

An Economic Analysis of Production of Tapioca in Namakkal District of Tamilnadu

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Abstract:- Tapioca is a starch extracted from the storage roots of the tapioca plant. Tapioca is a staple food for millions of people in tropical countries. An attempt has been made in this study to examine the economic analysis of cost and return per hectare and input output ratio of tapioca in Namakkal district of Tamilnadu. The study made use of a multistage sampling and random sampling technique to select 110 respondents among those selected villages. Data for the study were collected with the aid of a well- structured questionnaires. Data collected were analysed using tabulation method along with required statistical tool. The production of tapioca has increased largely due to productivity increase and increase in the area under the crop. Resource use structure in tapioca was found to be varied among the size groups. Production cost of tapioca was varied according to size groups of land holding. The per hectare cost of cultivation of tapioca was highest on small size farms and lowest on large size farms. The cost of cultivation was varied among the size groups of tapioca growers. The input output ratio is highest on large size farms and lowest on small size farms.

Keywords: - Tapioca, Cost and Return, Input Output Ratio

I. INTRODUCTION

Tapioca (*Manihot esculenta* Crantz) is a dicotyledonous perennial woody shrub with an edible starchy root, belonging to the botanical family Euphorbiaceae. And it has many names, including cassava, bitter-cassava, manioc, "mandioca". It belongs to roots and tuber crops that stores edible material in tuber which belong to class of foods that basically provide energy in the human diet in the form of carbohydrates. Apart from its use as human food, tapioca products also are popular in international trade under different forms such as dried chips, pellets, flour and starch, thus contributing to the economy of exporting countries. Tapioca leaves can also be consumed and are rich in protein (14- 40% dry matter), minerals, Vitamin B1, B2, C and carotenes. Cassava's growth characteristics make it a suitable food security crop, particularly due to its resilience growing in conditions that become unfavorable for other crops, such as periods of erratic rainfall. Due to this resilience to adverse environmental conditions, cassava has been named as an ideal climate change crop. Tapioca which is believed to be a crop of South American origin is presently cultivated in most countries of the tropical belt, ecologically most suited

to its cultivation. Nigeria is the major growing country in world accounting for 50% of area and production. In India crop is cultivated in southern peninsular region, particularly Kerala, Tamil Nadu and Andhra Pradesh contributing 93% of area and 98% of production in the country.

Tamilnadu state stands first(64%) in respect of tapioca production and also processing of tapioca into starch and sago. Tapioca is cultivated in major 14 districts including Namakkal(21%), Dharmapuri(19%), Salem(15%), Vilupuram(14%), Trichy(9%), Erode(5%), and Thiruvannamalai(5%) in an area of 1.21 lakh hectare. The main objective of this paper is to study cost and return per hectare and input output ratio of different size of farm groups and to estimate disposal pattern and marketable surplus of tapioca in different size of farm groups.

II. RESEARCH METHODOLOGY

The study was conducted in Namakkal district of Tamilnadu which is one of the 32 districts of Tamilnadu. Namakkal district comprises of 7 blocks among that 2 blocks i.e, Mohanur and Paramathi- Velur blocks were selected for this study. From that 2 blocks 5% villages viz., Anangur, Nanjai- Edayar, Nadandhai, Arasanatham, Rasipalyam, Andapuram, Oruvandur, Aniyapuram were selected. A list of all tapioca farmers/respondents is prepared with the help of head of the village pradhan or head of each selected villages in both block, there after farmers/respondents is categorized in 3 size groups on the basis of their land holding and then from each village 10% farmers were selected randomly from all the different size of farm groups. Data for the study was collected from 110 farmers randomly (i.e) 45 small farmers, 37 medium farmers and 28 large farmers . Tabulation method is used for analysis of data along with required statistical tool for the interpretation of the result.

III. RESULTS AND DISCUSSION

The study was conducted in Namakkal district of Tamilnadu. The necessary data were collected from the sample farmers spread over two blocks in above mentioned district. The present chapter is going to tell about the results and discussion for various objectives. The chapter is arranged in different sub-sections according to objectives of the study.

- To study cost and return per hectare and input output ratio of different size of farm groups.

