



CROPPING PATTERN ANALYSIS IN THANJAVUR DISTRICT

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Abstract

In this article, the main aim is to analyse the cropping pattern by taking the sample of farmers by considering their working condition for a particular duration. The production cost that is minimum policy cost is calculated by considering the alternatives.

1. Introduction

Harvest of paddy has been completed in three-fourth of the total area in which Samba and Thaladi cultivation was taken up – by farmers in Thanjavur District.

According to a press release from the Agriculture Department at the farmers Grievance day meeting held at the collect orate here on was 22, February, 2020, Paddy cultivation was taken up in 1, 03, 052 hectares during samba season and in 32,135 hecters as Thaladi crop. As of February 20, out of the total 1, 35, 187 hectares of cultivation, harvest had been completed in 1,

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04, 370 hectares.

While around 77,000 tones of paddy had been procured through 90 direct purchase centre in Orathanadu taluk till February 20, 8, 648 tones of paddy had been procured at DPC sin Peravurani District.

In all 2, 48, 982 tones of paddy had been procured by Tamilnadu civil supplies cooperation through 447 DPC's district so far.

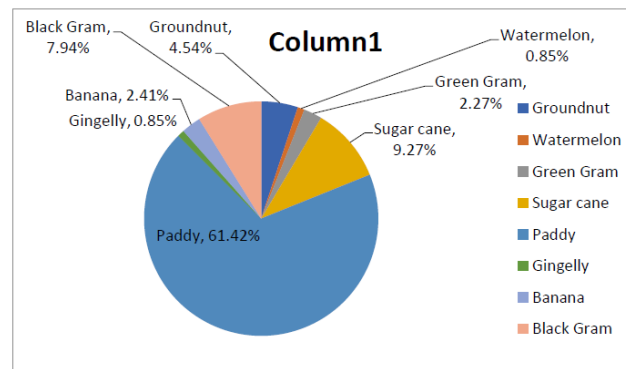
Sl. No.	Particulars	Numbers	Percent
I	Family Size		
	Small (< 4)	17	28.33
	Medium (4-5)	27	45.00
	Large (>5)	16	26.67
II	Age Group (Years)		
	< 40	13	21.66
	40-50	28	46.67
	>50	19	31.67
III	Educational Status		
	Illiterate	3	5.00
	Primary	10	16.67
	Secondary	44	73.33
	Degree	3	5.00
IV	Experience		
	20-30	28	46.67
	31-40	18	30.00
	Above 40	14	23.33
V	Size of Land Holding (ha)		
	<2 Small	27	45.00
	2 to 4 (Medium)	22	36.67
	>4 (Large)	11	18.33

2. Cropping Pattern

Cropping pattern observed in sample farms for the year 2016-17 is presented in Table 2. It clearly showed that in the study area major area was under paddy crop i.e. 61.42 per cent. This is mainly due to the environmental and climatic factors that were highly suitable to grow paddy crop. Next to paddy, sugar cane and black gram occupied the major area of 19.72 per cent and 7.94 per cent, respectively. Crops such as groundnut, gingelly, banana, watermelon and green gram were also grown in small areas.

Table 2. Area under Major Crops in Sample Farms during 2016-2017.

Sl. No.	Crops	Area in Hectors	Per cent to the Total
1	Paddy	86.60	61.42
2	Sugar Cane	27.80	9.72
3	Black Gram	11.20	7.94
4	Groundnut	6.40	4.54
5	Banana	3.40	2.41
6	Green Gram	3.20	2.27
7	Gingelly	1.20	0.85
8	Watermelon	1.20	0.85
Total		141.00	100.00



3. General Characteristics of Sample Farmers

It was observed from Table 1 among the 60 sample farmers 45 per cent of farm house holds had medium size family with four to five persons per family, 46.47 per cent of the farmers were in the age group between 40 to 50 years, 73.33 per cent of farmers had only secondary level of education 46.67 per cent farmers had the experience of more than 20 to 30 years. Regarding size of land holding, 45 per cent farmers are small farmers having less than two hectares of land.

