

# International Journal of Statistics and Applied Mathematics

ISSN: 2456-1452  
 Maths 2024; SP-9(1): 165-168  
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<https://www.mathsjournal.com>  
 Received: 02-11-2023  
 Accepted: 05-12-2023

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## A study on performance of cold pressed edible oil processing firms in Tamil Nadu

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### Abstract

Edible oil is an important source of nutrition for the population. India is the largest edible oil importer in the world. In recent years, there is increasing demand for cold pressed oil in the country especially in the state of Tamil Nadu. There are increasing competition among the local players and national players in the marketing of edible oil. In this context, the present study aimed at performance of edible oil processing units in Tamil Nadu. For this study, Western Zone Tamil Nadu was purposively selected and the list of edible oil units unit was collected from the trade associations and industrial centres. About 60 cold pressed edible oil processing units were selected for the study. Investment analysis and regression analysis were used to study the performance of edible oil units. The results of the study showed that the total investment made in the sample units was Rs.2-3 crores and they incurred an average expenditure of Rs.20.60 lakhs per year. The sample units achieved a benefit cost ratio of 1.4-1.6 and Internal Rate of Return (IRR) of 15-18 per cent. The regression analysis showed that number of years of operation, location of business unit and number of oil produced by the firms were the important factor influencing profitability of cold pressed oil processing industry.

**Keywords:** BC Ratio, IRR, cold pressed oil, investment analysis

### Introduction

The principal sources of fat in the diet are vegetable fats and oils, meats, dairy products, poultry, fish and nuts. Most vegetables and fruits are consumed as such contain only small amounts of fat (Johnson and Saikia, 2009) [4]. Edible oils are the important source of fat in Indian vegetarian diet. Edible oils are extracted from the oil seeds like Groundnut, Sesame, Caster, Sunflower, Safflower, Coconut etc., in India. Processing can remove the components of edible oils which may have negative effects on taste, stability, appearance or nutritional value. To the extent possible, processing should preserve tocopherols and prevent chemical changes in the triacylglycerols (Acharya, 1993) [1]. The demand for edible vegetable oils and fats in India has shown a compounded growth rate of 4.5 per cent over the last 10 years and is estimated at 29 million tonnes in 2027-28. India's annual per capita consumption has shown a steadily increasing trend from 4 kg in the 1970s to 10.2 kg in the late 1990s to current levels of 17 Kgs. However, it still ranks well below the world average of around 24 kg, thereby signifying the high growth potential of the industry.

Oil is extracted from oilseeds by mechanical (expeller press) and chemical extraction (hexane extraction). The cold pressed oil retains antioxidants which help to combat free radicals. However, these antioxidants are damaged during the hot pressed method. The cold pressed oil retains its flavour, colour and smell, which is considered to be good for health (Rana, 2017) [5]. The demand for cold pressed (Ghani) oils has been increasing recent years in Tamil Nadu. Many small oil firms have been started in the recent years and producing cold pressed oil in the state. These firms are started by first time rural entrepreneurs or farmers or some Farmer Producer Organisations (FPOs), operated mostly by sole proprietorship or partnership form of business or farmer producer companies. The success of these ventures would make the fellow farmers and other FPOs to follow and join in the value chain of oilseeds. National players are aggressively promoting the product through advertisement and sales promotion programmes in the market. In contrast, the local players are surviving with word of mouth and in-situ advertisements.

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Hence, there is a competition between local players and national players in this niche market. In this context, it is necessary to study the business operations, sourcing of raw material, processing activities, performance and sustainability of cold pressed oil processing firms in western districts of the state.

**Materials and Methods**

Western districts viz., Coimbatore, Tiruppur, Erode, Karur and Namakkal was purposively selected based on presence of more number of cold pressed oil processing firms. The details of cold pressed processing firms present in the western districts of Tamil Nadu were collected from the producers of cold pressed machineries, small scale industries association and District Industrial Centre (DIC). In each selected district, firms who cooperated to the survey was included in the study. Finally, about 26 firms in Coimbatore, 7 firms in Tiruppur, 14 firms in Erode, 8 firms in Namakkal and 5 firms in Karur included in the study. Thus, total sample size accounted to 60.

