farmers' groups. *Secondly,* reliance on cross-border export markets leaves producers vulnerable to fluctuations in demand, changes in trade policy, and price competition from dragon fruit producers in other countries.

Thirdly, implementing the "zero waste" concept requires technology transfer; however, limitations in technical capacity and local human resources can be a major factor contributing to the failure of processed product diversification. *Fourthly,* failure to meet export regulatory thresholds may result in products being rejected at the border. *Fifthly,* the development of large-scale commercial cultivation has the potential to trigger excessive land expansion, a decline in soil quality due to inorganic fertilisation, and challenges in managing liquid processing waste if the "'zero waste" principle is not optimally implemented. *Finally,* the greatest risk lies in the internal governance of cooperatives or farmers' groups. Weak leadership, a lack of financial transparency, and conflicts of interest amongst members can undermine the sustainability of the planne d horizontal interventions. Therefore, the transformation of dragon fruit from a mere agricultural commodity into an instrument of economic sovereignty in the Sambas border region requires sustained institutional support, facilitation of certification funding by the local government, and the provision of basic supporting infrastructure and post-harvest processing facilities.

CONCLUSION

Sambas Regency holds strategic potential as a dragon fruit hub in West Kalimantan, supported by its dominant production volume and direct geographical access to the Malaysian market via the Aruk Border Crossing Point (PLBN). However, the still-simple structure of the supply chain tends to place farmers in the position *of price takers*, with minimal absorption of value- . A review of the literature indicates that the implementation of vertical and horizontal integration based on the principles of *endogenous development* has the potential to strengthen local economic capacity and reduce supply chain vulnerabilities in border regions. This study has methodological limitations as it is based on a review of a limited body of literature without the support of primary data from interviews or surveys of farmers, cooperatives, processors, consumers, or relevant government agencies in Sambas Regency. As a follow-up measure, it is recommended that the local government and stakeholders facilitate the development of SME - scale processing facilities in production centres such as Jawai Sub-district in order to minimise crop losses, accelerate the attainment of GAP and food safety certification to access high-value markets, and strengthen marketing cooperatives linked to the Aruk Border Crossing Point (PLBN).

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