



# Comparative Study on Production and Marketing of Poovan and Nendran Banana in Thiruvananthapuram District of Kerala, India

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

The present research study was conducted in the year 2022 using a sample of one twenty respondent banana growers in the Thiruvananthapuram district of Kerala. Research data were collected using questionnaire schedule. The study revealed that total area under banana of the sample farmers was 230.58 ha, of which 59.58 percent was under Nendran and 40.42 percent was under Poovan banana. Cost of cultivation of Poovan banana per ha is much higher than the cost of cultivation of Nendran banana. The cost of cultivation per ha of Poovan banana for marginal, small, semi medium and medium farm size groups was found to be varied from Rs. 434117.24,

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Rs.431181.45, Rs.427948.25 and Rs 418435.14 respectively. The cost of cultivation per ha of Nendran banana for marginal, small, semi medium and medium farm size groups was found to be varied from Rs.414155.91, Rs.412809.04, Rs.409212.27 and Rs. 403082.07 respectively. Average Cost benefit ratio for Poovan banana related to Cost C was 1:1.6 which is lesser than average cost benefit ratio of Nendran banana related to Cost C was 1:1.8. Among the nine constraints related to production of Banana, High incidence of disease was ranked first by sample farmers and was reported by 70.33% while high cost of input ranked second and in marketing of banana price fluctuation was ranked first and was reported by 73.63%.

*Keywords: Cost benefit ratio; constraints; cost of cultivation; price fluctuation.*

## 1. INTRODUCTION

“Banana is an important domesticated herbaceous fruit crop of many tropical and subtropical regions in India. It is the oldest and commonest fruit known to the mankind. India is the 20th biggest exporter of bananas globally due to the fact that the country also consumes bananas in greater quantity. It is the fourth largest contributor in total export of fruits from India. It is a very popular fruit due to its low price and higher nutritive value. It is consumed in fresh or cooked form both as ripe and raw fruit. The advantage of this fruit is availability round the year makes it the favourite fruit among all classes of people. Banana and plantains are grown in about 120 countries in the world The major banana producing countries in the world include China, Ecuador, Philippines, Brazil, Indonesia, Guatemala, Angola and Burundi” (National Horticulture Board, 2018). “Bananas are a cheap energy source. It contains 27% carbohydrate, 1.0% protein, and 0.3% fat, providing 116 kcal of energy per 100 g of flesh. It has plenty of micro and macronutrient. Banana is a highly nutritious fruit, and the pulp (edible portion) of ripe fruit is rich in vitamin A, B-complex (thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, and folic acid), ascorbic acid vitamin E and micro (iron, copper, and zinc) and macro minerals (potassium, calcium, phosphorus, and magnesium)” [1,2,3]. “Due to its value, banana is made into powder and can be used as a major ingredient in preparing baby foods and healthy drinks. The fruit is easy to digest and free from fat and cholesterol. It helps in reducing the risk of heart diseases when used regularly and is recommended for patients suffering from high blood pressure, arthritis, ulcer, gastroenteritis, and kidney disorders. Low glycaemic, pre-biotic products can be made from banana flour with a considerable amount of resistant starch All social, religious festivals and functions that are adorned with banana plants are considered auspicious, besides providing beauty to the occasion” [4,5]. It is referred as

“Kalpatharu” (Plant of Virtue) due to its multifaceted uses. Banana plants are the largest plants on earth without a woody stem. Banana is the most delicious fruit used as subsidiary food. “It is consumed as table purpose as well as culinary fruit, its leaves are universally used for serving meals in South India and chopped banana stems are used as cattle feed. Some species of banana yield fibre, which is used for making ropes. The tip of inflorescence is cooked as a vegetable in some places” (Gaurav Sharma et al. 2020). “Medicinally, fruit of Nendran is a good laxative and fruit pulp contains vitamins B1, B2, B3, vitamin C, amino acids, iron, calcium phosphorus and proteins in substantial amount which are included in the daily need diet for human beings. The varietal characteristics of Nendran banana include, diversity in plant stature, bunches with 5-6 hands of about 6-12 kg. Fruits have a distinct neck with thick green skin turning buff yellow on ripening. Fruits remain starchy even on ripening. Chips made from fruits at 80 per cent maturity are of very high demand”. (Das, 2010). “Banana is a high yielding crop. Banana Cultivation can produce a large yield, but the key problem was cropping production and marketing. Pest and diseases were the main factors that interfere with the banana production. Lack of producer organizations, organic certification, and storage were all major marketing issues” [6-8]. The study's findings will be valuable for research in universities and other development agencies, as well as for other purposes. In order to minimize the per unit cost of production, the study will identify the many constraints in banana production and selling in Thiruvananthapuram district, and how the farmer's problem may be solved through various policies.

### 1.1 Objectives of Study

1. To estimate the Cost benefit ratio and return per ha. of different size farm group of banana growers (Poovan and Nendran).

- To identify different constraints in production and marketing of banana.

All together total respondent is 120 viz., 40 marginal, 37 small, 28 semi-medium, 15 medium respondents respectively. There was no large farmer in the study area.