**Investment Analysis**

Investment analysis was used to measure the viability of oil processing firms in the study area. Hence, Benefit Cost Ratio (BCR) and Internal Rate of Return (IRR) were used.

**Benefit Cost Ratio**

The benefit cost ratio is a measure of ratio between benefits and cost of the oil processing firms. If the estimate is more than one, then the particular firm is feasible and if BCR is less than one, then it is not feasible (Gittinger, 1989) [3]. To estimate the benefit cost ratio, the following formula is used.

$$BCR = \frac{PV[Benefits]}{PV[Costs]}$$

BCR = Benefit Cost Ratio

PV [Benefits] = Present Value of Benefit Stream (Rs)

PV[Cost] = Present Value of Costs (Rs)

**Internal rate of return**

Internal rate of return is a measure to estimate the rate of return on investment made in a project. This measure helps to compare the returns from an investment option over other (Gittinger, 1989) [3]. The following formula is used to measure the IRR.

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a)$$

IRR = Internal rate of return (IRR)

NPV = Net Present Value (NPV)

r<sub>a</sub>, r<sub>b</sub> = rate of return

**Factors influencing profitability of oil processing firms**

Regression analysis was used to measure the factors influencing the profitability of cold pressed method of processing of oil processing firms. The following functional form was used to establish relationship.

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + u_i$$

y = Total Profit of the sample oil processing firms (Rs/year)

a = intercept

b<sub>1</sub>-b<sub>4</sub> = Coefficients

x<sub>1</sub> = Years of operation (Numbers)

x<sub>2</sub> = Number of oils Products

x<sub>3</sub> = Location of processing Unit (Urban =1, Rural =0)

x<sub>4</sub> = Investment in Plant and Machinery (Rs)

u<sub>i</sub> = error term

**Results and Discussion**

**General operations of edible oil producers:** Among the sample edible oil processors, 73 per cent of the sample oil processing firms were sole proprietorship, about 23 percent of them were partnership firms and the remaining were private limited and FPOs. Further, majority of firms (78 percent) were less than 3 years of operation in the market and 93 percent used cold pressed wooden rotary for processing. Similarly, nearly 83 per cent of the sample processing firms sourced oil seeds from traders and only 3 per cent sourced from FPOs/ farmers. Groundnut oil, Sesame oil and Coconut oils were the oils produced by the units. Nearly 38 per cent of units practiced natural sedimentation for filtration of oil and 20 per cent used manual filtration method.

**Capacity Utilization:** Capacity utilization of production facility is an important criterion for efficiency and profitability of processing units. Hence, the details on capacity utilization of cold pressed oil processing units were collected and the results are presented in Table 1.

**Table 1:** Capacity Utilization of the Sample Units (Numbers)

| S. No. | Capacity (Percentage) | Coimbatore | Tiruppur  | Erode      | Namakkal  | Karur     | Sample     |
|--------|-----------------------|------------|-----------|------------|-----------|-----------|------------|
| 1.     | > 80                  | 1 (3.85)   | 0         | 0          | 0         | 1 (20.0)  | 2 (3.34)   |
| 2.     | 60-79                 | 2 (7.69)   | 1 (14.29) | 0          | 0         | 0         | 3 (5.00)   |
| 3.     | 40-59                 | 4 (15.38)  | 1 (14.29) | 2 (14.29)  | 0         | 1 (20.0)  | 8 (13.33)  |
| 4.     | <40                   | 19 (73.08) | 5 (71.42) | 12 (85.71) | 8 (100.0) | 3 (60.0)  | 47 (78.33) |
|        | Total                 | 26 (100.0) | 7 (100.0) | 14 (100.0) | 8 (100.0) | 5 (100.0) | 60 (100.0) |

Figures in parentheses indicate percentage to the total

It could be identified from the results that nearly 78 per cent of units were functioning less than 40 per cent of capacity utilization followed by 13.33 per cent of units with 40-59 per cent. The same trend prevailed among all the sample units of the selected districts. Hence, it could be concluded that most of the sample units were operating under poor capacity utilization. So, the oil processing firms in the study area have to find either alternative material for processing or increase the demand for edible oil from cold pressed method.

