

# **An Analysis of the Cost Structure and Cost-Effective Investment in the Production of Low-Sodium Fermented Fish with Traditional Flavors from Isaan Local Wisdom**

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This research aims to analyze the cost structure and investment value in producing low-sodium fermented fish with traditional Isaan flavors by Ban Dong Tat Thong Fermented Fish Processing Women's Community Enterprise, Sisaket Province. The study was motivated by three key challenges facing the enterprise: lack of systematic cost accounting, unclear cost component proportions, and insufficient investment cost analysis. The study employed mixed methods research, combining qualitative and quantitative approaches. Data were collected through in-depth interviews with 10 key informants, including the chairman, accounting directors, production manager, and group members, along with analysis of financial and accounting documents. The findings revealed that the total production cost was 109,713 baht, comprising direct raw materials (65.94%), production costs (16.72%), and direct labor costs (16.40%). Tilapia, the main raw material, accounted for 63.80% of total costs. The unit production cost was 16.68 baht per piece (20g). The investment analysis showed impressive returns with a gross profit margin of 58.29%, net profit margin of 52.51%, and return on investment (ROI) of 110.58%. The break-even point was 3,123 pieces, significantly lower than the actual production capacity of 6,576 pieces, with a short payback period of 5.7 months. The study also found that the enterprise effectively adapted to modern market demands through digital marketing, with online marketing expenses accounting for 59.21% of total selling and administrative expenses. This research

demonstrates that producing low-sodium fermented fish is a profitable venture that successfully combines traditional local wisdom with modern health trends, contributing to sustainable community development. However, the high proportion of raw material costs suggests a need for strategic cost management to maintain long-term profitability and competitive advantage in the market.

**Keywords:** Low-Sodium Fermented Fish, Cost Analysis, Return on Investment, Community Enterprise, Isaan Local Wisdom.

## 1. Introduction

Today's community business operations face higher competition. Especially community enterprises that produce processed products from local raw materials. Therefore, cost and reward management is critical to the survival and growth of the business. Ban Dong Tat Thong Fermented Fish Processing Women's Community Enterprise, Sisaket Province, is a group that has been continuously producing processed fermented fish and has developed a new product, low-sodium fermented fish cubes, to meet the needs of health-conscious consumers. However, according to preliminary studies, community enterprise groups face 3 major problems. First, (1) lack of systematic cost accounting; (2) The proportion of costs in each component cannot be clearly determined. and (3) lack of systematic analysis of investment cost. This affects effective selling pricing and production planning.

Cost accounting theory states that an accurate cost structure analysis will help businesses manage costs effectively. This leads to the determination of reasonable selling prices and the creation of sustainable profits. In addition, the cost-of-investment analysis is also an important tool for evaluating operational performance and business decisions, which is in line with Supayom's research. Nachan et al. (2018) found that systematic cost and return analysis helps community enterprises to improve production efficiency and increase competitiveness. Therefore, the researcher is interested in studying and analyzing the cost structure and cost-effectiveness of low-sodium fermented fish production of the Ban Dong Tat Thong Fermented Fish Processing Women's Community Enterprise. Sisaket Province to know the elements of the actual production cost and evaluate the investment value, which will be useful for business planning. This will lead to increased competitiveness and sustainable development.

In addition, the study of the production cost structure is also important for the development of the accounting system of community enterprises. Especially in the issue of cost classification according to cost behavior, both fixed and variable costs, which will help community enterprise groups to plan production and control costs more effectively. This is in line with Indira's research. Suwandee et al. (2017) found that cost behavior analysis helps community enterprise groups to determine break-even points and plan profits more accurately. The data can also be used to make administrative decisions, such as determining the appropriate production scale. Capacity planning and inventory management. The value for investment analysis is also an important tool to evaluate the financial performance of a business. In particular, the analysis of Return on Investment (ROI), Gross Profit Margin and Net Profit Margin will reflect the profitability and operational efficiency of the business. According to a study by Jintra Sanan (2016), systematic analysis of financial ratios helps

community enterprises to assess their financial status and plan for future growth effectively. In addition, it is also important information for obtaining financial support from financial institutions or relevant government agencies. This will help strengthen community enterprises in the long term.