## 2. RESEARCH METHODOLOGY

### 2.1 Sampling Design

Multi-stage sampling procedure was adopted for the selection of samples;

I st Stage	- Selection of District
II nd Stage	- Selection of Block
III rd Stage	- Selection of Villages
IV th Stage	- Selection of Respondents
V th Stage	- Selection of Market
VI th Stage	- Selection of Marketing functionaries

### 2.2 Selection of District

Thiruvananthapuram district of Kerala was taken purposively as it has the highest area under cultivation of Nendran and Poovan banana among all the other districts.

### 2.3 Selection of Blocks

There are 11 blocks in the district and Nedumangad block was selected purposively according to area of production.

### 2.4 Selection of Villages

The list of all the villages was prepared with the help of Block Development Officer, and it is arranged in ascending order. There are 26 villages in Nedumangad Block. Out of that cultivation of Poovan and Nendran banana is concentrated in 10 villages. Four villages were randomly selected for the study.

### 2.5 Selection of Sample Respondents

The individuals in charge of all selected villages provided a complete list of all respondents cultivating both Nendran and Poovan. Then, 10% of all farmers are chosen at random for the current study. Respondents are divided into categories based on the amount of land they own.

- Marginal = less than 1 ha
- Small = 1-2 ha
- Semi-Medium = 2-4 ha
- Medium = 4- 10 ha
- Large = more than 10 ha

### 2.6 Analysis of Data

#### 2.6.1 Measures of cost concept

The different cost items that are included under each concepts are given in detailed below with their procedure.

- Cost- A<sub>1</sub>: It includes the value of:
  - Imputed value of machine charges (hired and owned)
  - Bullock charges (hired and owned)
  - Cost of Seedlings
  - Cost of Manures and fertilizers
  - Cost of Plant protection chemical
  - Cost of Irrigation charges
  - Miscellaneous charges
  - Interest on working capital
  - Depreciation on fixed resources
  - Land revenue paid to government
 The total of all these cost items makes up Cost A<sub>1</sub>
- Cost A<sub>2</sub> = Cost A<sub>1</sub>+ Rent paid for leased-in land, if any.
- Cost B = Cost A<sub>2</sub>+ Imputed rental value of owned land + interest on owned fixed capital
- Cost C = Cost B+ Imputed value of family labour. Cost C is the total cost of cultivation or gross cost.

#### 2.6.2 Measures of farm profitability

- Gross income = Price per quintal X yield per hectare in quintal.
- Farm business income = Gross income - Cost A<sub>2</sub>
- Farm investment income = Net income + rental value of owned land + interest on fixed capital
- Net income = Gross income - cost C
- Family labor income = gross income-cost B
- Input-output ratio (cost-benefit ratio) = Gross income/Cost C
- Cost of Production per quintal = Total Cost of cultivation divided by total yield.

#### 2.6.3 Garrett's ranking technique

Garrett's Ranking Technique used in order to rank the problems faced by the cultivators in

production and marketing of Banana respectively. According to this, the respondents were asked to assign rank to different problems by using the following formula (Garrett and Woodsworth, 1969):

$$\text{Per cent position} = [100(\text{Rij} - 0.5)] / \text{Nj}$$

where, Rij= rank given for ith problem by jth individual; Nj= number of problems ranked by the jth individual.

### 3. RESULTS AND DISCUSSION

Table 1 revealed that among size of farms, total cost incurred by the marginal size farms were highest i.e., Rs 414155.91/ha followed by small size farms Rs 412809.04/ha followed by semi medium size farms Rs. 409212.27/ha and medium size farm Rs 403082.07/ha. The sample average for total cost was Rs 409814.82/ha in different size of farms group. The cost of human labour, family labour, implement, irrigation and seed were high as compared to the other cost. The distribution of pattern of operational cost under various inputs revealed that the cost of family labour was the highest in the marginal size family (Rs20601.34/ha), followed by small, semi medium size farms and medium size farms (Rs 20409.74/ha, Rs 19974.82/ha and Rs 19673.86/ha). The land preparation charge ranges from Rs18957.37/ha (marginal size farms) to Rs 10446.36/ha (medium size farms). For plant protection, cost range from Rs 17117.79/ha (marginal size farms) to Rs 16346.49/ha (medium size farms). Labour cost range from Rs 81944.17/ha (marginal size farms) to Rs 85433.66/ha (medium size farms). The sample average for depreciation on fixed resources was Rs 1456.43 and the interest

on fixed capital and working capital sample average were Rs 1798.37 and Rs 27619.64 in different size of farms group. The sample average for rental value of own land was Rs 13250 in different size of farms group.