**Volume of Sale**

Volume of sale of edible oil from the retail units attained by the sample firms shows the robustness of business. Hence, the details on sale of various edible oils were collected and the results are presented in Table 2.

The results revealed that the sale of edible oil was high among Coimbatore unit (151 lts/Month) followed by Erode (125 lts/month) and Tiruppur (151 lts/month). However, units of Erode and Namakkal sold 97 lts/month and 88 lts/month

respectively. Among the edible oil sold, Groundnut oil was maximum volume with 54.93 per cent followed by sesame oil (27.91 per cent) and Coconut oil (17.16 per cent). Almost same trend was prevailed among the selected sample districts. Hence, it is concluded that the volume of sale was the highest

among the edible oil processing units of Coimbatore followed by Karur and Tiruppur. In the edible oils, groundnut oil accounted the maximum share followed by sesame oil and coconut oil.

**Table 2:** Average volume of sale of edible oil by the sample units (Litres/Month)

| S. No | Type of oil   | Coimbatore  | Tiruppur    | Erode      | Namakkal   | Karur       | Sample      |
|-------|---------------|-------------|-------------|------------|------------|-------------|-------------|
| 1.    | Groundnut oil | 84 (55.63)  | 62 (53.45)  | 54 (55.67) | 55 (62.5)  | 62 (49.6)   | 317 (54.93) |
| 2.    | Sesame oil    | 45 (29.80)  | 32 (27.59)  | 25 (25.77) | 21 (23.86) | 38 (30.4)   | 161 (27.91) |
| 3.    | Coconut oil   | 22 (14.57)  | 22 (18.96)  | 18 (18.56) | 12 (13.64) | 25 (20.0)   | 99 (17.16)  |
|       | Total         | 151 (100.0) | 116 (100.0) | 97 (100.0) | 88 (100.0) | 125 (100.0) | 577 (100.0) |

Figures in parentheses indicate percentage to the total

**Cost of Production**

**Fixed Cost:** Analysis of cost and returns of edible oil production is an important measure to ascertain the profitability of edible oil production units. Hence, the details of cost of fixed cost were collected and the annualized fixed cost was presented in Table 3. It is identified that average fixed cost of cold pressed processing of edible oil was

Rs.2,21,124. In total fixed cost, nearly 56 per cent of fixed cost spent on salary of permanent labour among oil processing firms. Annualized value of building and cost of machinery accounted to 31.81 per cent and 10.27 per cent respectively. Other cost like annualized value of electrical utilities, packing machines and measuring instrument accounted to less than one percent of the total fixed cost.

**Table 3:** Fixed cost of oil processing firms (Rs/Year)

| S. No | Particulars                  | Cost (Rs) | Annualized Cost (Rs/Year) | Percentage to the total |
|-------|------------------------------|-----------|---------------------------|-------------------------|
|       | <b>Fixed Cost</b>            |           |                           |                         |
| 1.    | Cost of Processing Machinery | 128351    | 22716                     | 10.27                   |
| 2.    | Electrical utilities         | 6288      | 1112                      | 0.50                    |
| 3.    | Packing Machines             | 9531      | 1686                      | 0.76                    |
| 4.    | Measuring instruments        | 1018      | 282                       | 0.13                    |
| 5.    | Building Value               | 5,25,311  | 70328                     | 31.81                   |
| 6.    | Permanent Labour Salary      |           | 1,25,000                  | 56.53                   |
|       | Total Fixed Cost             |           | 221124                    | 100                     |

**Variable cost:** The details of variable cost of processing of one tonne of raw material were collected and the results are presented in Table 4.