### Research Objectives

1. To analyze the production cost structure of low-sodium fermented fish cubes with traditional taste from Isaan local wisdom.
2. To analyze the investment value and return rate from the production of low-sodium fermented fish, traditional flavors from Isaan local wisdom.

### Scope of Research

1. Raw materials for fermented fish from the Women's Fish Processing Community Enterprise in Ban Dong Tat Thong Prang Ku District, Sisaket Province and fermented fish from a limited partnership. Mae Aoi Kalasin Agricultural Processing Interfood Yang Talat District, Kalasin Province
2. The food prototype product in this study is low-sodium fermented fish.
3. Analysis of production cost structure, including raw material cost, labor cost, production cost, and strategic cost management

## 2. Research Methodology

The research entitled "Analysis of Cost Structure and Investment Value in Low-sodium Fermented Fish Production: A Case Study of Women's Community Enterprises Processing Fermented Fish in Ban Dong Tat Thong, Sisaket Province" is qualitative research combined with quantitative data analysis with the following research methods:

The population used in this study was 50 members of the Women's Community Enterprise Group for Processing Fermented Fish in Ban Dong Tat Thong, Sisaket Province. 1 Chairman of the Community Enterprise Group, 2 Accounting and Finance Directors, 1 Production Manager, and 6 Group Members Related to Production. can provide detailed and complete information. Mae Aoi Kalasin Agricultural Processing Interfood Yang Talat District, Kalasin Province by selecting a specific sample (Purposive Sampling) of 5 people.

**Research Tools** The researcher developed a structured in-depth interview form which is divided into 4 parts, including: General information of the interviewee Information about production costs. Revenue and return information and problems and suggestions. In addition, the Company uses cost and expense records, as well as accounting and financial records, to obtain complete and accurate information.

Data collection is carried out in two parts: primary data and secondary data. For primary information We used in-depth interviews with key informants. Collect information from accounting and financial documents. and observe the production and operation process.

Secondary data is obtained from the collection of data from the annual report. Community Enterprise Registration Documents and Historical Financial Statements

The data analysis is divided into three main parts: cost structure analysis, investment value analysis, and qualitative analysis. This includes the calculation of unit production costs and the analysis of cost proportions for each type. For the analysis of the value of investment, various financial instruments are used, such as break-even analysis, gross profit margin, net profit margin, return on investment, and payback period. Qualitative analysis analyzes the content of the interviews. Summarize key issues related to cost management and analyze problems and obstacles in operation

The results of the data analysis are presented in a tabular format showing the cost structure. The chart shows the cost ratio, financial ratio analysis, and cost management recommendations to provide a clear overview of the cost and value for investment. This will be beneficial to the development of the operation of community enterprise groups.

### 3. Results

Objective 1 is to analyze the cost structure of low-sodium fermented fish production of the Women's Fermented Fish Processing Community Enterprise in Ban Dong Tat Thong. Sisaket Province

Table 1 shows the cost structure of low-sodium fermented fish cubes.

Transaction	Amount (Baht)	Percentage
1. Direct raw material cost		
- Tilapia	70,000	63.80
- rock salt	1,000	0.91
- Maltodextrin	1,000	0.91
- glycerol	48	0.04
- Roasted rice	300	0.27
Total raw material cost	72,348	65.94
2. Direct labor costs	18,000	16.40
3. Production cost		
3.1 Variable production costs		
- package	12,000	10.93
- Utility bills	500	0.45
Total variable expenses	12,500	11.38
3.2 Fixed production costs		
- Depreciation of hot air dryers	2,000	1.82
- Glider depreciation	2,500	2.27
- Depreciation of large frying pans	1,000	0.91
- Depreciation of other equipment	365	0.34
Total Fixed Expenses	5,865	5.34
Total production costs	19,365	16.72
Total production costs	109,713	100.00

Table 1 shows the cost structure of low-sodium fermented fish balls. The results can be interpreted and analyzed as follows:

Analysis of the Cost Structure of Low-Sodium Fermented Fish Production of Women's Community Enterprises Processing Fermented Fish in Ban Dong Tat Thong Sisaket Province It was found that there was a total production cost of 109,713 baht, consisting of 3 main costs, as follows:

Part 1: Direct raw material costs are the cost with the highest proportion. The total value is 72,348 baht, accounting for 65.94% of the total production cost, consisting of tilapia with a value of 70,000 baht (63.80%), followed by rock salt and maltodextrin. 1,000 Baht each (0.91% equal) Roasted rice worth 300 baht (0.27 percent) and glycerin worth 48 baht (0.04 percent) respectively. Part 2: Direct labor costs are valued at 18,000 baht, accounting for 16.40% of the total production cost. Part 3: Production expenses totaled 19,365 baht, accounting for 16.72% of the total production cost, divided into 2 categories:

1) Variable production expenses, total value of 12,500 baht (11.38%), including packaging costs of 12,000 baht (10.93%), utility costs of 500 baht (0.45%), 2) fixed production expenses, total value of 5,865 baht (5.34%), including depreciation of gliders 2,500 baht (2.27%), depreciation of hot air dryers 2,000 baht (1.82%), depreciation of large pans 1,000 baht (0.91%), depreciation of other equipment 365 baht (0.34%).

Based on the above analysis of the cost structure. It was found that the cost of direct raw materials accounted for the highest proportion of 65.94 percent, especially the cost of tilapia which accounted for 63.80 percent, followed by production costs at 16.72 percent and direct labor costs at 16.40 percent, respectively. This data suggests that community enterprises should prioritize raw material cost management as it has the greatest impact on the total cost.

Table 2 shows the analysis of the cost of production per unit

Item	Number/Unit
Production Volume (Bale)	6,576
Total Cost (Baht)	109,713
Packing Size (g/bale)	20
Unit Cost (Baht/Piece)	16.68

Table 2 shows the analysis of the cost of production per unit. The results can be interpreted and analyzed as follows:

Analysis of the unit production cost of low-sodium fermented fish products It was found that the Women's Community Enterprise Processing Fermented Fish in Ban Dong Tat Thong. When the total production cost of 109,713 baht is calculated to calculate the unit cost, it is found that the production cost is 16.68 baht per cube. The resulting unit cost data will be useful for community enterprises in planning business strategies. This will affect the profitability and sustainable growth of the business

From Table 1 and Table 2, it can be summarized that the production cost structure of low-sodium fermented fish has raw material cost as the main cost (65.94%), followed by production cost (16.72%) and direct labor cost (16.40%), respectively, with a unit production cost of 16.68 baht per bale

Table 3 Comparison of the cost of traditional fermented fish with low-sodium fermented fish cubes

The cost of producing original fermented fish			Production cost of Low sodium fermented fish cubes		
Transaction	Amount (Baht)	Percentage	Transaction	Amount (Baht)	Percentage
1. Raw materials			1. Raw material		
1.1 Combined fish (daffodils, cichlids)	96,000.00	64.63	1.1 Combined (Cichlids)	70,000.00	63.80
1.2 rock salt	300.00	0.20	1.2 rock salt	300.00	0.27
1.3 sea salt	1,200.00	0.81	1.3 maltodextrin	1,000.00	0.91
1.4 Soft bran	1,800.00	1.21	1.4 glycerin	1,000.00	0.91
1.5 Roasted rice	48.00	0.03	1.5 roasted rice	48.00	0.04
Fermented fish ingredients included	99,348.00	66.88	Fermented fish ingredients included	72,348.00	65.94
Total raw materials	99,348.00	66.88	Total raw materials	72,348.00	65.94
2. Labor costs	28,800.00	19.39	2. Labor costs	18,000.00	16.40
2.1 Labor Cost			2.1 Labor Cost		
Total Labor Costs	28,800.00	19.39	รวมค่าแรง	18,000.00	16.40
3. Production cost			3. Production cost		
3.1 Variable production costs			3.1 Variable production costs		
3.1.1 Fermented Fish Packaging - 20 kg plastic drums	12,000.00	8.10	3.1.1 Fermented Fish Packaging - 20 kg plastic bucket	12,000.00	10.93
3.1.2 Electricity bill	1,500.00	1.01	3.1.2 Utility bills		
				500.00	0.45
Total variable production costs	13,500.00	9.11	Total variable production costs	12,500.00	11.38
3.2 Fixed production costs			3.2 Fixed production costs		
3.2.1 Dragon Pot Depreciation	1,800.00	1.21	3.2.1 Mixed Strike Depreciation	1,000.00	0.91
3.2.2 Depreciation of a large mortar + a large pestle		0.01	3.2.2 Depreciation of mixing bowl sample		
3.2.3 Depreciation of large frying pans	20.00	0.04	3.2.3 Depreciation of large frying pans	20.00	0.01
3.2.4 Depreciation of fish scale remover		1.68	3.2.4 Depreciation of hot air dryers		
3.2.5 Depreciation of fish scale gliders	65.00	1.35	3.2.5 Glider depreciation	65.00	0.05
3.2.6 Depreciation of cutting boards + knives	2,500.00	0.28	3.2.6 Depreciation of cutting boards + knives		
3.2.7 Depreciation of large basins	416.67	0.05	3.2.7 Depreciation of large basins	2,500.00	2.27
				2,000.00	1.35
				200.00	1.82
				80.00	0.07
Total fixed production costs	6,881.67	4.62	Total fixed production costs	5,865.00	5.34
Total production costs	20,381.67	13.73	Total production costs	19,365.00	16.72
Total production costs	148,529.67	100.00	Total production costs	109,713.00	100.00