A Cane Mill in Thanjavur has a contract to supply sugar as per the following schedule. The sugar pack made during a month will be supplied at the end of the month. (Sugar cane is collected from various farmer area in Thanjavur). The setup cost is Rs. 1000/- while the inventory carrying cost is Re. 1/- per piece per month. In which month should the batches be produced and of what size, so that the total of setup and inventory carrying cost are minimized?

Month	Number of Item
July	100
August	200
September	300
October	400
November	400
December	300

Solution. This problem is considered as six-stage problem and scheduling of inventory is done in 6 stages by using dynamic programming technique, we can start from the last month.

6th Stage: Month of June: To save the carrying cost, nothing should have been left at the end of the month of May and also nothing should be left at the end of 6 month, i.e. June, as this is the last month.

Produce 300 units for which the setup cost is Rs. 1000/- and no inventory carrying cost. Hence the total cost is Rs. 1000/-,

5th stage: Month of May: There are two alternatives.

First alternative: Produce 700 units in 5th month and send 400 units and 300 parts will remain as inventory for one month. Hence the total cost = Set up cost + inventory carrying cost for one month = Rs. 1000 + Rs. 300/- = Rs. 1300/-

Second alternative: Produce 400 units in 5th month and 300 units in 6th month when the total cost is and send the goods in the respective month so that there will be no inventory carrying cost. We have only two setup costs i.e. Rs. 1000 + Rs. 1000 = Rs. 2000/-

The first alternative is cheaper, hence instead of producing 400 units in 5th month and 300 units in 6th month produce 700 units in 5th month and send 400 units to market and maintain an inventory of 300 units.

Stage 4: 4th month: There are three alternatives.

(a) Produce 1100 units in 4th month and send 400 units in April to market and maintain an inventory of 700 units for one month and another 300 units for a period of 2 months. For which total cost is Setup cost for 1100 units + 2 months inventory carrying cost for 300. units + 1 month inventory cost for 400 units = Rs. 1000 + Rs. 700 + Rs. 300 = Rs. 2000.

(b) Produce 300 units in 6th month and 800 units in 4th month at a cost of setup cost of 6 month and setup cost of 4th month + inventory of 400 units for one month = Rs. 1000 + Rs. 1000 + Rs. 400 = Rs. 2400.

(c) Produce 700 units in 5th month and 400 units in 4th month at a cost of setup cost of 5th and 4th months and inventory carrying cost for one month for 300 units for 6th month. = Rs. 1000/- + Rs. 1000/- + Rs. 300/- Rs. 2300/

Out of the three decisions, the first decision (a) is optimal. The firm has to produce 1100 units in the 4th month at the cost of Rs. 2000/.

Stage 3: 3rd month: There are four alternatives.

(a) Produce 1400 units in the third month at a cost of Setup cost of Rs. 1000/- + Inventory carrying charges of Rs. 1100/- + 700/- + 300/- Rs. 3100/-.

(b) Produce 300 units in 6th month and 1100 units in 3rd month at a cost of Setup cost of Rs.1000+ Rs. 1000/-) + inventory carrying cost of Rs. 800- + Rs. 400/ = Total Rs. 3200.

(c) Produce 700 units in 5th month and 700 units in 3rd month at cost of Setup cost of Rs. 1000 + Rs. 1000) + (inventory carrying cost of Rs. 300/- + Rs. 400/-) = Total Rs. 2700/-

(d) Produce 1100 units in 5th month and 300 units in the 3rd month at cost of (Setup cost of Rs. 1000 + Rs. 1000/- + Inventory carrying charges of Rs. 700/- + Rs. 300/- Rs. 3000/-.

The optimal decision at this stage is to produce 700 units in 5th month and the cost of production and inventory maintenance is Rs. 2700/-.

