



Investment Review in Marine Fish Distribution, Baleendah Sub-District, Bandung District, Indonesia: A Case Study

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Authors' contributions

This work was carried out in collaboration between both authors. Author YA designed the study, wrote the protocol and wrote the first draft of the manuscript and managed the analyses of the study. Author RIP managed the literature searches and writing. Both authors read and approved the final manuscript.

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ABSTRACT

The stable availability of fish as a crucial source of affordable animal protein with commendable nutritional content, contributing significantly to quality protein intake. To provide and ensure a steady supply of raw materials, a marine fish distributor in Baleendah Sub-district, Bandung Regency, is imperative. This distributor, functioning as a fish container (cold storage), acts as a crucial link between major marine fish producers and local fish processing farmers. During abundant fish seasons, the distributor collects fish, supporting prices during limited stock periods. This strategic intervention ensures the continuity of activities for salt-boiled fish processing farmers in Bandung Regency. The key objectives in establishing a marine fish distributor in Baleendah Sub-district, Bandung Regency, include optimizing the operation of distribution facilities and

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infrastructure. This optimization ensures a consistent supply of raw materials, reducing price fluctuations and ultimately lowering the production cost of processed fish. For the marine fish distribution company to operate sustainably, controlling fixed and variable expenses is crucial. Distributors of marine fish have total fixed and variable costs of IDR 271,950,000. The net result is calculated by deducting the whole fixed and variable costs from the revenue, which comes to IDR 688,050,000. The calculated Revenue/Cost (R/C) Ratio of 3.542 suggests a positive equilibrium between revenue and expenses. This ratio is a crucial financial indicator that shows profitability potential. Furthermore, the payback period—which is projected to be 0.46 years—indicates the amount of time needed to recoup the initial expenditure in relation to the net benefit that is delivered.

Keywords: Marine fishes; distribution; processing; investment.

1. INTRODUCTION

Fish stands out as a crucial source of affordable animal protein with commendable nutritional content, contributing significantly to quality protein intake [1]. The positive correlation between increased fish consumption and improved nutritional status underscores its importance in enhancing human resources. However, the highly perishable nature of fishery products poses challenges in marketing, distribution, and storage in fresh form. Consequently, processing fish, exemplified by products like salt-boiled fish, not only addresses preservation concerns but also elevates the product's value through diversified processing. Beyond preservation, fish processing serves as a catalyst for household industry development, empowering communities and contributing to non-oil and gas sector foreign exchange [2].

To enhance the value and make optimal use of marine catch production, a dual strategy involving the development of both traditional and contemporary value-added products is imperative. Presently, Indonesia predominantly focuses on economic fish like tuna and shrimp for value addition, given their inherent market value even in their raw state. However, to transform the market dynamics for non-economic fish, a strategic shift is necessary. This involves diversifying fishery product processing to create offerings that resonate with public preferences and align with market tastes. The objective is twofold: to meet the nutritional requirements of the community and ensure the safety and healthiness of the products. A prime example of successfully diversifying fishery product processing, particularly appreciated in West Java, Indonesia, is the production of salt-boiled fish. This sought-after delicacy is crafted from a variety of raw materials, including carp, milkfish,

mackerel tuna, and yellow-striped trevally. By introducing such processed fishery products, we not only cater to market preferences but also contribute to the economic transformation of non-economic fish. This strategic move aligns with the broader goal of ensuring food safety, promoting health, and fulfilling the evolving culinary desires of the community [3].

The fish processing potential in Bandung Regency, especially in salt boiling fish, is substantial, boasting approximately 700 processors across various sub-districts with a monthly business capacity of 1,750 - 3,150 tons. Nevertheless, a significant challenge faced by these processors is the seasonal and fluctuating availability of sea fish, the primary ingredient for salt-boiled fish [4]. The dynamics of sea fish availability and transportation intricacies lead to price fluctuations and stock uncertainties [5].

In the domain of business operations, numerous entrepreneurs encounter challenges in advancing their ventures, primarily stemming from the absence of well-defined management plans and coherent business strategies. Hence, the imperative for a meticulous and lucid management plan is underscored, acting as a catalyst for the growth of these businesses. Strategic efforts geared towards business development necessitate a targeted enhancement in competitiveness. This becomes pivotal in not only navigating obstacles and challenges but also in capitalizing on emerging market opportunities. The maturation of a business demands a heightened level of focus and dedicated efforts. It is incumbent upon entrepreneurs to ensure that this developmental process receives utmost attention, fostering an environment conducive to optimal growth and surpassing benchmarks set by other sectors [6].