From Table 3, it can be seen that the cost of producing fermented fish cubes is low, in terms of raw materials, labor, variable costs, and production costs

Table data comparing the cost between traditional fermented fish and low-sodium fermented fish cubes. They are as follows:

The production of traditional fermented fish has a total production cost of 148,529.67 baht, consisting of raw material costs of 99,348 baht, accounting for 66.88 percent, of which the main raw materials are mixed fish (catfish, cichlid) worth 96,000 baht, accounting for 64.63 percent, followed by sea salt 1,800 baht (1.21 percent), rock salt 1,000 baht. The total production cost was 28,800 baht, or 19.39 percent, while the total production cost was 20,381.67 baht (13.73 percent), divided into variable costs of 13,500 baht (9.11 percent) and fixed expenses of 6,881.67 baht (4.62 percent). The labor cost for the production of low-sodium fermented fish was 18,000 baht, accounting for 16.40 percent, while the total production cost was 19,365 baht (16.72 percent), divided into variable expenses of 12,500 baht (11.38 percent) and fixed expenses of 5,865 baht (5.34 percent).

Considering the cost of raw materials per unit of production of low-sodium fermented fish, it was found that the main raw materials used in the production of 1 kg were 7 kg tilapia at 700 baht, roasted rice 0.1 kg at 6.40 baht, rock salt 0.2 kg at 13.80 baht, maltodextrin 0.3 kg at 19.20 baht and glycerin 0.5 kg at 28 baht, with a total raw material cost per kilogram of 767.40 baht. The total cost can be reduced by 38,816.67 baht as a result of the development of a more efficient production process. Choosing the right raw materials and better control production costs.

Table 4 Calculation of raw material costs for the production of powdered fermented fish and low-sodium fermented fish cubes per quantity 1 kilogram

Ingredients	Weight (kg)	Price per kilogram (Baht)	Total in Baht
Fermented fish (whole fish)	7.00	100	700.00
Roasted rice	0.10	64	6.40
rock salt	0.20	69	13.80
Maltodextrin	0.30	64	19.20
Grizzarin	0.50	56	28.00
รวม			767.40
Average cost per unit (20 grams each): 16.68 THB			16.68

\*1 kilogram of whole fermented fish can be processed into approximately 130 grams of fermented fish powder when dried."