Table 2 reveals the cost and returns in Nendran Banana cultivation in different farms group. The total cost of cultivation was highest in marginal farms group (Rs 414155.91/ha) followed by small farms group (Rs 412809.04/ha) followed by semi medium farm groups Rs 409212.27/ha and lowest was medium farms group (Rs 403082.07/ha). The sample average for total cost of cultivation was Rs 409814.82/ha in different farms size group. The gross returns obtained per hectare by medium size farms was highest (Rs 769061.77/ha) followed by semi medium size farms (Rs 745824.16/ha), small size farms (Rs 717643.60/ha) and marginal size farm (Rs 693746.54/ha) respectively. The net returns per hectare by medium size farm is the highest (Rs 365979.70/ha), followed by semi medium size farms (Rs 336611.89/ha), small size farms (Rs 304834.56/ha) and marginal farm size (Rs 279590.63/ha) respectively. The average yield of Nendran Banana in different size of farm was 230.1qtl/ha. The yield was highest in case of medium size farms 235.18 qtl/ha, followed by semi medium size farms 232 qtl/ha, small size farms 229.45 qtl/ha and marginal size farms 227.47qtl/ha respectively. The average cost of production per quintal was Rs 230.1 qtl/ha and price per quintal was Rs 3139.81 in different size farms group. Cost benefit ratio was highest in medium size farms 1:1.9, followed by semi medium size farms 1:1.8, small size farms 1:1.7 and marginal size farm 1:1.7 where the sample average was 1:1.8.

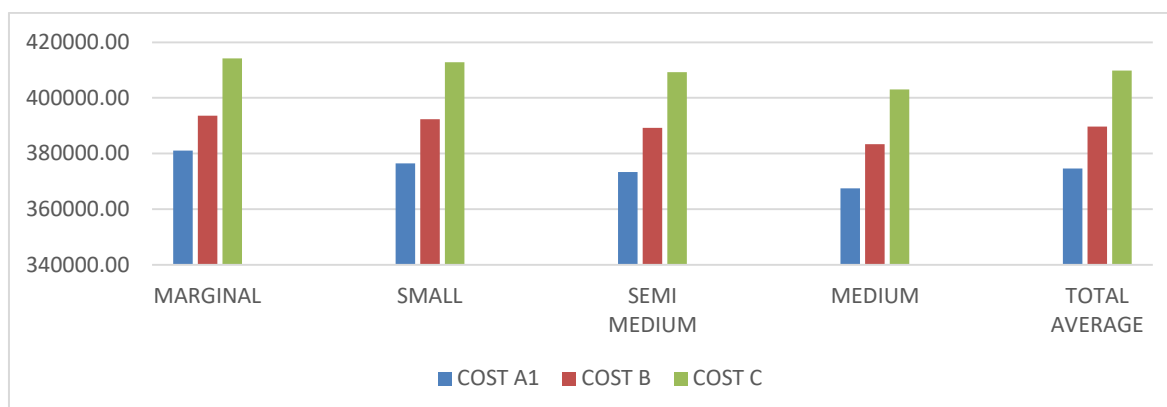


Fig. 1. Cost concept of Nendran Banana per hectare in different size of farm groups

**Table 1. Cost of Cultivation of Nendran per Hectare in Different Size of Farms Group**  
**M S SM MD= 40+37+28+15= 120**

S. No	Particulars	Size of farms groups				Sample average
		Marginal	Small	Semi medium	Medium	
1.	Land preparation by Machinery	18957.37	15986.31	13729.60	10446.36	14779.91
2.	Hired labour	81944.17	82603.45	84552.98	85433.66	83633.56
3.	Seed cost	27530	28007.86	28435.64	29116.67	28272.54
4.	Irrigation Charges	135268.13	134010.14	131154.46	129178.33	132402.76
5.	Manure and fertilizer	59824.10	60156.94	60534.55	60978.61	60373.55
6.	Transportation	10520	9280	8950	7225	8993.75
7.	Plant protection	17117.79	16950.39	16742.79	16346.49	16789.37
8.	Total working cost	351161.55	346995.09	344100.02	338725.12	345245.45
9.	Interest on working capital@8%	28092.92	27759.61	27528.00	27098.01	27619.64
10.	Depreciation on fixed resources	1487.95	1474.11	1442.70	1420.96	1456.43
11.	Land revenue	280	280	280	280	280
12.	Rental value of owed land	11000	14000	14000	14000	13250
13.	Total Fixed Capital	12767.95	15754.11	15722.70	15700.96	14986.43
14.	Interest on fixed Capital @12%	1532.15	1890.49	1886.72	1884.12	1798.37
15.	Imputed value of family labour	20601.34	20409.74	19974.82	19673.86	20164.94
16.	<b>Total cost of cultivation per ha</b>	<b>414155.91</b>	<b>412809.04</b>	<b>409212.27</b>	<b>403082.07</b>	<b>409814.82</b>

**Table 2. Cost and return in Nendran banana per hectare in different size of farms group**

S. No	Particulars	Size of farms group				Sample average
		Marginal	Small	Semi Medium	Medium	
1.	Total Cost of Cultivation	414155.91	412809.04	409212.27	403082.07	409814.82
2.	Average Yieldper hectare (Main product) in quintal	227.47	229.45	232	235.18	230.1
3.	Price per Quintal (main product)	3049.80	3127.64	3214.72	3270.02	3139.81
4.	Total value of main product	693746.54	717643.60	745824.16	769061.77	722680.65
5.	Net returns per hectare	279590.63	304834.56	336611.89	365979.70	312865.83
6.	Cost of Production per Quintal	1820.69	1799.11	1763.84	1713.89	1781.00
7.	Cost Benefit Ratio	1:1.7	1:1.7	1:1.8	1:1.9	1:1.8