A. Resource Use and Cost of Cultivation of Tapioca Crop Per Hectare in Different Size of Farm Groups:

The economic aspects of tapioca such as cost of cultivation, returns per hectare, input and output ratio of

small size, medium and large size farm groups are given below

S.No	Particulars	Small	Medium	Large	Sample Average
1	Hired human labour charges	8500 (11.24)	8700 (11.53)	8900 (11.83)	8700 (11.53)
2	Bullock labour charges	1900 (2.51)	2000 (2.65)	2200 (2.92)	2033.33 (2.69)
3	Machinery charges	3750 (4.95)	3900 (5.17)	4020 (5.34)	3890 (5.15)
4	Cost of stems	7800 (10.31)	7950 (10.54)	8100 (10.76)	7950 (10.54)
5	Cost of manure	8300 (10.97)	8500 (11.27)	8700 (11.56)	8500 (11.27)
6	Cost of fertilizers	9000 (11.9)	9200 (12.19)	9400 (12.49)	9200 (12.19)
7	Cost of irrigation	8500 (11.24)	8700 (11.53)	8900 (11.83)	8700 (11.53)
8	Cost of plant protection	4000 (5.29)	4200 (5.56)	4400 (5.84)	4200 (5.56)
9	Interest on working capital @ 7%	3662.5 (4.84)	3810 (5.05)	3880 (5.15)	3818.66 (5.06)
10	Depreciation on fixed capital	500 (0.66)	520 (0.68)	540 (0.71)	520 (0.68)
11	Land revenue paid to government	0 (0)	0 (0)	0 (0)	0 (0)
12	Interest on fixed capital @ 11%	5692.5 (7.52)	5993 (7.94)	6110 (8.12)	6007 (7.96)
13	Rental value of land	10,000 (13.22)	10,000 (13.26)	10,000 (13.29)	10000 (13.26)
14	Family labour income	4000 (5.29)	4300 (5.7)	4500 (5.98)	4266.66 (5.65)
15	Total cost of cultivation	75605 (100)	75410 (100)	75223 (100)	75412.66 (100)

Table 1:- Resource Use and Cost of Cultivation of Tapioca Crop Per Hectare in Different Size of Farm Groups

In the above table 1 it explains that the small size respondent is using 8500 rupees investment on hired labour and it consists of 11.24 percentage of total cost of cultivation and 1900 rupees investment on bullock labour and it consists of 2.51 percentage of total cost of cultivation and 3750 rupees invested on machinery and it consists of 4.95 percentage of total cost of cultivation and 7800 rupees invested on stems and it consists of 10.31 percentage of total cost of cultivation and 8300 rupees invested on manures and it consists of 10.97 percentage of total cost of cultivation and 9000 rupees invested on fertilizers and it consists of 11.9 percentage of total cost of cultivation and 4000 rupees invested on plant protection and it consists of 5.29 percentage of total cost of cultivation and cost of irrigation is 8500 rupees and it consists of 11.24 percentage of total cost of cultivation and 3662.5 rupees invested on interest on working capital and it consists of 4.84 percentage of total cost of cultivation and 500 rupees invested on depreciation on fixed capital and it consists of 0.66 percentage of total cost of cultivation and government not taking land revenue from farmers and 5692.5 rupees invested on interest on fixed capital and it consists of 7.52 percentage of total cost

of cultivation and 10000 rupees invested on rental value of land and it consists of 13.22 percentage of total cost of cultivation and 4000 rupees invested on family labour income and it consists of 5.29 percentage of total cost of cultivation and total cost of cultivation of small farm respondent is 75605.

The medium size respondent is using 8700 rupees investment on hired labour and it consists of 11.53 percentage of total cost of cultivation and 2000 rupees investment on bullock labour and it consists of 2.65 percentage of total cost of cultivation and 3900 rupees invested on machinery and it consists of 5.17 percentage of total cost of cultivation and 7950 rupees invested on stems and it consists of 10.54 percentage of total cost of cultivation and 8500 rupees invested on manures and it consists of 11.27 percentage of total cost of cultivation and 9200 rupees invested on fertilizers and it consists of 12.19 percentage of total cost of cultivation and 4200 rupees invested on plant protection and it consists of 5.56 percentage of total cost of cultivation and cost of irrigation is 8700 rupees and it consists of 11.53 percentage of total

cost of cultivation and 3810 rupees invested on interest on working capital and it consists of 5.05 percentage of total cost of cultivation and 520 rupees invested on depreciation on fixed capital and it consists of 0.68 percentage of total cost of cultivation and government not taking land revenue from farmers and 5993 rupees invested on interest on fixed capital and it consists of 7.94 percentage of total cost of cultivation and 10000 rupees invested on rental value of land and it consists of 13.26 percentage of total cost of cultivation and 4300 rupees invested on family labour income and it consists of 5.7 percentage of total cost of cultivation and total cost of cultivation of medium farm respondent is 75410.

