An Economic Analysis of Production and Constraints faced by Cassava Farmers in Hill areas of Western Tamil Nadu

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Abstract

The present study endeavor with the cassava production and constrained faced by cassava of farmers in hill areas of western Tamil Nadu. Salem and Namakkal district were purposively selected since these are the major cassava growing districts of western Tamil Nadu. Thus the total sample size is 180. The result showed that, average cost of production per kg over Cost C_2 was high in Kollihills ($\overline{\ast}$. 4.31) than Kalvarayan hills ($\overline{\ast}$. 4.01). The return per rupee of cost over Cost C_2 was higher in Kalvarayan hills (1:1.21) due to efficient use of all the inputs. The return per rupee of investment over Cost C_2 was less in Kolli hills (1:1.14) due to low yield and high cost of production. Due to variety selection yield was higher in Kalvarayan hills. Hence, the gross return was higher when compared to Kolli hills. High incidence of weeds, Tuber mosaic were identified as the most important constraints in cassava production systems in Kalvarayan and Kolli hills of western Tamil Nadu, respectively.

Keywords: Cassava, Production, Constraints

1. Introduction

Cassava (Manihot Esculenta) is a perennial vegetable crop and belongs to family Euphorbiaceae and originated in the regions of west-central Brazil. It is now being cultivated all over the world particularly in the Tropical and Sub-tropical regions. The cassava plant gives the third-highest yield of carbohydrates per cultivated area among crop plants, after sugarcane and sugar beets. Cassava is cultivated in 22 million hectares spread over the continents of Asia, Africa, and South America with a production of 281 million tonnes (FAO STAT, 2016). India acquires significant position in the global cassava scenario due to its highest productivity in the world (35.64 tonnes per ha). It is largely cultivated in the states of Tamil Nadu, Kerala, parts of Nagaland, Meghalaya, Andhra Pradesh, Karnataka, Puducherry and Assam. It is a food security crop in Kerala. Tamil Nadu occupies first position in terms of area and production of cassava in India and its productivity is the highest in the world. It is cultivated both under irrigated and rainfed conditions. Sixty per cent of the crop is grown under irrigated conditions in Salem, Erode, Dharmapuri and Namakkal districts while forty per cent of the crop is cultivated as rainfed crop in these districts. In situation Cassava is the main livelihood crop in the study areas, especially for the small and marginal farmers. In the event commercialization of agriculture, it is proposed to test the hypothesis that the cassava, the rainfed crops of small and marginal farmers, helps their livelihood.

2. Materials and Methods:

The present study concerned with the cassava production and problems faced by farmers in hill areas of western Tamil Nadu. Salem and Namakkal district were purposively selected since these are the major cassava growing districts of western Tamil Nadu.Kollimalai block and Pethanaikenpalayam block (Kalvarayan hills) are the highest contributors to area under cassava cultivation in Namakkal and Salem districts respectively. Besides, a large number of cassava processing units also functioning in these two districts. In the second stage, one block viz, Pethanaikenpalayam block from Salem district and Kollimalai block from Namakkal district were purposively selected based on the highest area under cassava in hilly area. In these areas, cassava is being cultivated mostly under rainfed condition. In the next stage, three villages were selected at random from each block. Totally villages were selected. six From the list, 30 farmers were selected at random from each village. Thus the total sample size is 180. The primary data required for the study were collected through personal interview with the help of pre-tested comprehensive interview schedule. The schedule for the farmers covered aspects such as cost of cultivation, net returns from the crops, marketing of cassava, problem in production etc. The data collected were tabulated, processed and subjected to statistical analysis.

2.1. Cost Concepts

- Cost A_2 : Cost A_1 + rent paid for leased in land,
- Cost B₁: Cost A₂ + interest on owned fixed capital assets (excluding land)
- Cost B_2 : Cost- B_1 + rental value for owned land
- Cost C₁: Cost B₁ + imputed value of family labour
- Cost C₂: Cost B₂ + imputed value of family labour

• Cost of production = (Cost C_2 - value of by-product) / yield

2.2. Garrett's ranking

To rank the constraints faced in the cassava production and marketing, Garrett's ranking technique was used.

Garrett (1965) suggested a scoring technique procedure for converting the ranks in to scores when the number of items ranked from respondent to respondent. To rank the constraints faced in the cassava production, processing and marketing, Garrett's ranking scoring technique was used. The ranks assigned by the respondents were converted into percent position by using the formula.