**Table 4:** Variable Cost

|    | Cost                          | Total Cost (Rs) | Percentage |
|----|-------------------------------|-----------------|------------|
| 1. | Raw Materials (Rs)            | 1054248         | 78.42      |
| 2. | Cost of Transportation (Rs)   | 8658            | 0.65       |
| 3. | Cost of Packing Material (Rs) | 9884            | 0.74       |
| 4. | Labour Charges Rs             | 21510           | 1.62       |
| 5. | Electricity Charges           | 3011            | 0.23       |
| 6. | GST and Others taxes          | 230167          | 17.34      |
|    | Total Cost                    | 1327480         | 100        |

Average variable cost of processing raw materials through cold pressed method was Rs.13.27 lakhs. Further, it is identified that nearly 79 per cent of variable cost constituted as cost of raw materials and 17.34 per cent accounted as GST charges in processing of raw materials. Further, labour charges accounted to be 1.62 per cent in the total variable cost. Other cost like cost of transportation, packing materials and electricity charges accounted to be less than one per cent of total variable cost.

**Cost and Returns:** The cost and returns in edible oil processing was calculated for the edible oil processing firms and the results were calculated and the results are presented in Table 5. It is estimated that the total fixed cost of oil processing was Rs2,21,124 which accounted to 14.25 per cent of total cost. Further, total variable cost was accounted to Rs.13,27,458 which was 85.72 per cent of total cost. Thus, the total cost accounted to Rs.20,60,640. The results showed that the oil processing firms needed more working capital for the operations.

**Table 5:** Cost and Returns in Oil Processing (Rupees)

| S. No. | Details             | Value   | Percentage to the total cost |
|--------|---------------------|---------|------------------------------|
| 1.     | Total Fixed Cost    | 221124  | 14.28                        |
| 2.     | Total Variable Cost | 1327458 | 85.72                        |
| 3.     | Total Cost          | 1548582 | 100.00                       |
| 4.     | Total Returns       | 2060640 |                              |

**Investment Analysis**

**Benefit-Cost Ratio:** Benefit Cost ratio is one of the important criteria to measure feasibility of any project. Hence, it was calculated for all the sample oil processing units and the results are presented in Table 6.

**Table 6:** Benefit-Cost ratio of oil processing units (Numbers)

| S. No. | BCR      | Coimbatore | Tiruppur  | Erode      | Namakkal  | Karur     | Sample     |
|--------|----------|------------|-----------|------------|-----------|-----------|------------|
| 1      | 1.1-1.3  | 1 (3.85)   | 0         | 1 (7.14)   | 0         | 0         | 2 (3.34)   |
| 2      | 1.4 -1.6 | 15 (57.69) | 4 (57.14) | 4 (28.57)  | 4 (50.0)  | 5 (100)   | 32 (53.34) |
| 3      | 1.7-1.9  | 9 (34.61)  | 3 (42.86) | 6 (42.86)  | 4 (50.0)  | 0         | 22 (36.66) |
| 4      | >2.0     | 1 (3.85)   | 0         | 3 (21.43)  | 0         | 0         | 4 (6.66)   |
|        | Total    | 26 (100.0) | 7 (100.0) | 14 (100.0) | 8 (100.0) | 5 (100.0) | 60 (100.0) |

It is found that nearly 53 per cent of oil processing units operated a Benefit Cost Ratio (BCR) in the range of 1.4 – 1.6 followed by nearly 36 per cent of units were with the BCR range of 1.7 – 1.9. However, only 6.66 per cent units had a benefit cost ratio of more than 2. In contrast, nearly 3 per cent of units had a BCR of 1.1-1.3. Among the districts, around 21 per cent and 3.85 per cent of units were the BC ratio of above 2 in Erode and Coimbatore Districts respectively. Most of the sample processing units in the sample district except Erode

were fall in the BC ration range of 1.4-1.6. Hence, it is concluded that most of the units operated in the BC Ratio Range of 1.4-1.6.

### Internal Rate of Return

Internal Rate of Return (IRR) is one of the measure to measure feasibility of the project. Hence, IRR as calculated for the sample oil processing firms and results are presented in Table 7.