The large size respondent is using 8900 rupees investment on hired labour and it consists of 11.83 percentage of total cost of cultivation and 2200 rupees investment on bullock labour and it consists of 2.92 percentage of total cost of cultivation and 4020 rupees invested on machinery and it consists of 5.34 percentage of total cost of cultivation and 8100 rupees invested on stem cuttings and it consists of 10.76 percentage of total cost of cultivation and 8700 rupees invested on manures and it consists of 11.56 percentage of total cost of cultivation and

9400 rupees invested on fertilizers and it consists of 12.49 percentage of total cost of cultivation and 4400 rupees invested on plant protection and it consists of 5.84 percentage of total cost of cultivation and cost of irrigation is 8900 rupees and it consists of 11.83 percentage of total cost of cultivation and 3880 rupees invested on interest on working capital and it consists of 5.15 percentage of total cost of cultivation and 540 rupees invested on depreciation on fixed capital and it consists of 0.1 percentage of total cost of cultivation and government not taking land revenue from farmers and 6110 rupees invested on interest on fixed capital and it consists of 8.12 percentage of total cost of cultivation and 10000 rupees invested on rental value of land and it consists of 13.29 percentage of total cost of cultivation and 4500 rupees invested on family labour income and it consists of 5.98 percentage of total cost of cultivation and the total cost of cultivation of large size farm respondent is 75223. After comparison on total cost of cultivation, the cost of cultivation is high in small size farm groups, then compared to small size farm groups medium size farm group has less cost of cultivation than small size farm groups and it the cost of cultivation of large size farm groups is less compared to small and medium size farm groups.

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result	S. Ed. (\pm)	C.D. at 5%
Due to size group	2	448142.178	224071.089	15.76446239	3.34	S	97.344	200.917
Due to Particulars	14	14103064267.811	1007361733.415	70872.66921	2.06	S	43.533	89.853
Error	28	397983.156	14213.684	-	-	-	-	-
TOTAL	44		-	-	-	-	-	-

Table 2:- ANOVA

In the above ANOVA table, in due to size group degrees of freedom is 2, sum of squares is 448142.178, mean sum of squares is 224071.089, F. Calculated value is 15.76446239, F. tabulated value @ 5% is 3.34, result is significant, standard deviation is 97.344 and critical difference @ 5% is 200.917. In due to particulars, degrees of freedom is 14, sum of squares is 44812.178, mean sum of squares is 224071.089, F. Calculated value is 15.76446239, F. tabulated value is 2.06, result is significant, standard deviation is 97.344 and critical difference @ 5% is 89.853.

In error, degrees of freedom is 28, sum of squares is 397983.156 and mean sum of squares is 14213.684.

B. Cost of Cultivation in Tapioca Crop Per Hectare in Different Size of Farm Groups:

Below table explains about cost of cultivation in tapioca crop per hectare in different size of farm groups with cost A1 and cost A2 and cost B and cost C.

S.No	Cost concepts	Small	Medium	Large	Sample Average
1	Cost A1	55912.5	55985.25	56103.65	56000.46
2	Cost A2	65912.5	65950.3	65996.25	65953.01
3	Cost B	71605	71832	71995	71810.66
4	Cost C	75605	75410	75223	75412.66

Table 3:- Cost of Cultivation in Tapioca Crop per Hectare in Different Size of Farm Groups

In above table 3 explains about return and output of small size respondents cost A1 is 55912.5 and cost A2 is 65912.5 and cost B is 71605 and cost C is 75605. Medium size respondents cost A1 is 55985.25 and cost A2 is 65950.3 and cost B is 71995 and cost C is 75410. Large size respondents cost A1 is 56103.65 and cost A2 is 65996.25

and cost B is 71995 and cost C is 75223. Average sample respondents cost A1 is 56000.46 and cost A2 is 65953.01 and cost B is 71810.66 and cost C is 75412.66.