From Table 4, the analysis of the cost of raw materials for the production of powdered fermented fish and low-sodium fermented fish per 1 kilogram of volume, it is found that the main raw material in the production process is tilapia in the amount of 7 kilograms, the price is 100 baht per kilogram, a total cost of 700 baht, which accounts for up to 91.22% of the total raw material cost. In addition, there are important auxiliary raw materials such as glycerin 0.50 kg at 28 baht, maltodextrin 0.30 kg at 19.20 baht, rock salt 0.20 kg at 13.80 baht, and roasted rice 0.10 kg at 6.40 baht when including the total cost of raw materials per 1 kg is 767.40 baht. When 1 kg of fermented fish is dried, only about 130 grams of powdered fermented fish can be obtained. Based on the analysis of the cost structure. It was pointed out that tilapia, which is the main raw material, has the greatest impact on production costs. Therefore, community enterprises should pay special attention to the management of this main raw material, both in terms of procurement, storage, and efficient use of raw materials. To control production costs to an appropriate level. In addition, dividing the packaging into

20-gram cubes is a good strategy to set retail prices and facilitate consumers. This will increase the competitiveness of the product in the market

Objective 2 is to analyze the investment value and return rate from the production of low-sodium fermented fish cubes of the Women's Fermented Fish Processing Community Enterprise in Ban Dong Tat Thong, Sisaket Province Table 5 shows the results of the analysis of the value on investment and the rate of return

Table 5 shows the results of the analysis of the value on investment and the rate of return

Item	Amount (Baht)
1. Production and sales information	
- Production Volume (Bale)	6,576
- Unit Price (Baht)	40
- Total sales (Baht)	263,040
2. Costs and expenses	
- Total production cost (Baht)	109,713
- Selling and Administrative Expenses (Baht)	15,200
Total cost (Baht)	124,913
3. Return Analysis	
- Gross Profit (Baht)	153,327
- Net Profit (Baht)	138,127
- Gross Profit Margin (%)	58.29
- Net Profit Margin (%)	52.51
- break-even point (lump)	3,123
- Payback Period (Months)	5.7
- Return on Investment (ROI) (%)	110.58

Table 5 shows the results of the analysis of the investment value and return rate of low-sodium fermented fish production. The results can be interpreted and analyzed as follows:

In terms of production and sales data, it was found that the Ban Dong Tat Thong Fermented Fish Processing Women's Community Enterprise has a production capacity of 6,576 fermented fish cubes with a selling price of 40 baht per cube. As a result, the total sales were 263,040 baht, including total production costs of 109,713 baht and sales and administrative expenses of 15,200 baht, for a total cost of 124,913 baht. It was found that the business had a gross profit of Baht 153,327, representing a gross profit margin of 58.29%, and a net profit of Baht 138,127, representing a net profit margin of 52.51%, indicating that the business has a relatively high profitability. The break-even point analysis showed that the business had to produce and sell 3,123 fermented fish balls to break even, which was lower than the actual production volume of 6,576 fish cubes. The payback period is 5.7 months, which is considered a relatively short period and when considering the return on investment (ROI), it is as high as 110.58 percent, indicating that investing in this business provides a high value for money

Based on all the results of the analysis. In conclusion, the production of low-sodium fermented fish cubes by community enterprises is very cost-effective for investment because of the high rate of return. The break-even point is lower than the actual production capacity, which shows the potential for future expansion.

Table 6 shows the details of sales and administrative expenses

Transaction	Amount (Baht)	Percentage
1. Billboard Fee	200	1.32
2. Internet fee	9,000	59.21
3. Vehicle Fee	6,000	39.47
Total	15,200	100.00

Table 6 shows the details of the selling and administrative costs of the production of low-sodium fermented fish. The results can be interpreted and analyzed as follows:

Analysis of Selling and Administrative Expenses of Women's Community Enterprises Processing Fermented Fish in Ban Dong Tat Thong It was found that the total expenses were 15,200 baht, consisting of 3 main expenses: 1) Internet expenses, which accounted for the highest proportion of 9,000 baht, accounting for 59.21% of the total sales and administrative expenses, reflecting that the business focuses on online marketing and business communication through internet channels. The cost of transportation and travel for business is 6,000 baht, or 39.47 percent, showing the cost of transportation and business travel, and 3) the cost of billboards is 200 baht, or 1.32 percent, which is the smallest proportion of sales and administrative expenses