To address these challenges and ensure a steady supply of raw materials, a marine fish distributor in Baleendah Sub-district, Bandung Regency, is imperative. This distributor, functioning as a fish collector (cold storage), acts as a crucial link between major marine fish producers and local fish processing farmers [7]. During abundant fish seasons, the distributor collects fish, supporting prices during limited stock periods. This strategic intervention ensures the continuity of activities for salt-boiled fish processing farmers in Bandung Regency. Fisheries processing businesses encounter a common challenge rooted in the unpredictable oscillation of raw material prices, resulting in potential setbacks in both production volume and sales of processed products. Beyond the variability in the cost of fish raw materials, additional inputs, and other materials, several components, including plastic packaging, fuel, water, and electricity, undergo price fluctuations. These challenges intricately impact the cost structure incurred and, consequently, the income generated by the fish processing business [8].

The key objectives in establishing a marine fish distributor in Baleendah Sub-district, Bandung Regency, include optimizing the operation of distribution facilities and infrastructure. This optimization ensures a consistent supply of raw materials, reducing price fluctuations and ultimately lowering the production cost of processed fish. Additionally, the initiative aims to foster investment and business development in the marine fish distribution sector in Bandung Regency. By providing quality and continuous access to marine fish, the project also seeks to stimulate the growth of fish processing businesses in the region.

2. MATERIALS AND METHODS

This article evolved through a meticulous literature review that explored into research findings and survey outcomes, encompassing aspects such as marine fish distributors, processor potentials, salt-boiled fish, market mapping, and more. The literature search spanned references to articles published in journals and other publications relevant to marine fish distributors in the Bandung Regency area. To streamline this citation process, a diverse set of tools was employed, including searches in scientific journal databases, and other pertinent information sources, leveraging Google Scholar and navigating official websites via Google Chrome.

The study followed a structured approach, aligning with established guidelines [9], involving six key steps: formulating and clarifying the study question(s), thoroughly reviewing the existing literature, defining inclusion criteria, assessing the quality of primary research, processing gathered information, and finally, interpreting the data to compose a comprehensive summary. The preparation of materials entailed a comprehensive library research approach, assimilating literature from various sources such as books, articles, and research findings, obtained through both traditional library searches and online exploration. The extension survey activities were meticulously planned, featuring well-coordinated efforts between the research team and diverse fish distributors in the Bandung Regency.

3. RESULTS AND DISCUSSION

3.1 Technical Aspect

3.1.1 Overview of fish processing potential in bandung regency

Bandung Regency harbor has significant potential in the fisheries sector, particularly within the realm of fish processing [10]. Up until 2004, the region boasted a substantial number of fish processors, spanning across diverse sub-districts, with a recorded count of 738 production households contributing to a cumulative production of 14,797,960 kg. The array of processed fish encompasses a variety, including salt-boiled fish, fish crackers, salted fish, presto milkfish, shredded fish, and an assortment of other processed fish. Based on data from the West Java Province Maritime and Fisheries Service (2019). For a more detailed breakdown, the distribution of fish processors and the range of processed commodities in Bandung Regency is elucidated in Table 1.

3.1.2 Facilities and infrastructure

Area development necessitates the establishment of essential facilities and infrastructure. Generally, facilities encompass all tools and materials instrumental in realizing the goals and objectives of a production process, whereas infrastructure constitutes the primary support for production implementation. The absence of these critical elements implies that planned activities will fall short of achieving the anticipated results [11]. Currently, two companies are actively involved in the distribution of marine

fish in Bandung Regency, precisely situated in Jelekong Village, Baleendah Subdistrict. These entities serve as crucial suppliers of marine fish to processing farmers across multiple sub-districts within Bandung Regency. Essential facilities required for marine fish distributors encompass:

1. Administration Office
2. Cold Storage: A room measuring 5 x 6 x 2.8 m designed to maintain a temperature below 0°C. Estimated cost: IDR 200 million
3. Sitting Scales: With a capacity of 150 kg (Cost = IDR 500,000).
4. Plastic Baskets: 20 pcs sized at 100 x 60 x 50 cm each, 10 kg capacity, priced at IDR 100,000 per piece.
5. Push Wheels: 2 pcs priced at IDR 250,000 each.
6. Electricity: With a power capacity of 13,000 watts (Monthly cost = 1.7 million rupiahs).
7. Freon: Priced at IDR 250,000 for five months
8. Pick-up Car: A vehicle with a capacity of

1.5 tons, one piece priced at IDR 45,000,000.

9. Labor: Staffing requirements include warehouse personnel (2), a driver (1), administrative staff (2), and a manager (1).