C. Cost and Returns in Tapioca Crop Per Hectare in Different Size of Farm Groups:

Below table explains about cost of cultivation per ton, returns per ton and hectare of main product and by product,

gross return, net return, family labour, farm business income and benefit cost ratio

S.No	Particulars	Size of farm groups			Sample Average	
		Small	Medium	Large		
1	Cost of cultivation(Rs./ha)	75605	75410	75223	75412.66	
2	Yield(ton/ha)	Main product	25	25.8	26.2	25.66
		By product	26	27.5	28.2	27.23
3	Cost of production(Rs./ton)	3024.2	2922.86	2871.10	2938.91	
4	Return(Rs./ton)	Main product	5000.00	5000.00	5000.00	5000.00
		By product	400.00	400.00	400.00	400.00
5	Return(Rs./ha)	Main product	125000	129000	131000	128300
		By product	10400	11000	11280	10892
6	Gross return	135400	140000	142280	139192	
7	Net return	59795	59993	60123	59970.33	
8	Family labour income	4000	4300	4500	4266.66	
9	Farm business income	69487.5	69632.2	69902.75	69674.15	
10	Input output ratio	1:1.79	1:1.82	1:1.86	1:1.82	

Table 4: - Cost and Returns in Tapioca Crop Per Hectare in Different Size of Farm Groups

In above table 4 explains about small size respondents cost of production per ton 3024.2, yield of main product 25 tons, yield of by product 26 tons, gross return is 135400 and net return in small size respondents is 59795 and family labour income is 4000 in small respondents and farm business income is 69487.5 and input output ratio is 1:1.79. Medium size respondents cost of production per ton 2992.86, yield of main product 25.8 tons, yield of by product 27.5 tons, gross return is 140000 and net return in medium size respondents is 59993 and family labour income is 4300 in medium respondents and farm business income is 69632.2 and input output ratio is 1:1.82. Large size

respondents cost of production per ton 2871.10, yield of main product 26.2 tons, yield of by product 28.2 tons, gross return is 142280 and net return in large size respondents is 60123 and family labour income is 4500 in large respondents and farm business income is 69902.75 and benefit cost ratio is 1:1.86. Average sample of small, medium and large size respondents are cost of production per ton 2938.91, yield of main product is 25.66 tons, yield of by product 27.23 tons, gross return is 139192 and net return is 59970.33 and family labour income is 4266.66 in large respondents and farm business income is 69674.15 and input output ratio is 1:1.82.

ANOVA:								
Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result	S. Ed. (±)	C.D. at 5%
Due to size group	2	8480888.51	4240444.26	1.555796763	5.14	NS	1347.981	2782.232
Due to Particulars	3	27606391471.59	9202130490.53	3376.213426	4.76	S	1167.385	2409.483
Error	6	16353463.47	2725577.25	-	-	-	-	-
TOTAL	11		-	-	-	-	-	-

Table 5

In the above anova table, in due to size group degrees of freedom is 2, sum of squares is 8480888.51, mean sum of squares is 4240444.26, F. Calculated value is 1.555796763, F. tabulated value @ 5% is 5.14, result is not significant, standard deviation is 1347.981 and critical difference is @ 5% is 2782.232. In due to particulars, degrees of freedom is 3, sum of squares is 27606391471.59,

mean sum of squares is 9202130490.53, F. Calculated value is 3376.213426, F. tabulated value @ 5% is 2.06, result is significant, standard deviation is 1167.385 and critical difference is 2409.483. In error, degrees of freedom is 6, sum of squares is 16353463.47 and mean sum of squares is 2725577.25.

IV. CONCLUSION

The production of tapioca has increased largely due to productivity increase and increase in the area under the crop. The acreages under tapioca not influenced by improvement in the productivity but it largely depended on the other factors like rainfall and price of this crop. The cropping pattern was dominated by tapioca crop followed by groundnut, sugarcane and paddy. Resource use structure in tapioca was found to be varied among the size groups. Production cost of tapioca was varied according to size groups of holding. The per hectare cost of cultivation of tapioca was the highest on small size farms and lowest on large size farm. Among which rental value of land, hired human labour, fertilizers, manures, seeds were the major items of cost. The cost of cultivation varied among the size groups of tapioca growers.

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