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Changes in The Ratio of Seed Price to Production Cost of Siamese Pangasius in Indonesia

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Abstract

Seed is an initial input that determines working-capital requirements and the continuity of striped catfish production cycles. An increase in farm-gate fish prices does not necessarily strengthen farmers' capacity to restart production when seed prices rise faster. This study examines changes in the seed-to-farm-gate price ratio of striped catfish in Indonesia during 2024–2025. The analysis uses final research data on farm-gate prices and seed prices for the 7–9 cm and 10–12 cm size categories. The indicators include price growth, the seed-to-output price ratio, the number of seeds equivalent to the value of one kilogram of fish, and the fish-output value required to purchase 10,000 seeds. Farm-gate prices increased by 4.5%, from IDR16,500/kg to IDR17,250/kg. During the same period, the price of 7–9 cm seeds increased by 14.3%, from IDR350 to IDR400 per seed, while the price of 10–12 cm seeds increased by 9.5%, from IDR475 to IDR520. The relative price ratio increased by 9.3% for 7–9 cm seeds and by 4.7% for 10–12 cm seeds. The value of one kilogram of fish could purchase 47.1 small seeds in 2024 but only 43.1 in 2025. For 10–12 cm seeds, the purchasing capacity declined from 34.7 to 33.2 seeds. The fish-output equivalent required to purchase 10,000 seeds increased from 212.1 kg to 231.9 kg for the smaller size and from 287.9 kg to 301.4 kg for the larger size. The results indicate that farm-gate price growth did not fully offset the increase in seed prices, particularly for the 7–9 cm category. This ratio does not measure total profitability or technical efficiency.

Keywords: Farm-gate price, Fish seed, Pangasius, Price ratio, Working capital.

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INTRODUCTION

Siamese Pangasius (Pangasianodon hypophthalmus) is an important commodity of Indonesian freshwater aquaculture. National pangasius production increased from 348,378.76 tons in 2023 to 381,968.89 tons in 2024, while the provisional figure for 2025 reached 456,311 tons. This growth strengthens the role of pangasius as a source of food, farmers' income, and raw material for trade and freshwater fish processing (Ministry of Marine Affairs and Fisheries, 2026).

The sustainability of production is not determined solely by pond capacity and grow-out technology, but also by the ability of farmers to obtain seed in the appropriate quantity, size, quality, and timing. Seed costs are generally incurred at the beginning of the cycle, before grow-out activities generate revenue. Therefore, an increase in seed prices directly raises working capital requirements and can influence decisions to maintain stocking density, postpone production, or seek additional financing.

An increase in fish production prices does not necessarily improve farmers' economic position if the price of initial inputs rises more rapidly. Under such conditions, the share of harvest value that must be allocated to obtain the same quantity of seed becomes larger. This relationship can be analyzed through a partial input-output price ratio. This approach differs from the overall farmers' terms of trade because it compares only one output, namely live and whole Siamese pangasius at the farmer level, with one initial input, namely Siamese pangasius seed (Zulham et al., 2011).

Seed size needs to be distinguished because 7–9 cm and 10–12 cm seeds represent different nursery stages and have different prices per individual. Differences in nominal prices cannot be directly used to determine the most efficient size. Technical efficiency requires information on survival rate, growth, rearing period, feed conversion, productivity, and harvest yield. Research on pangasius nursery shows that the age and size of seed are related to stocking readiness and rearing performance (Andriyanto et al., 2012; Ariyanto et al., 2012).

Studies on pangasius business and value chains in Indonesia have addressed financial feasibility, agribusiness systems, marketing efficiency, input continuity, and inter-actor relationships (Putinur et al., 2019, 2021; Sazmi et al., 2018; Susanti et al., 2017; Yuliana et al., 2021; Yulisti & Putri, 2013). However, studies that specifically compare changes in seed prices with changes in fish production prices remain limited. An increase in output prices may give the impression that farmers' position is improving, whereas the ability of the harvest to finance the next cycle may decline when seed prices grow faster.

This study aims to analyze the growth of production prices and seed prices, measure changes in the ratio of seed price to production price, assess changes in the capacity of one kilogram of fish to purchase seed, and simulate the production value

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required to finance 10,000 seeds. The novelty of this study lies in the use of a partial input-output price ratio that distinguishes between two seed sizes and translates price changes into initial capital pressure that is easy to understand. This indicator does not replace profitability analysis, but provides an early signal regarding the sustainability of production cycle financing.

RESEARCH METHODS

The research location covered the centers of Siamese pangasius seed production in Java, Sumatra, and Kalimantan. The study employed a descriptive-comparative approach to assess changes in the price relationship between output and initial input of Siamese pangasius aquaculture during 2024–2025. The object of analysis was limited to the price of live and whole Siamese pangasius at the farmer level and the price of Siamese pangasius seed by size category. The production price was IDR 16,500/kg in 2024 and IDR 17,250/kg in 2025. The price of 7–9 cm seed was IDR350/individual in 2024 and IDR400/individual in 2025, while the price of 10–12 cm seed was IDR 475/individual in 2024 and IDR 520/individual in 2025.