**Table 3. Cost concepts in Nendran Banana per hectare in different size of farm group**

S. no	Cost concepts	Size of farms group				Total average
		Marginal	Small	Semi medium	Medium	
1	Cost A <sub>1</sub>	381022.42	376508.81	373350.73	367524.09	374601.51
2.	Cost B	393554.58	392399.30	389237.45	383408.21	389649.88
3.	Cost C	414155.91	412809.04	409212.27	403082.07	409814.82

**Table 4. Measures of farm profitability in Nendran Banana per hectare in different size farm group (Rs/ha)**

S. No	Particulars	Size of farms group				Sample Average
		Marginal	Small	Semi medium	Medium	
1.	Gross income	693746.54	717643.60	745824.16	769061.77	722680.65
2.	Farm business income	312724.12	344292.88	378300.07	392552.96	348079.14
3.	Farm investment income	292122.78	320725.05	352498.61	381863.81	327914.20
4.	Net income	279590.63	304834.56	336611.89	365979.70	312865.83
5	Family labour income	300191.96	328406.15	362415.95	376662.47	333030.77
6	Cost Benefit Ratio	1:1.7	1:1.7	1:1.8	1:1.9	1:1.8

Table 3 and Fig. 1 shows the cost concept for different size of farm group per hectare. Cost A<sub>1</sub> was highest in marginal size farms Rs 381022.42/ha, followed by small size farms Rs 376508.81/ha, semi medium farms Rs 373350.73/ha and lowest at medium farm size Rs 367524.09. Cost C was highest for marginal size farms Rs 414155.91/ha, followed by small size farms Rs 412809.04/ha, semi medium farm size Rs 409212.27/ha and medium size farms Rs 403082.07/ha respectively. Cost B was highest in marginal size farms Rs 393554.58/ha, followed by small size farms Rs 392399.30/ha followed by semi medium farms Rs 389237.45/ha and lowest at medium farm size Rs 383408.21/ha respectively. The sample average for Cost A, Cost B, Cost C, was Rs 374601.51/ha, Rs 389649.88/ha and Rs 409814.82/ha in different size of farms group.

Table 4 reveals that the gross returns obtained per hectare by medium size farms were high (Rs. 769061.77/ha) as compare to semi-medium size farms (Rs. 745824.16/ha), small size farm (Rs. 717643.60/ha) and marginal size farms (Rs. 693746.54/ha) respectively. This makes sample average for gross returns was Rs. 722680.65/ha in different size of farms group. Farm business incomes in marginal, small, semi medium and medium size of farms group were Rs. 312724.12/ha, Rs. 344292.88/ha, Rs. 378300.07/ha and Rs. 392552.96/ha

respectively. Sample average for farm business income was Rs. 348079.14/ha in different size of farm group. The Net returns per hectare obtained by marginal size farms were low (Rs. 279590.63/ha) as compared to small (Rs. 304834.56/ha) semi medium (Rs. 336611.89/ha) and medium size farms (Rs. 365979.70/ha) respectively. Sample average for net returns was (Rs. 312865.83/ha) indifferent size of farm group. Family labour income in marginal, small, semi medium and medium size of farm groups were (Rs. 300191.96, Rs. 328406.15/ha, Rs. 362415.95/ha and Rs. 376662.47/ha) respectively. Sample average for family labour income was (Rs. 333030.77/ha) in different size of farm groups. Input output ratios for marginal, small, semi medium and medium size of farm groups were (1:1.7, 1:1.7, 1:1.8, 1:1.9) respectively. The sample average for Input output ratio was 1:1.8 in different size of farms.

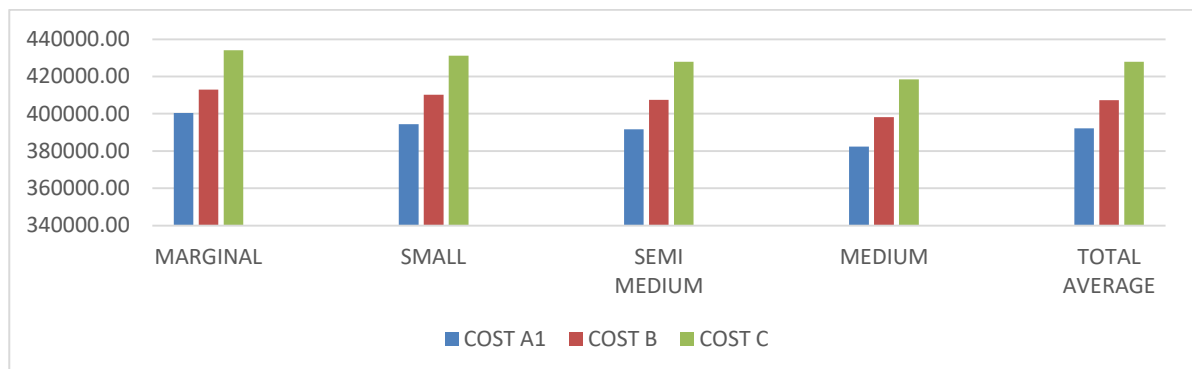
Table 5 revealed that among size of farms, total cost incurred by the marginal size farms were highest (Rs 434117.24/ha) as followed by small size farms (Rs. 431181.45/ha) followed by semi medium size farms (Rs. 427948.25/ha) and medium size farm (Rs 418435.14/ha). The sample average for total cost was (Rs 427920.52/ha) in different size of farms group. The cost of human labour, family labour, implement and seed were high as compared to

the other cost. The distribution of pattern of operational cost under various inputs revealed that the cost of family labour was the highest in the marginal size family (Rs.21092.16/ha), followed by small, semi medium size farms and medium size farms (Rs. 20891.61/ha, Rs. 20441.68/ha and Rs 20182.05/ha). The land preparation charge ranges from Rs. 19406.16 (marginal size farms) to Rs 11018.74 (medium size farms). For plant protection, cost range from Rs. 17331.86/ha (marginal size farms) to Rs