3.1.3 Scope of activities

Marine fish distributors engage in a range of activities aimed at sourcing fish from different locations and distributing them to fish processing farmers, particularly for salt-boiled fish production. The primary locations for fish sourcing include Jakarta, Surabaya, and Sulawesi. Varieties of marine fish meeting the requirements of processing farmers, such as mackerel tuna (Jakarta), skipjack tuna (Jakarta, Sulawesi, Surabaya), sardines (Jakarta, Surabaya), *Decapterus* sp. (Jakarta, Sulawesi) [12]. Mackerel tuna, whole fresh milkfish, and sardines, are commonly imported due to their affordability and high market demand.

Table 1. Distribution of fish processors and processed fish commodities in bandung regency

Sub-district	Ward	Commodity	Household	Production (kg)
Bojongsoang	Lengkong	Salt-boiled fish (common	30	540,000
	Ciganitri	carp, milkfish, mackerel tuna,	10	90,000
	Bojongsoang	yellow-stripe trevally, sardines)	368	3,312,000
Banjaran	Kamasan	Various processed fish	10	60,000
	Neglasari	Various processed fish	10	60,000
	Kiangroke	Salt-boiled fish	9	216,000
Pasir Jambu	Cibodas	Salt-boiled fish (common	80	4,800.000
	Cukang Genteng	carp, milkfish, mackerel tuna, yellow-stripe trevally, sardines)	40	2,400.000
Ciwidey	Panyocokan	Salt-boiled fish	8	144,000
Cicalengka	Cicalengka	<i>Ecot</i> salt-boiled fish	1	12,000
Cililin	Bongas	Salt-boiled (common carp, tilapia), pangasius salted fish	55	495,000
Cipeundeuy	Margalaksana	Various processed fish	20	72,000
Pameungpeuk	Rancatungku, Sukasari	Various processed fishes	12	28,800
Margahayu	Margahayu Tengah	Fish crackers	8	192,000
Ciparay	Mekarsari	Salt-boiled fish	17	510,000
Baleendah	Jelekong	Salt-boiled fish	22	660,000
Padalarang	Padalarang	Salted snakehead fish	1	6,000
Katapang	Katapang	Pressure cooker salt-boiled milkfish, salt-boiled mackerel tuna	13	156,000
Ibun	Talun	Salt-boiled fish	3	90,000
Dayeuhkolot	Cangkuang Wetan	Salt-boiled fish	13	702,000
Majalaya	Majalaya	Salt-boiled fish	7	252,000
Ngamprah	Ngamprah	Fish floss	1	160
Total			738	14,797,960

The importation of sea fish is facilitated either by physically visiting the source (Jakarta) or through telephone orders from marine fish producers (Surabaya, Sulawesi). Distribution to processing farmers, who are partners of these distributors scattered across various sub-districts in Bandung Regency, occurs through two main methods: 1) processing farmers visiting distributors, and 2) distributors sending consignments to groups of processing farmers. Ensuring efficiency is pivotal for companies striving to thrive and compete in

the contemporary business landscape. The swift movement of goods is significantly influenced by the effectiveness of distribution. The challenge in marketing channel patterns extends beyond the mere length of the channels; the emphasis should be on identifying channels that offer the utmost efficiency. The crux of the issue related to marketing channel patterns is not just about their length but about pinpointing the channels that deliver the highest level of efficiency [13].



Fig. 1. Fish weighing process



Fig. 2. Mackerel tuna



Fig. 3. Sorting fish before distribution

3.2 Market Analysis and Mapping

3.2.1 Market conditions

Marine fish distributors play a crucial role in supporting fish processing activities catering to a middle to lower market segment [14]. The anticipated consumers and partners of these distributors are typically fish processing farmers with limited capital. The distribution network of marine fish spans various sub-districts around Bandung Regency, employing a sales system either at the distributor's location or by directly delivering to the processing farmers. In this context, the distributor serves as both a market guarantor and a vital raw material provider [15].

3.2.2 Market opportunities

The market potential for marine fish distributors in Bandung Regency remains substantial. Currently, only two seafood distributors operate in Jelekong Sub-district, whereas the number of processing farmers stands at 738 households. This stark contrast indicates a

considerable untapped market for marine fish distributors.

Annually, processing farmers in Bandung Regency generate 14,797,960 kg of processed fish, requiring a substantial supply of fresh and sea fish when considering depreciation and additives. Assuming half of this demand relies on sea fish, a weekly requirement of 154.145 tons necessitates eight cold storages, each with a capacity of 5m x 5m x 2.8m, to meet the demand in Bandung Regency.