The analysis used four indicators: price growth, the ratio of seed price to production price, the value capacity of one kilogram of fish to purchase seed, and the production value equivalent to the cost of purchasing 10,000 seeds. The equations are presented as follows.

$$G_i = [(P_{i,2025} - P_{i,2024}) / P_{i,2024}] \times 100\% \quad (1)$$

$$R_{s,t} = (B_{s,t} / P_t) \times 100\% \quad (2)$$

$$K_{s,t} = P_t / B_{s,t} \quad (3)$$

$$E_{s,t} = (10.000 \times B_{s,t}) / P_t \quad (4)$$

Where Gi is the price growth of component i; P is the fish production price; B is the seed price of size s in year t; R is the ratio of seed price to production price; K is the number of seeds equivalent to the value of one kilogram of fish; and E is the kilograms of fish whose sales value is equivalent to the cost of purchasing 10,000 seeds. An increase in R indicates a higher relative burden of seed price, while a decrease in K indicates a weakening capacity of production value to finance seed procurement.

The simulation of 10,000 individuals is used as an analytical unit, not as a stocking density recommendation. The analysis does not include feed, labor, energy, medicine, depreciation, mortality, transportation, and marketing costs. Therefore, the results are not interpreted as total production cost, business profit, the overall farmers' terms of trade, or evidence of technical efficiency for either seed size.

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RESULTS AND DISCUSSION

Dynamics of Production Price and Seed Price

All three price components increased during 2024–2025, but at different rates. Seed prices rose faster than fish production prices. This difference in growth rates indicates that the strengthening of output prices has not been sufficient to offset the increase in initial input costs. The greatest relative pressure occurred in 7–9 cm seed, even though the nominal price per individual remained lower than that of 10–12 cm seed.

Table 1. Changes in Production Costs and Prices of Siamese Catfish Fry

Components	2024	2025	Nominal Change	Growth (%)
Fish Production Price	IDR 16,500/Kg	IDR 17,250/Kg	IDR 750/Kg	4.5
Fry, 7–9 cm	IDR 350/tail	IDR 400/tail	IDR 50/tail	14.3
Fry, 10–12 cm	IDR 475/tail	IDR 520/tail	IDR 45/tail	9.5

The price of 7–9 cm seed grew approximately 9.7 percentage points higher than the production price, while the growth difference for 10–12 cm seed reached approximately 4.9 percentage points. The key finding is not merely the existence of price increases, but the change in the relative position of input to output. For the same stocking quantity, farmers must prepare a larger additional amount of funds for seed compared to the additional value received from each kilogram of fish.Changes in

Price Ratio and Seed Purchasing Capacity

The difference in price growth increased the ratio of seed price to production price. An increase in the ratio means that the share of value from one kilogram of fish equivalent to the price of one seed becomes larger. The impact is evident in the decline in the number of seeds that can be financed by the same value of production output.

Table 2. Changes in the Price-to-Production-Value Ratio and Production-Value Capacity

Indicators	2024	2025	Changes (%)
Ratio of 7–9 cm fingerlings to fish price	2.12%	2.32%	Up 9.3
Ratio of 10–12 cm fingerlings to fish price	2.88%	3.01%	Up 4.7
7–9 cm fingerlings are equivalent in value to 1 kg of fish	47.1 tail	43.1 tail	Down 8.5

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Indicators	2024	2025	Changes (%)
10–12 cm fingerlings are equivalent in value to 1 kg of fish	34.7 tail	33.2 tail	Down 4.5

The decline in purchasing capacity was sharper for 7–9 cm seed. The value of one kilogram of fish could finance approximately four fewer seeds compared to the previous year. For 10–12 cm seed, the decline was approximately one and a half seeds. The direction of change was the same for both sizes, but the level of pressure differed.Simulation of Capital Requirement for 10,000 Seeds
Translating the ratio into a purchase scale reveals more tangible liquidity consequences. Farmers must provide additional funds to obtain the same quantity and size of seed. In terms of equivalent production value, this requirement also increased because the growth in fish prices was lower than the growth in seed prices.

Table 3. Simulation of Procurement Requirement for 10,000 Seeds

Seed size	Capital 2024 (IDR)	Capital 2025 (IDR)	Additional funds (IDR)	Fish equivalent 2024 (Kg)	Fish equivalent 2025 (Kg)
7–9 cm	3,500,000	4,000,000	500,000	212.1	231.9
10–12 cm	4,750,000	5,200,000	450,000	287.9	301.4

Source: research findings. The figure of 10,000 individuals is a simulation unit.

In nominal terms, 10–12 cm seed still requires a larger initial capital. However, the difference in the price relationship to output is stronger for 7–9 cm seed. This difference underscores the importance of distinguishing between price levels and relative price changes. Seed with a lower price per individual can experience greater upward pressure on farmers' financing capacity.

CONCLUSION

The production price of Siamese pangasius increased during 2024–2025, but the increase was lower than the prices of 7–9 cm and 10–12 cm seed. This imbalance raised the ratio of seed price to production price and reduced the number of seeds that could be financed by the value of one kilogram of fish. The greatest relative pressure occurred in 7–9 cm seed, although its nominal price remained lower than that of 10–12 cm seed. A simulation of procuring 10,000 seeds shows that farmers require additional capital and a larger equivalent production value to start a cycle with the same number of seeds. The

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findings do not prove that one seed size is more efficient, because seed size selection must consider quality, survival, growth, rearing period, productivity, and capital capacity. The ratio of seed price to production price can be used as an early indicator of working capital pressure. Monitoring the ratio should be complemented by price transparency by size and quality, collective purchasing, supply contracts, strengthening of nurseries, cycle-based cost recording, and financing aligned with harvest timing.

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