16591.29/ha (medium size farms). Labour cost range from Rs 82470.10/ha (marginal size farms) to Rs. 84101.75/ha (medium size farms). The sample average for depreciation on fixed resources was Rs 1395.76 and the interest on fixed capital and working capital sample average were Rs. 14925.76 and Rs 28929.76 in different size of farms group. The sample average for land revenue paid to the government was Rs. 280 and rental value of own land was Rs. 13250 in different size of farms group.

**Table 5. Cost of Cultivation of Poovan Banana per Hectare in Different Size of Farms Group  
M S SM MD= 40+37+28+15= 120**

S. No	Particulars	Size of farms groups				Sample average
		Marginal	Small	Semi Medium	Medium	
1.	Land preparation by machinery	19406.16	15015.19	14246.28	11018.74	14921.59
2.	Hired labour	82470.10	83013.20	83778.29	84101.75	83340.83
3.	Seed cost	40341.03	41011.50	41678.69	42153.30	40660.38
4.	Irrigation Charges	138400.00	137084.03	134131.73	132428.13	135510.97
5.	Transportation	11500	10220	9500	7600	9705.00
6.	Manure and fertilizer	59805.39	60113.37	60779.66	61179.24	60469.42
7.	Plant protection`	17331.86	17167.57	16964.64	16591.29	17013.84
8.	Total working cost	369254.54	363624.86	361079.29	352529.44	361622.03
9.	Interest onworking capital@8%	29540.36	29089.99	28886.34	28202.36	28929.76
10.	Depreciation on fixed resources	1425.52	1411.97	1381.56	1364.01	1395.76
11.	Land revenue	280	280	280	280	280
12.	Rental value of owned land	11000	14000	14000	14000	13250
13.	Total Fixed Cost	12705.52	15691.97	15661.56	15644.01	14925.76
14.	Interest on fixed Capital @12%	1524.66	1883.04	1879.39	1877.28	1791.09
15.	Imputed valueof family labour	21092.16	20891.61	20441.68	20182.05	20651.87
16.	Total cost of cultivation in ha	434117.24	431181.45	427948.25	418435.14	427920.52



**Fig. 2. Cost concept of Poovan Banana per hectare in different size of farm group**

**Table 6. Cost and Return in Poovan Banana per Hectare in different size of farms**

S. No	Particulars	Size of farms group				Sample Average
		Marginal	Small	Semi medium	Medium	
1.	Total Cost of Cultivation	434117.24	431181.45	427948.25	418435.14	427920.52
2.	Average yieldper hectare	339.04	344.78	347.74	352.09	344.47
3.	Price per Quintal (main product)	1932.66	2039.61	2058.51	2062.33	2011.21
4.	Total value of main product	655281.13	703242.11	715834.91	726129.29	693054.34
5.	Net returns per hectare	221163.89	272060.66	287886.66	307694.15	265133.81
6.	Cost of Productionper Quintal	1280.43	1250.59	1230.64	1188.44	1242.25
7.	Cost Benefit Ratio	1:1.5	1:1.6	1:1.7	1:1.7	1:1.6

**Table 7. Cost Concepts in Poovan Banana per Hectare in Different Size of Farm Group**

S. No	Cost concepts	Size of farms group				Total average
		Marginal	Small	Semi medium	Medium	
1	Cost A <sub>1</sub>	400500.4	394406.8	391627.2	382375.8	392227.6
2	Cost B	413025.1	410289.9	407506.6	398253.1	407268.7
3	Cost C	434117.2	431181.5	427948.3	418435.1	427920.5

**Table 8. Measures of farm profitability in Poovan Banana per hectare in different size farm group (Rs/ha)**

S. No	Particulars	Size of farms group				Sample average
		Marginal	Small	Semi Medium	Medium	
1.	Gross income	655281.13	703242.11	715834.91	726129.29	693054.34
2.	Farm business income	254780.71	311614.92	333459.10	343753.48	300826.78
3.	Farm investment income	233688.55	287943.69	303766.05	323571.43	280174.91
4.	Net income	221163.89	272060.66	287886.66	307694.15	265133.81
5.	Familylabour income	242256.05	295735.53	317581.82	315839.44	285785.69
6.	Cost Benefit ratio	1:1.5	1:1.6	1:1.7	1:1.7	1:1.6



Table 6 reveals the cost and returns in Poovan banana cultivation in different farms group. The total cost of cultivation was highest in marginal farms group (Rs 434117.24/ha) followed by small farms group (Rs. 431181.45/ha) followed by semi medium farm groups (Rs 427948.25/ha) and lowest was medium farms group (Rs 418435.14/ha). The sample average for total cost of cultivation was Rs 427920.52/ha in different farms size group. The gross returns obtained per hectare by medium size farms was highest (Rs 726129.29/ha) followed by semi medium size farms (Rs 715834.91/ha), small size farms (Rs 703242.11/ha) and marginal size farm (Rs 655281.13/ha) Respectively. The net returns per hectare by medium size farm is the highest (Rs 307694.15/ha), followed by semi medium size farms (Rs. 287886.66/ha), small size farms (Rs 272060.66/ha) and marginal farm size (Rs. 221163.89/ha) respectively.