Stage 2: At 2nd month. There are 5 alternatives and they are:

(a) Produce 1600 units in 2nd month. a cost of Setup cost of Rs. 1000/- + inventory carrying charges of Rs. 1400 + 1100 + 700 + 300 = Total Rs. 4500/-.

(b) Produce 300 in 6th month and 1300 units in 2nd month at cost of Rs. 1000 + 1000 + 1100 + 800 + 400 Total Rs. 4300/-.

(c) Produce 700 units in 5th month and 900 units in 2nd month at cost of Rs.1300 + 1000 + 700 + 400 = Rs 3400/-.

(d) Produce 1100 units in 4th month, 500 units in 2nd month at cost of Rs. 2000/- 1000 + 300 = Rs. 3300/-.

(e) Produce 700 units in 3rd month, 700 in 5th month and 200 in 2nd month at cost of Rs. 3000/- + Rs. 700/ = Total Rs. 3700/-.

The optimal decision rule is Produce 500 units in 2nd month and 1100 units in 4th month at cost of Rs. 3300/.

1st stage: Month 1: There are k6 alternatives. They are:

(a) Produce 1700 units at cost of 1000 - 1600 + 1400 + 1100 + 700 + 300 = Rs. 6100/-.

(b) Produce 300 units in 6th month and 1400 units in 1st month and the cost is: Rs. 100/- + Rs.1000/- + Rs. 1300/- + Rs.1100/- + Rs.800/- + Rs.400/- = Total Rs. 5600/-.

(c) Produce 700 units in 5th month and 1000 units in the 1st month and the cost is in Rs.1300 + 1000 + 900/- + 700 + 400 = Total Rs. 4300/-.

(d) Produce 1100 units in 4th month and 600 units in 1st month and the cost Rs. 2000/- + 1000 + 500 + 300 = Total Rs. 3800/-.

(e) Produce 700 units in 3rd month, and 700 in 5th month and 300 units in the 1st month at a cost of Rs. $2700 - 1000 + 200 = \text{Rs } 3900/-$.

(g) Produce 500 units in the 2nd month and 1100 units in the 4th month and 100 units in the 1st month at a cost of Rs. $3300/- + \text{Rs. } 1000/= \text{ Total Rs. } 4300/.$

The optimal decision rule is to Produce 600 units in 1st month and 1100 units in 4th month at a total cost of Rs. 3800/-.

Problem: In Thanjavur, a Rice Mill has a contract to supply Rice as per the following schedule. The as Rice made during a month in various of agricultural area of Thanjavur will be supplied at the end of the month. The setup cost is Rs.2000 and the same time inventory carrying cost is Rs. 10 per tone, per month. In which month should the batches be produced and of what size. So that the total of setup and inventory carrying cost are minimized.

Month	Number of Rice Pack (each pack has 1 tone)
January	300
February	200
March	150
April	300
May	350
June	250
July	200
August	300
September	150
October	200
November	250
December	100

Solution: This problem is Considered as 12 stage Problem and scheduling of inventory is done in 12 stages by wing dynamic technique. We can stage stand from the last month.

Stage 12th:

Month of December:

To save the carrying cost, nothing should have been last at the end of the Month of November and also nothing should be left at the end of 12th month i.e., December, as this is the last month. So produce 100 units for which the Setup cost is Rs. 20,000.

Stage 11th:**Month of November:**

There are two cases arise, we choose one.

Case (i). Produce 360 units in November month and send 250 units in market and 100 units will remain as inventory for one month. Hence

$$\text{Total Cost} = \text{Setup Cost} + \text{Inventory Carrying cost for one month}$$

$$= 20,000 + (100 \times 10)$$

$$= 20,000 + 1000$$

$$\text{Total Cost} = \text{Rs. } 21,000$$

Case (ii). Produce 250 Units in November month and 100 units December month, and send the goods in the respective month so that there will be no inventory carrying cost. We have only setup cost.