3.2.3 Market needs and competitors

The market demand for marine fish from distributors ranges from 200 kg to 4 tons per day, scaling up in response to the demand for processed fish. However, the general volume of marine fish absorbed by processing farmers is detailed in Table 2. Competing businesses, such as Caringin Market and Gedebage Bandung, have endured in this industry, primarily due to their robust and reliable partnership networks along with substantial capital reserves.



Fig. 4. Fish ready for distribution



Fig. 5. Fish storage boxes

3.2.4 Selling price condition

The procurement cost of fish from the source fluctuates between IDR 2,700 and IDR 15,000 per kilo. Notably, the selling price to farmer processors is IDR 1,000 higher than the purchase price. A detailed breakdown is provided in Table 3.

The storage duration for marine fish upon arrival is a maximum of 1.5 months. Beyond this period, a decline in quality occurs, necessitating a sale at 50% of the regular price. The market for these lower-quality fish is found in Garut, West Java

typically priced between IDR 3,500 and IDR 4,000 per kilogram when received at the processing farmer's location. These degraded marine fish are commonly repurposed for animal feed and fish bait production. In the course of one year, marine fish distributors in Bandung Regency have managed to distribute 94.6 tons of fish, fulfilling only 1.3% of the local demand for marine fish. Optimizing the managerial aspects of fish distribution holds the potential to enhance market absorption, subsequently improving the overall function and efficiency of marine fish distributors.

Table 2. Volume of seafood absorbed by processors in bandung regency

Consumer	Uptake Volume	Origin
Farmer-processors group	5 quintals/3 days	Ciganitri, Bojongsoang
Individuals	2 quintals/week	Ciparay, Majalaya, Pasirjambu, Rancaekek
Traditional market vendors	5-6 quintals/week	Caringin, Gedebage

Table 3. Type and price of fish at marine fish distributors

Type of Fish	Purchase Price (IDR)	Selling Price (IDR)
Skipjack tuna	7,800 - 10,000	8,800 - 11,000
Mackerel tuna	7,700 - 10,000	8,700 - 11,000
Sardines	2,700 - 3,500	3,800 - 4,500
Pacific mackerel	8,500 - 9,500	9,500 - 11,000
<i>Decapterus</i> sp.	7,500 - 8,000	8,500 - 9,000
Milkfish	7,500 - 8,000	8,500 - 9,000
Tuna	11,000 - 15,000	12,000 - 16,000



Fig. 6. Operational vehicle for marine fish distribution

3.3 Investment Opportunity

3.3.1 Business feasibility analysis

A. Investment

Investment is a critical aspect of establishing a successful marine fish distribution business. It encompasses various components crucial for operational efficiency and sustainability. The office building, priced at IDR 20,000,000, serves as the administrative hub, offering a centralized space for managerial tasks. Meanwhile, the cold storage facility, a significant investment at IDR 200,000,000, is designed to store up to 20 tons of marine fish, ensuring a continuous supply chain. The weighing scale, priced at IDR 500,000, plays a pivotal role in accurate measurement, an essential aspect of fair transactions. The two pushcarts, priced at IDR 250,000 each, provide a means of transporting fish efficiently. Additionally, 20 plastic baskets, each costing IDR 100,000, serve as containers for easy handling of fish. Finally, two pick-up vehicles, at IDR 45,000,000 each, are crucial for transportation, linking the distribution center with

various sub-districts. Table 4 shows that the total investment needed is at IDR 313,000,000; with IDR 31,350,000 depreciation.

B. Fixed and variable costs

Managing fixed and variable costs is essential for the sustainable operation of the marine fish distribution business. The depreciation cost, amounting to IDR 31,350,000, accounts for the gradual reduction in the value of assets over time. Electricity, totaling IDR 1,700,000, is a recurring fixed cost crucial for the operation of facilities such as the cold storage. The expense for Freon, at IDR 600,000, contributes to maintaining the optimal temperature in the cold storage, preserving the quality of marine fish. Labor costs, including warehouse staff, drivers, administrative personnel, marketing, and managerial staff, amount to IDR 25,200,000, IDR 19,200,000, IDR 19,200,000, IDR 36,000,000, and IDR 24,000,000, respectively, forming a substantial portion of the total operating expenses. Table 5 shows the total fixed and variable costs of marine fish distributors is at IDR 271,950,000.