The average yield of Poovan banana in different size of farm was 344.47 qtl/ha. The yield was highest in case of medium size farms 352.09 qtl/ha, followed by semi medium size farms 347.74 qtl/ha, small size farms 344.78 qtl/ha and marginal size farms 339.04 qtl/ha respectively. The average cost of production per quintal was Rs 1242.25 qtl/ha and price per quintal was Rs 2011.21 in different size farms group. Cost benefit ratio was highest in medium size farms 1:1.7, followed by semi medium size farms 1:1.7, small size farms 1:1.6 and marginal size farm 1:1.5 where the sample average was 1:1.6.

Table 7 and Fig. 2 shows the cost concept for different size of farm group per hectare. Cost A1 was highest in marginal size farms Rs. 400500.42/ha, followed by small size farms Rs. 394406.81/ha, semi medium farms Rs. 391627.19/ha and lowest at medium farm size Rs. 382375.81/ha. Cost C was highest for marginal size farms Rs 434117.24/ha, followed by small size farms Rs 431181.45/ha, semi medium farm size Rs. 427948.25/ha and medium size farms Rs 418435.14/ha respectively. Cost B was highest in marginal size farms Rs. 413025.08/ha, followed by small size farms Rs. 410289.85/ha followed by semi medium farms Rs. 407506.58/ha and lowest at medium farm size Rs. 398253.09/ha respectively. The sample average for Cost A1, Cost B, Cost C, was Rs. 392227.56/ha, Rs. 407268.65/ha and Rs. 427920.52/ha in different size of farms group.

Table 8 reveals that the gross returns obtained per hectare by medium size farms were high

(Rs.726129.29/ha) as compare to semi-medium size farms (Rs. 715834.91/ha), small size farm (Rs. 703242.11/ha) and marginal size farms (Rs. 655281.13/ha) respectively. This makes sample average for gross returns was Rs. 693054.34/ha in different size of farms group. Farm business incomes in marginal, small, semi medium and medium size of farms group were Rs. 254780.71, Rs. 311614.92/ha, Rs. 333459.10/ha and Rs. 343753.48/ha respectively. Sample average for farm business income was Rs. 300826.78/ha in different size of farm group. The Net income obtained by marginal size farms were low Rs. 221163.89/ha as compared to small (Rs. 272060.66/ha) semi medium (Rs. 287886.66/ha) and medium size farms (Rs. 307694.15/ha) respectively. Sample average for net returns was (Rs. 265133.81/ha) in different size of farm group. Family labour income in marginal, small, semi medium and medium size of farm groups were (Rs. 242256.05/ha, Rs. 295735.53/ha, Rs. 317581.82/ha and Rs. 315839.44/ha) respectively. Sample average for family labour income was (Rs. 285785.69/ha) in different size of farm groups Cost Benefit ratios for marginal, small, semi medium and medium size of farm groups were (1:1.5, 1:1.6, 1:1.7,1:1.7) respectively. The sample average for Input output ratio was 1:1.6 in different size of farms.

The cost of cultivation of Nendran Banana and Poovan Banana is presented in Table 9 and Fig. 3. The cost of cultivation per ha of Nendran Banana for marginal, small, semi medium and medium farm size groups was found to be varied from (Rs. 414155.91/ha, Rs. 412809.04/ha, Rs. 409212.27/ha and Rs. 403082.07/ha) respectively. The cost of cultivation per ha of Poovan Banana for marginal, small, semi medium and medium farm size groups was found to be varied from Rs. 434117.24/ha, Rs. 431181.45/ha, Rs. 427948.25/ha and Rs. 418435.14/ha respectively. From the table it was revealed that the cost of cultivation of Poovan Banana per ha is much higher than the cost of production of Nendran Banana [9-13].