Total Cost = Setup cost for November Month + Setup Cost for December Month + Inventory carrying cost is zero

$$= 20,000 + 20,000 + 0$$

$$\text{Total Cost} = \text{Rs. } 40,000$$

The first case is cheaper, here instead of second case. So Optimal cost = Rs. 21,000.

Stage 10:**October Month:**

There are three possibilities

Case (i). Produce 550 Units in October month and send 200 Units in Market in October and maintain an inventory 350 units for one month again send 250 units in market on November and maintain as inventory of 100

units for next one month. In December we send 100 units in market so

Total Cost = Setup cost for 550 units + Two Month Inventory Carrying Cost for 350 units + One Month Inventory carrying cost for 100 units.

$$= 20,000 + (350 \times 10) + (100 \times 10)$$

$$\text{Total Cost} = \text{Rs. } 24,500$$

Case (ii). Produce 100 Units in 12th month and 450 Units in 10th month. Similarly we get

Total Cost = Setup cost for December + Setup Cost for October + One Month Inventory carrying cost for 250 units.

$$= 20,000 + 20,000 + (200 \times 10)$$

$$\text{Total Cost} = \text{Rs. } 42,500.$$

Case (iii). Produce 200 Units in October month and 350 Units in November month. In November we just send 250 units in market and using 100 units as inventory for next one month.

Total Cost = Setup cost for 200 units in October + Setup Cost for 350 units in November + One Month Inventory carrying cost for 250 units.

$$= 20,000 + 20,000 + (150 \times 10)$$

$$\text{Total Cost} = \text{Rs. } 41,500$$

Out of three decisions, the first decision (i) is optimal.

Stage 9:

August Stages, we have similarly for above stages we have 4 Alternatives.

Case (i). Total Cost = Setup cost for 700 units + Inventory Cost of 550 units for three months + Inventory Cost of 350 units for two months + Inventory Cost of 100 units for one months

$$= 20,000 + (550 \times 10) + (350 \times 10) + (100 \times 10)$$

$$\text{Total Cost} = \text{Rs. } 30,000.$$

Case (ii). Total Cost = Setup cost for 300 units in August + setup cost for 700 units in September month + Inventory carrying Cost of 550 units for three months + Inventory carrying Cost of 350 units for two months + Inventory carrying Cost of 100 units for one month.

$$= 20,000 + 20,000 + (550 \times 10) + (350 \times 10) + (100 \times 10)$$

Total Cost = Rs. 50,000.

Case (iii). Total Cost = Setup cost for 450 units in August + Inventory carrying Cost of 150 units for one month + setup cost for 550 units in October month + Inventory carrying Cost of 350 units for two months + Inventory carrying Cost of 100 units for one month.

$$= 20,000 + (150 \times 10) + 20,000 + (350 \times 10) + (100 \times 10)$$

Total Cost = Rs. 46,000.

Case (iv). Total Cost = Setup cost for 650 units in August + Inventory carrying Cost of 350 units for two months + Inventory carrying Cost of 200 units for one month + setup cost for 350 units in November month + Inventory carrying Cost for 100 units for one month.

$$= 20,000 + (350 \times 10) + 20,000 + (350 \times 10) + (100 \times 10)$$

Total Cost = Rs. 48,000.

Out of all stages, from stage 7 to 1

The optimal solution for stage 7.

Setup cost for 120 units in June + Inventory carrying Cost of 1000 units for six months + Inventory carrying Cost of 700 units for five months + Inventory carrying Cost for 550 units for four months + Inventory carrying Cost for 350 units for three months + Inventory carrying Cost for 100 units for two months

$$= 20,000 + 1000 + 7000 + 5500 + 3500 + 1000$$

Total Cost = Rs. 47,000.

The optimal solution for

Stage 6 is = Rs. 73,500

Stage 5 is = Rs. 75,300

Stage 4 is = Rs. 77,400

Stage 3 is = Rs. 79,650

Stage 2 is = Rs. 82,100

Stage 1 is = Rs. 84,850.

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