Based on the analysis of the above sales and administrative expense structure. The main points can be summarized as follows: 1) 2) Transportation and travel costs (vehicle costs) are an important proportion and should be planned for effective logistics management, and 3) investment in billboards is small. According to the results of the analysis, the investment in the production of low-sodium fermented fish cubes is worth investing in because 1) 2) The company has a relatively short payback period, 3) has a high return on investment of 110.58%, and 4) has a break-even point of 3,123 lumps, which is lower than the actual production capacity

#### 4. Discussion

The research entitled "Analysis of Cost Structure and Investment Value in Low-sodium Fermented Fish Production: A Case Study of Women's Community Enterprises Processing Fermented Fish in Ban Dong Tat Thong, Sisaket Province" is a qualitative research combined with quantitative data analysis as follows:

Competitive Strategy and Value Creation The fact that community enterprises are able to set the selling price at 40 baht per bale while having a production cost of 16.68 baht per bale reflects the success in creating added value for local products by developing them into low-sodium healthy products in line with the concept of creating innovative products from local wisdom.

In terms of strategic cost management, although the cost of raw materials accounted for

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65.94 percent, the fact that the business was able to maintain a gross profit margin of 58.29 percent shows the efficiency of overall production cost management, especially the control of labor costs and production costs to an appropriate level. This makes it possible to maintain profitability.

In terms of capacity utilization, the business has a break-even point of 3,123 units while the actual production capacity is 6,576 units, which shows that the business is using its production capacity efficiently. The production volume was 110.57 percent higher than the break-even point, reflecting good production planning and accurate estimation of market demand

**Product Development and Innovation** The development of low-sodium fermented fish products is considered an innovation that responds to the trend of healthy food while maintaining the uniqueness of local food. As a result, the product has a clear selling point and can create high added value. This is reflected in the high net profit margin of 52.51 percent

**Marketing and distribution channels:** Online marketing investment accounted for 59.21 percent of sales and administrative expenses. This shows the adaptation of community enterprises to access the modern market, which is a strategy that is in line with current consumer behavior and reduces distribution costs compared to traditional distribution channels

In terms of business sustainability, the short payback period of only 5.7 months and the high return on investment of 110.58% not only show the value of the investment, but also reflect the potential for long-term business sustainability, as the business can generate strong cash flow and sufficient working capital for future expansion

**Community Development and Local Economy** The success of the production of low-sodium fermented fish not only generates good financial returns, but also helps create jobs and income for the community, as well as the preservation and extension of local wisdom to add economic value, which is a sustainable development approach based on the principles of the community economy

Based on the results of the analysis of the cost structure of low-sodium fermented fish balls. It was found that the cost of direct raw materials accounted for the highest proportion of 65.94 percent, especially the cost of tilapia which accounted for as high as 63.80 percent, which is in line with Supayom's research. Nachan et al. (2018) found that the main raw materials for processing fish products often have the highest proportion of costs in the production cost structure because they are raw materials with price fluctuations and supply constraints. Therefore, community enterprises should prioritize the management of raw material costs.

Direct labor costs accounted for 16.40 percent and production costs accounted for 16.72 percent. It reflects the balanced management of production resources, in line with Indira's concept. Suwandee et al. (2017) stated that effective cost management must take into account the balance between labor costs and production costs. This is to avoid wasting or lacking resources.

In terms of value for investment. The results show that the production of low-sodium

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fermented fish cubes has a high investment cost. The return on investment (ROI) was 110.58 percent, gross profit margin was 58.29 percent, and net profit margin was 52.51 percent, which is in line with Jintra's research. Saen Can (2016) found that processed products from local wisdom that have been developed to meet the needs of the modern market often yield cost-effective returns

The break-even point was 3,123 blocks, which was lower than the actual production capacity of 6,576 blocks, and the payback period was only 5.7 months, reflecting the profit potential and expansion opportunities

In addition, the structure of sales and administrative expenses found that a high proportion of online marketing investment (59.21%) reflects the adaptation of community enterprises to the digital market, which is in line with the current trend of consumer behavior and increases effective distribution channels. However, the cost of raw materials accounts for as much as 65.94 percent, which may be a risk to long-term profitability. Therefore, community enterprises should consider strategies for managing raw material cost risks, such as entering into derivatives contracts. Building a network of raw material suppliers or developing an effective inventory management system to maintain a sustainable level of profitability

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