100 (Rij – 0.5) Percentage position = -----

Where,

Rij = Rank given for ith factor by j th individual

Ni

Nj = Number of factors ranked by j th individual

By referring to Garrett's table, the percentage positions estimate was converted in to scores and then for each factor the scores of various respondents were added and mean value was arrived at. These means were arranged in descending order. The problem having the highest mean value was considered to be the most important and was given the highest rank and vice versa.

3. Result and Discussion:

3.1. Cost and Returns in Cassava Cultivation

3.1.1. Fixed Costs

The fixed cost incurred by the sample farmers in cassava production in the selected districts was worked out and the results are presented in Table 1.

It could be observed from the Table 1 that total fixed cost incurred by the sample farmer for cassava production per ha was ₹.21, 255 and ₹.25, 925 in Kalvarayan and Kolli hills respectively. Rental value of owned land accounted for 25.99 per cent to total cost in Kolli hills and 20.57 per cent in Kalvarayanhills. The share of fixed cost to total cost was 27.28 per cent in Kolli hills and 22.13 per cent in Kalvarayan hills. High fixed cost was mainly due to higher rental value. Higher rental value was due to availability of land for leasing and yield potential of the land. On an average, the proportion of fixed cost to total cost was 24.69 per cent for the two selected study areas.

3.1.2. Variable Costs

Variable cost includes the cost for preparatory cultivation, manures and fertilizers, harvesting and interest on working capital. The variable cost incurred by the cassava farmers in Kalvarayan hills and Kolli hills were worked out and the results are given in Table 1.

It could be observed from the table that total variable cost was higher in Kalvarayan hills with $\mathbf{\overline{x}}.74$, 791.74 as compared to $\mathbf{\overline{x}}.69$, 121.64 in Kolli hills. Of the total variable cost,

hired human labour accounted for the higher proportion to total cost with 40.12 per cent in Kalvarayan hills, and 33.91 per cent in Kolli hills. The next important variable cost was fertilizers which account for 15.18 per cent to total cost in Kolli hills and 13.15 per cent in Kalvarayan hills. The cost of manures contributed 4.53 per cent in Kalvarayan hills and 3.80 per cent in Kolli hills. Thus, it could be concluded that the human labour, fertilizers and manures were the major inputs used in cassava production in the selected sample farms of the study area.

	(₹/Hectare					
	Particulars	Kalvarayan Hills	Kolli Hills	Average		
Ι	Fixed Cost			•		
1	Dental value of land	19,760	24,700	22,230		
	Rental value of land	(20.57)	(25.99)	(23.27)		
2	Land revenue and cess	125	125	125		
Z		(0.13)	(0.13)	(0.13)		
	Depreciation on	650	500	575		
3	equipment and	(0.68)	(0.53)	$\frac{373}{(0.60)}$		
	buildings	(0.08)	(0.55)	(0.00)		
1	Interest on fixed	720	600	660		
4	capital	(0.75)	(0.63)	(0.69)		
	Total Fixed Cost	21,255	25,925	23,590		
		(22.13)	(27.28)	(24.69)		
II	Variable Cost	·		•		
1	Manures	4,350	3,610	3,980		
1		(4.53)	(3.80)	(4.17)		
0	Fertilizers	12,625.82	14,431.66	13,528.74		
Z		(13.15)	(15.18)	(14.16)		
2	Machine power	9,204	8,768	8,986		
5		(9.58)	(9.22)	(9.40)		
	Hind human labour	38,532	32,233	35,382.50		
1	nneu numan labour	(40.12)	(33.91)	(37.03)		
4	Es an llas Islanda	5,187	5,557	5,372		
	Family labour	(5.40)	(5.85)	(5.62)		
5	Interest on working	4,892.92	4,521.98	4,707.45		
	capital	(5.09)	(4.76)	(4.93)		
		74,791.74	69,121.64	71,956.69		
	Total variable Cost	(77.87)	(72.72)	(75.31)		
	Total Cost	96,046.74	95,046.64	95,546.69		
		(100.00)	(100.00)	(100.00)		

(Figures in the parentheses indicate percentages to Total Cost)

Cost of Cultivation based on CACP Cost Concepts Table 2. Cost of Cultivation of Cassava based on CACP Cost Concepts