Table 4. Investment cost for marine fish distribution

Type	Quantity	Price (x IDR 1000)	Value (x IDR 1000)	Economic Life	Depreciation (x IDR 1.000)
Office building	1	20,000	20,000	20	1,000
Cold Storage Capacity 20 Tons	1	200,000	200,000	10	20,000
Weighing Scale	1	500	500	5	100
Pushcart	2	250	500	2	250
Plastic baskets	20	100	2,000	2	1,000
Pick-up vehicle	2	45,000	90,000	10	9,000
Total			313,000		31,350

Table 5. Fixed and Variable Cost of Marine Fish Distributors

Type	Quantity	Price per-unit IDR)	Value (IDR/year)
Depreciation			31,350,000
Electricity		1,700,000	20,400,000
Freon		600,000	600,000
Labor			
- Warehouse	3	700,000	25,200,000
- Driver	2	800,000	19,200,000
- Administration	2	800,000	19,200,000
- Marketing	2	1,500,000	36,000,000
- Manager	1	2,000,000	24,000,000
Transportation	20,000 kg/week	100	96,000,000
Total			271,950,000

C. Calculation of annual cost benefits

Understanding the annual cost benefits is crucial for evaluating the financial viability of the business. The revenue, calculated at IDR 960,000,000, is derived from the production volume multiplied by the selling price. The resulting profit, amounting to IDR 688,050,000, is obtained by subtracting the total fixed and variable costs from the revenue. This profit becomes especially significant when considering that the cost of purchasing fish from the source is assumed to average IDR 10,000 per kilogram. Consequently, maintaining a working capital of IDR 800,000,000 per month or IDR 200,000,000 per week is imperative.

The Revenue/Cost (R/C) Ratio, calculated at 3.542, indicates a promising balance between revenue and costs. This ratio serves as a key financial metric, showcasing the potential for profitability. Additionally, the payback period, estimated at 0.46 years, signifies the duration required to recover the initial investment based on the generated net benefit. These financial indicators collectively offer insights into the robustness and efficiency of the proposed marine fish distribution business. The details of which are as follow:

1. Revenue (Production x Price)
 - For every kilogram of fish, the distributor gains a profit of IDR 1,000.
 - Revenue = 20,000/mg x 48 weeks x IDR 1,000
= IDR 960,000,000
2. Profit
 - Profit = IDR 960,000,000 – IDR 271,950,000
= IDR 688,050,000
 - The cost of purchasing fish from the source is assumed to be an average of IDR 10,000 per kg. In one month, the distributor must have a working capital of IDR 800,000,000 or IDR 200,000,000 per week.
3. Analysis of Revenue and Cost Balance R/C Ratio
 - R/C Ratio = IDR 960,000,000 / IDR 271,950,000
= 3.542
 - Payback period = Investment x 1 year / Net benefit
= IDR 313,000,000 x 1 year / IDR 688,050,000
= 0.46 years

3.3.2 Challenges and resolutions

The progress of marine fish distributors in Baleendah Sub-district, Bandung Regency, is intricately tied to the substantial financial needs of a single business unit, making independent organization by distributor managers impractical. Addressing this challenge involves the provision of credit coupled with managerial training and technical guidance to pave the way for a viable solution. The investment initiative presents a lucrative opportunity for investors seeking strong returns and positive community impact. With a total initial investment of IDR 313 million, the project possess a projected annual profit of Rp 688 million and a rapid payback period of just 0.46 years. Few highlights from the investment potential described above were:

Strong Financial Fundamentals:

- 1) Low Operational Costs: Depreciation, electricity, and freon expenses are minimal, totaling only Rp 33.7 million annually.
- 2) High-Profit Margin: Each kilogram of fish sold generates a profit of Rp 1,000, leading to an estimated annual revenue of Rp 960 million.
- 3) Favorable R/C Ratio: The calculated R/C ratio of 3.542 demonstrates a significant return on investment, exceeding the breakeven point by over 3x.

Key Investment Highlights:

- 1) Essential Infrastructure: The project includes the purchase of a cold storage facility, office building, weighing scale, pushcarts, plastic baskets, and pick-up vehicles.
- 2) Skilled Workforce: A dedicated team of warehouse laborers, drivers, administrative staff, marketing personnel, and a manager ensures efficient operations.
- 3) Strategic Location: The Baleendah District location provides direct access to a reliable supply of marine fish and proximity to potential buyers.

Investing in this marine fish distributor is a chance to not only generate substantial financial returns but also contribute to the development of the local economy and empower salt-boiled fish processors in Bandung Regency, Indonesia.

4. CONCLUSION

The activity of marine fish distributors in Bandung Regency has great prospects to be developed but is hampered by the large capital that must be spent by distributor entrepreneurs. For better implementation, government intervention is needed in terms of capital/investment accompanied by technical and managerial assistance aimed at fish distributor entrepreneurs in Bandung Regency, Indonesia.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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