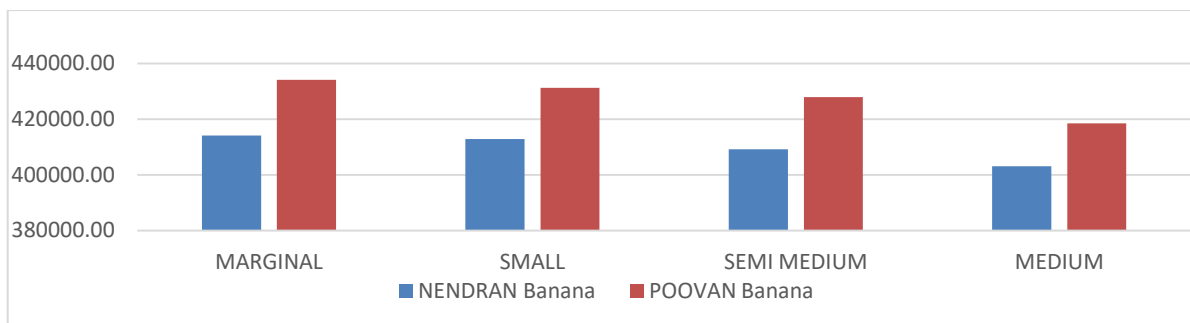
The Net income and cost benefit ratio of Nendran Banana and Poovan Banana is presented in Table 10 and Fig. 4. The cost benefit ratio per ha of Nendran Banana for marginal, small, semi medium and medium farm size groups was found to be varied from (1:1.7, 1:1.7, 1:1.8 and 1:1.9) respectively and net income per ha of Nendran banana was found to be (Rs 279590.63/ha, Rs.304834.56/ha, Rs. 336611.89/ha,

Rs.365979.70). The net income per ha of Poovan Banana for marginal, small, semi medium and medium farm size groups was found to be varied from (Rs. 221163.89/ha, Rs. 272060.66/ha, Rs. 287886.66/ha and Rs. 307694.15/ha) respectively and cost benefit ratio per ha of Poovan banana was found to be 1:1.5, 1:1.6, 1:1.7, 1:1.7. From the table it is revealed that Net income and Cost benefit ratio of Nendran banana per ha is much higher than the net income and cost benefit ratio of poovan banana per ha.

Table 11 and Fig. 5 shows the Constrains faced by the Banana grower in production of Banana in the study area. Most of the respondents expressed that the major constrains in production of Banana was High Cost of Labour facilities (1<sup>st</sup> rank) followed by High Incidence of Disease (2<sup>nd</sup> rank), Attack of pest as (3<sup>rd</sup>), High Cost of Input at (4<sup>th</sup>), Lack of Irrigation Facilities at (5<sup>th</sup>), Delay in sanction of crop loan at (6<sup>th</sup>), Uncertain Weather at(7<sup>th</sup>) Inadequate Credit (8<sup>th</sup>), Lacks of knowledge and improve technology at(9<sup>th</sup>).

**Table 9. Cost of cultivation of Nendran and Poovan Banana**

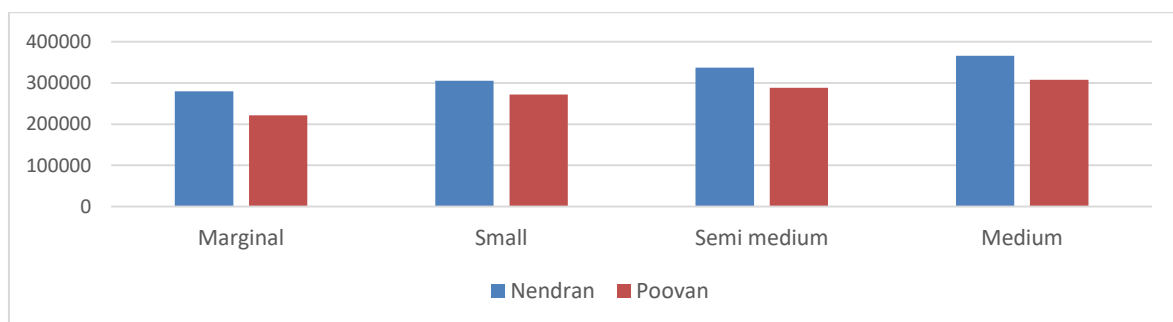
Farm size	Nendran (Rs per ha)	Poovan (Rs per ha)
Marginal	414155.91	434117.24
Small	412809.04	431181.45
Semi medium	409212.27	427948.25
Medium	403082.07	418435.14



**Fig. 3. Cost of cultivation of Nendran and Poovan Banana**

**Table 10. Net income and Cost benefit ratio of Nendran and Poovan Banana**

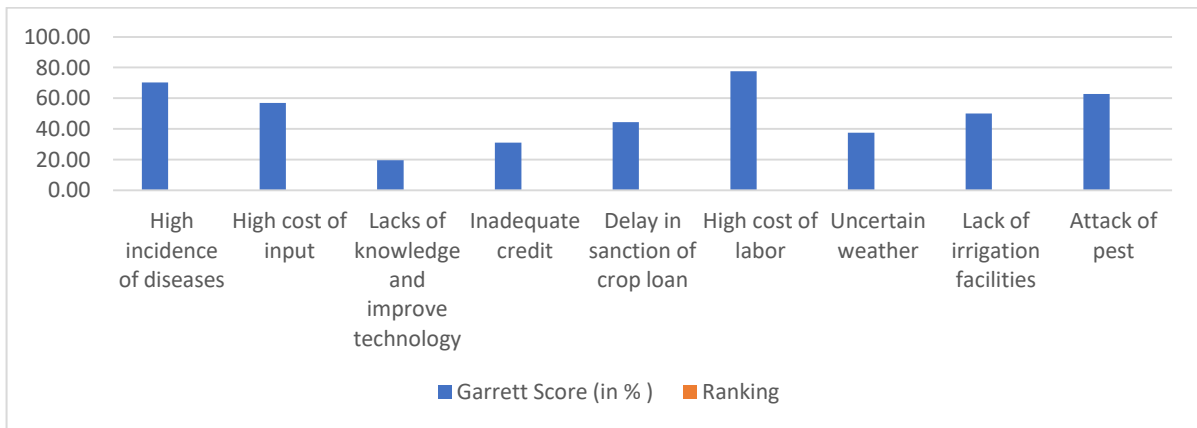
Farm size	Cost benefit ratio and net income			
	Nendran (Rs per ha)		Poovan (Rs per ha)	
Marginal	1:1.7	279590.63	1:1.5	221163.89
Small	1:1.7	304834.56	1:1.6	272060.66
Semi medium	1:1.8	336611.89	1:1.7	287886.66
Medium	1:1.9	365979.70	1:1.7	307694.15