**Table 7:** Internal Rate of return of the sample oil processing units (Numbers)

| S. No. | IRR     | Coimbatore | Tiruppur  | Erode      | Namakkal  | Karur     | Sample     |
|--------|---------|------------|-----------|------------|-----------|-----------|------------|
| 1      | < 12%   | 1 (3.85)   | 0         | 1 (7.14)   | 0         | 0         | 2 (3.33)   |
| 2      | 12-15%  | 11 (42.31) | 3 (42.85) | 1 (7.14)   | 3 (37.5)  | 2 (40.0)  | 20 (33.33) |
| 3      | 15.1-18 | 10 (38.46) | 2 (28.57) | 5 (35.72)  | 4 (50.0)  | 3 (60.0)  | 24 (35.00) |
| 4      | 18.1-21 | 4 (15.38)  | 1 (14.29) | 7 (50.0)   | 1 (12.5)  | 0         | 13 (21.66) |
| 5      | > 21    | 0          | 1 (14.29) | 0          | 0         | 0         | 1 (1.66)   |
|        | Total   | 26 (100.0) | 7 (100.0) | 14 (100.0) | 8 (100.0) | 5 (100.0) | 60 (100.0) |

It is found out that from the results that about 35 per cent of sample processing firms operating at 15-18 per cent of Internal Rate of Return (IRR). Further, nearly 33 per cent of oil processing firms operated at 12-15 per cent of IRR and nearly 21 per cent of firms operated at 18-21 per cent. Among the districts, about 50 per cent of the firms operating at 18-21 per cent of IRR in Erode district. However, nearly 42 per cent of firms in Coimbatore districts operated at 12-15 percent IRR. Hence, it could be concluded that most of the sample oil processing firms were operating at a feasible level of IRR.

### Factors influencing the profitability of oil processing units

Factors influencing the productivity of oil processing units were identified with a regression analysis. The results showed that the R Square value was 0.61 which indicated that 61 per cent of the variations in the profitability of oil processing

units were explained by the variables like number of years of operation, number of edible oil produced and location of the processing units. The results of regression analysis are presented in Table 8. The coefficient of number of years of operation showed that one year increase in years of operation would increase the profit by Rs.0.0133 lakhs in a year. Years of operation of oil units would help to understand the market better which could help the firms to increase the sales. Similarly, increase in one more oil type by the sample firms would increase the profitability by Rs.0.1905 lakhs during a year. It might be due to more variety of edible oil produced by units would increase the volume of sales which inturn could increase the profit. Further, the presence on oil retail unit in urban area increases the profitability by Rs.0.2760 lakhs in a year. This could be due to the presence of oil retail unit in the urban area could fetch more sales to the processing units.

**Table 8:** Factors influencing Profitability of Sample Oil processing Units

| S. No. | Variable                            | Coefficients | Standard Error | T-Stat | P-Value |
|--------|-------------------------------------|--------------|----------------|--------|---------|
| 1.     | Intercept                           | 0.7511***    | 0.2845         | 2.6396 | 0.0107  |
| 2.     | Years of Operation (Years)          | 0.0133**     | 0.0059         | 2.2170 | 0.0307  |
| 3.     | No.of Oil Products (Nos.)           | 0.1905*      | 0.0995         | 1.9139 | 0.0608  |
| 4.     | Location of Unit (Urban-1, Rural-0) | 0.2760**     | 0.1101         | 2.5052 | 0.0152  |
| 5.     | Fixed Cost (Lakhs)                  | 0.0982       | 0.1530         | 0.6416 | 0.5237  |

R<sup>2</sup> Value = 0.61

### Conclusion

It is concluded that groundnut oil, sesame oil and groundnut oil were the major oil produced by the cold pressed oil processing units. Further, nearly 83 per cent of the sample processing firms sourced oil seeds from traders and only 3 per cent sourced from FPOs/ farmers. Similarly, around 78 per cent of units used 40 per cent capacity of production. Most of the units invested 2-3 lakhs in the processing facility. The results of investment analysis showed that total cost accounted to Rs.20.21 lakhs per year and total returns was Rs.15.48 lakhs per year. Nearly 53 per cent of the firms achieved the benefit cost ratio of 1.4-1.6. Similarly, about 35 per cent of the firms got the IRR of 15-18 per cent by their operations. Number of years of operation, location of business unit and number of oil produced by the firms were the important factor influencing profitability of cold pressed oil processing industry.

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