				(₹/ha)
Sl. No.	Cost Concepts	Kalvarayan Hills	Kolli Hills	Average
Ι	Cost A ₁			
	Manures	4350.00	3610.00	3980.00
	Fertilizers	12625.82	14431.66	13528.74
	Machine power	9204.00	8768.00	8986.00
	Human labour	38532.00	32233.00	35382.50
	Land revenue	125.00	125.00	125.00
	Depreciation for implements and farm buildings	650.00	500.00	575.00
	Working capital	69898.82	64599.66	67249.24
	Interest on working capital	4892.92	4521.98	4707.45
	Total	70379.74	64189.64	67284.69
	Total	(73.28)	(67.53)	(70.42)
	Interest on owned fixed capital asset excludes land	720.00	600.00	660.00
II	Cost B ₁	71099.74	64789.64	67944.69
		(74.03)	(68.17)	(71.11)
	Rental value of owned land	19760.00	24700.00	22230.00
		(20.57)	(25.99)	(23.27)
ш	Cost B ₂	90859.74	89489.64	90174.69
		(94.60)	(94.15)	(94.38)
	Imputed value of family labour	5187.00	5557.00	5372.00
		(5.40)	(5.85)	(5.62)
IV	CostC ₁	76286.74	70346.64	73316.69
		(79.43)	(74.01)	(76.73)
	Cost B ₂	90859.74	89489.64	90174.69
		(94.60)	(94.15)	(94.38)
	Imputed value of family labour	5187.00	5557.00	5372.00
		(5.40)	(5.85)	(5.62)
v	Cost C ₂	96046.74	95046.64	95546.69
		(100.00)	(100.00)	(100.00)

(Figures in the parentheses indicate percentages to cost C₂)

The cost concepts used in this study were Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁ and Cost C₂ and these concepts are used in CACP for estimating cost of cultivation of principal crops. The details of the cost of cultivation of cassava in Kalvarayan hills and Kolli hills based on CACP cost concepts are presented in Table 2.The cost concepts worked out in the above table revealed that the Cost A₁ was \overline{x} . 70,379.74 per ha for cassava cultivation in Kalvarayan hills and \overline{x} .64, 189.64 per ha in case of Kolli hills. Cost C₂ was \overline{x} . 96,046.74 per ha for Kalvarayan hills and \overline{x} . 95,046.64 per ha for Kolli hills. The proportion of imputed value of family labour to cost C_2 was more in case of Kolli hills with 5.85 per cent compared to Kalvarayan hills (5.40 per cent). Thus, it could be noted that there was a significant contribution of family labour in cassava production in the selected areas.

3.1.3. Yield of cassava in Kalvarayan hills and Kolli hills

Yield particulars of cassava production in Kalvarayan and Kolli hills are presented in Table 3. It was observed from the table that cassava yield was 23.98 tonnes per ha in Kalvarayan hills and 22.07 tonnes per ha in Kolli hills. The yield was more in Kalvarayan hills due to the variety selection (MVD1) and application of inputs like manure, machine power and human labour.

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S. No		Kalvarayan Hills		Kolli Hills		Average	
	Yield	Qty	Value	Qty	Value	Qty	Value
		(t/ha)	(₹/ha)	(t/ha)	(t/ha)	(t/ha)	(₹/ha)
1	Cassava tubers	23.98	116492.4	22.07	108164.4	23.02	112328.4

Table 3. Yield of Cassava in the Sample Farmers of Study Areas

3.1.4. Income Measures based on Cost Concepts

The income measures based on the cost concepts for cassava production in Kalvarayan hills and Kolli hills are furnished in Table 4.

Sl. No	Particulars	Kalvarayan Hills	Kolli Hills	Average
1	Gross returns (₹/ha)	1,16,492.4	1,08,164.4	1,12,328.4
2	Net returns over the Cost C ₂ (₹/ha)	20,445.66	13,117.76	16,781.71
3	Farm business income (₹/ha)	46,112.66	43,374.76	44,743.71
4	Family labour income (₹/ha)	25,632.66	18,674.76	22,153.71
5	Cost of Production (₹/kg)	4.01	4.31	4.16
6	Average price received per kg	4.86	4.90	4.88
7	Input-output Ratio over Cost C ₂	1:1.21	1:1.14	1:1.18