**Fig. 4. Net Income of Nendran and Poovan Banana**

**Table 11. Constraints in production of Banana in study area**

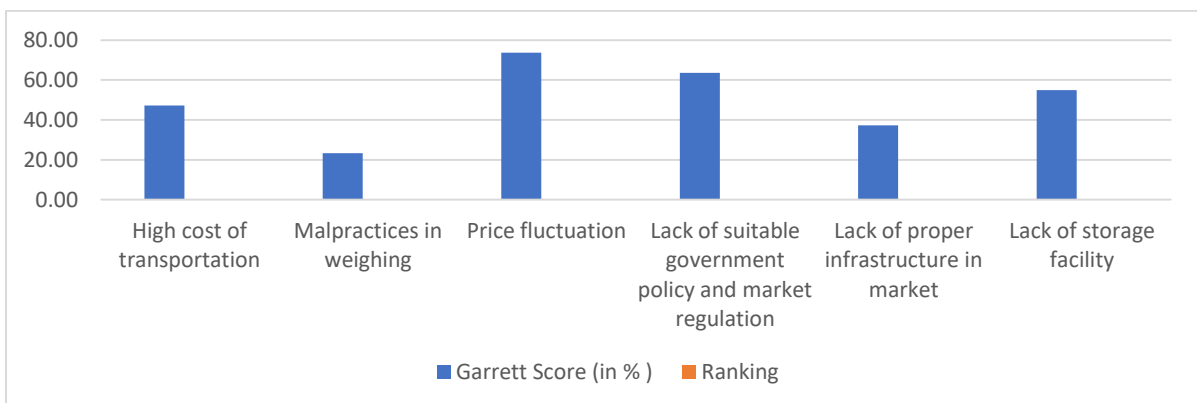
S. No.	Particulars	Garrett score (in %)	Ranking
1.	High incidence of diseases	70.33	II
2.	High cost of input	56.86	IV
3.	Lacks of knowledge and improve technology	19.50	IX
4.	Inadequate credit	31.13	VIII
5.	Delay in sanction of crop loan	44.40	VI
6.	High cost of labour	77.58	I
7.	Uncertain weather	37.42	VII
8.	Lack of irrigation facilities	50.05	V
9.	Attack of pest	62.73	III



**Fig. 5. Constraints in production of Banana in study area**

**Table 12. Constraints in marketing of banana in study area**

S. No.	Particulars	Garrett score (in %)	Ranking
1.	High cost of transportation	47.24	IV
2.	Malpractices in weighing	23.31	VI
3.	Price fluctuation	73.63	I
4.	Lack of suitable government policy and market regulation	63.58	II
5.	Lack of proper infrastructure in market	37.25	V
6.	Lack of storage facility	54.99	III



**Fig. 6. Constraints in marketing of banana**

Table 12 and Fig. 6 shows the Constrains faced by the Banana grower in marketing of Banana in the study area. Most of the respondents expressed that the major constrains in marketing of Banana was Price fluctuation (1st rank) followed by Lack of suitable Govt. policy like procurement and market regulation (2nd rank), Lack of storage facility (3 rd rank) High cost of transportation (4th rank), Lack of proper infrastructure in market (5th rank), Malpractices in weighing (6th rank).

#### 4. CONCLUSION

The comparative study of production and marketing of Poovan and Nendran varieties of banana in Thiruvananthapuram District, Kerala, revealed some interesting findings. In Nendran cultivation, cost of cultivation for different farm sizes are as follows (Rs 414155.91, Rs. 412809.04, Rs. 409212.27, Rs 403082.07) and in the cost of cultivation per ha of Poovan Banana for marginal, small, semi medium and medium farm size groups was found to be varied from (Rs. 434117.24, Rs.431181.45, Rs.427948.25 and Rs. 418435.14). It was evident that Nendran banana is more profitable as cost of cultivation was found to be lower than the cost of cultivation of Poovan banana and the price of the Nendran banana is more than the Poovan banana. In terms of challenges faced by farmers, the study found that both Poovan and Nendran banana growers faced issues such as high incidence of diseases, high cost of input mainly fertilizer, pest attack and inadequate credit, price fluctuation, lack of suitable govt. policy like procurement and market regulation are the major constraints to the sample farmer.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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