Table 4. Income Measures based on Cost Concepts

It could be seen from the above table that the gross income was more in Kalvarayan hills ($\overline{\$}$. 1, 16,492.4 per ha) compared to Kolli hills ($\overline{\$}$. 1, 08,164.4 per ha). The average net return over Cost C₂ was more in Kalvarayan hills ($\overline{\$}$.20, 445.66 per ha) compared to Kolli hills ($\overline{\$}$.13, 117.76 per ha). Farm business income was $\overline{\$}$.46,112.66 per ha for Kalvarayan hills, $\overline{\$}$. 43,374.76 per ha for Kolli hills. Family labour income was higher in case of Kalvarayan hills with $\overline{\$}$. 25,632.66 per ha, compared to Kolli hills ($\overline{\$}$.18,674.76 per ha). The average cost of production per kg over Cost C₂ was high in Kolli hills ($\overline{\$}$. 4.31) than Kalvarayan hills ($\overline{\$}$. 4.01). The return per rupee of cost over Cost C₂ was higher in Kalvarayan hills (1:1.21) due to efficient use of all the inputs. The return per rupee of investment over Cost C₂ was less in Kolli hills (1:1.14) due to low yield and high cost of production.Due to variety selection yield was higher in Kalvarayan hills. Hence, the gross return was higher when compared to Kolli hills and also the other inputs used were higher in quantity, hence the cost C₂ in Kalvarayan hills was higher.

3.2. Constraints in Production and Marketing

Garrett's ranking technique was employed to find out the constraints faced by the cassava farmers in Kalvarayan hills and Kolli hills farmers and the results are presented in Table 5.

Sl. No	Constraints	Kalvarayan Hills		Kolli Hills	
	Constraints	Score	Rank	Score	Rank
1	Labour scarcity	23	VI	46	IV
2	High incidence of weeds	77	Ι	63	II
3	Low productivity	54	III	23	VI
4	High cost of hired labour	46	IV	36	V
5	CassavaMosaic Disease	63	II	77	Ι
6	Problem of rodents	36	V	54	III

Table 5. Constraint Analysis in Cassava production in the study area

3.2.1. Kalvarayan hills

The most important constraint faced by the sample farmers in Kalvarayan hills was high incidence of farmers followed by tuber mosaic disease, low productivity, high cost of hired labour , problem of rodents and labour scarcity. Non-availability of fertilizer at appropriate time of production was mainly due to poor supply of fertilizers in the inputs supply markets, cooperative societies and local fertilizer shops.

3.2.2. Kolli hills

The most important constraint in Kolli hills was tuber mosaic disease followed by high incidence of weeds, problem of rodents, labour scarcity, high cost of hired labour and low productivity. The results on the analysis of constraints in cassava production by the sample farmers in the study area using Garrett's ranking technique indicated that the high incidence of weeds, Tuber mosaic were the most important constraints in cassava production in Kalvarayan and kolli hills respectively.

Sl. No	Constraints	Kalvarayan Hills		Kolli Hills	
	Constraints	Score	Rank	Score	Rank
1	Price fluctuation	77	Ι	77	Ι
2	Malpractice measuring starch content	54	III	70	II
3	Perishability of the cassava	23	VI	23	VI
4	Exploitation of middle men	36	V	46	V
5	High transport cost	46	IV	54	IV
6	Fixed price for starch content in the tubers	63	II	63	III

Table 6. Constraint Analysis in Cassava marketing in the study area

3.2.3. Kalvarayan hills

The most important constraint in Kalvarayan hills was price fluctuation followed by tuber mosaic disease, low productivity, high cost of hired labour, problem of rodents and labour scarcity.

3.2.4. Kolli hills

The most important constraint in Kolli hills was tuber mosaic disease followed by high incidence of weeds, problem of rodents, labour scarcity, high cost of hired labour and low productivity.

In both hilly regions, price and disease were the Important Constraint for Cassava production and marketing. Similar kind of results were found in some of the studies. Pushpa et al. (2006)studied the constraints faced by the farmers in rose flower. Low price of flowers limitations identified through the study.Grover and Singh (2007) studied constraints faced by gingelly growers. The biotic (diseases, insect/ pest and weeds) was the constraints identified through this study.

4. Conclusion

The gross income and average net return were higher in Kalvarayan hills compared to Kolli hills. The average cost of production per kg was high in Kolli hills than Kalvarayan hills. The return per rupee of cost over Cost C_2 was higher in Kalvarayan hills due to efficient use of all the inputs. The return per rupee of investment over Cost C_2 was less in Kolli hills due to low yield and high cost of production. The most important constraint in Kalvarayan hills was high incidence of farmers followed by tuber mosaic disease, low productivity, high cost of hired labour, problem of rodents and labour scarcity.

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