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A STUDY ON PRODUCTION AND MARKETING OF COFFEE WITH SPECIAL REFERENCE TO PULNEY HILLS IN TAMIL NADU

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Abstract
The purpose of this Paper is basically aimed at studying the economic viability of coffee cultivation. The research was conducted in Pulney Hills in Dindigul district in Tamil Nadu in India, which has the highest area under coffee cultivation with 15,088 hectares accounting for 45.86 per cent of coffee cultivation in Tamil Nadu. On liberalization of Coffee Market in the year 1995 , transnational corporations control the Coffee market. Coffee bean prices often below the cost of production unleaded a series of adverse consequences among rural workers and small scale farmers. The cost of production of Coffee is steadily escalating due to increasing wages, decreasing efficiency, yield pattern of existing varieties and spiraling fertilizer cost. So reduction in the cost of production is possible only with increased productivity.

In this regard a study on the determinants of yield would be useful for evaluating the resource use efficiency and identifying the constraints in realizing the potential yield. Thus an analysis of resource use efficiency in Coffee farms would help in formulating policy packages to improve the cultivation of Coffee.

Key words: Coffee bean means the commodity derived from the fruit of the rubiaceous plant known as Coffee tree. Coffee plantation takes three to five years to bear fruit after sowing. Good yield starts from the fifth year onwards and continues to yield up to fifty years of the life of the plant.

1.1 Introduction

Coffee bean popularly known as brown gold is the second largest traded commodity in the world next to oil. Coffee is grown in more than 80 countries of the world. Most of the Coffee producing countries are heavily dependent on Coffee as a major source of foreign exchange earnings. In India, Coffee industry is a source of direct employment for about 4 lakhs of people. India's export earnings from Coffee was '1600 crores in the year 2016 .Coffee covers a small area in India but is of high economic value. Indian Coffee is exported to many countries such as Italy, Germany, Belgium, the Netherlands, France, United Kingdom, Sweden, Norway, Yugoslavia, Russia, Poland and Hungary .Mainly 67 per cent Coffee is exported in the form of Coffee bean not roasted but decaffeinated and 33 per cent as Coffee husk and skins and Coffee substitutes. Indian Coffee is known for its quality. It has built up a reputation for its quality and suitability for blending with Coffee of other origins. India is the third-largest producer and exporter of coffee in Asia, and the sixth-largest producer and fifth-largest exporter of coffee in the world. The country accounts for 4.05 per cent of the global coffee production. .Of the total coffee produced in India, 70 per cent is exported and 30 per cent is consumed domestically. The Coffee Board of India is engaged in the research, development, extension, quality upgrade, market information, and domestic and international promotion of Indian coffee.

Literature Review

Deshmukh, P.R., Bhosale and V.T.Wattamwar, "Participation of Youths in Rural Development", Journal of Agriculture, Update February-March 2008, Vol.3 (1 & 2), pp.143-147. in their study entitled "Participation of Youths in Rural Development", explained that India is said to be the land of youth. The participation of youth in the plantation sector with technology empowerment and improved varieties with intensive Coffee cultivation would pave the way for improved productivity.

As per the Global and Local Newsletter, Issue No.5, July-August, 2006.That generates discussion on "Globalization and Decentralisation of Coffee" Coffee growers in other countries like Vietnam participate in exhibitions and trade fairs in large numbers and try to obtain orders. The contrast is that the small growers in Tamil Nadu sell at the nearest Coffee procurement centres.

Siddarth in his study entitled "Development and Performance Evaluation of a Washer for Partially Fermented Coffee Parchment", Thesis submitted to Tamil Nadu Agricultural University, Coimbatore, 1999. explained that the wet processing of Coffee is better option than dry processing as it yields good value to the Coffee beans. In Tamil Nadu, the wet processing method is adopted only for the Arabica Coffee. When farmers install the correct type of pulpers for pulping of Coffee beans, the minimum processing cost and the low water requirement on pulping encourage farmers to go for wet processing method

.Design of the Study

1.2 **statement of the problem**

During the years 1942-1995, the Coffee Board, under the Ministry of Commerce and Industry, Government of India, had the monopoly of handling the Coffee market in India. The Coffee industry in India underwent changes in the year 1995, when the Coffee Board got its marketing wound up. The market became open to the Coffee producers. The market reforms initiated brought structural changes in the Indian Coffee market. The market structure has changed from a non-competitive structure to a competitive market structure. Perhaps it was good news for the big players in the Coffee business. But for many of the small Coffee planters, it was very drastic for they did not know any other mode of marketing, until then the small growers were spoon fed by the Coffee Board.

On liberalization, the growers and marketing agents reaped windfall profit in the short run. But in the long run, it was not conducive in the Coffee sector as the windfall profit resulted in increase in the payments for the factors of production. Coffee bean prices often below low cost of production unleaded series adverse consequences among rural workers and small scale farmers. As handful of transnational corporations control the market. The cost of production of Coffee is steadily escalating due to increasing wages, decreasing efficiency, yield pattern of existing varieties and spiraling fertilizer cost. So reduction in the cost of production is possible only with increased productivity.

In this regard a study on the determinants of yield would be useful for evaluating the resource use efficiency and identifying the constraints in realizing the potential yield. Thus an analysis of resource use efficiency in Coffee farms would help in formulating policy packages to improve the cultivation of Coffee.

1.3 Scope of the Study

The present study is basically aimed at studying the performance of Coffee industry, especially the Pulney hills in Dindigul District. The study is aimed at providing empirical evidence on key issues relating to the Coffee plantations which will be of much use to the decision makers for effecting changes in the cultivation of Coffee.

1.4 Objectives of the Study

1. To analyse the cost and returns of Coffee production.
2. To study the resource use efficiency and to compute returns to scale.
3. To evaluate the capital productivity of Coffee cultivation.
4. To evaluate marketing cost, marketing margin and the price spread.analyze the problems encountered in the cultivation and marketing of Coffee by the growers and to suggest suitable solutions to solve them.

1.5 Sampling Design

The 'Pulney Hills' comprises four major Coffee growing zones namely the Perumbarai zone, the Pannaikadu zone, the Adalur zone and the Perumalmalai zone spreading over 19 villages in total and having around 15051 hectares of land. According to the records available the Regional Office of the Coffee Board, Thandikudi a vast majority of cultivators are small holders having less than 10 hectares each. There are around 500 active Coffee cultivators in this region and 75 Coffee planters were selected randomly from each zone keeping every zone as a cluster. A total of 300 Coffee cultivators constitute the sample size for collecting primary data.

1.6 Field Work and Collection of Data

The primary data were collected from the growers through the personal interview method. The data required for the study of marketing were also gathered by interviewing the different market functionaries.

1.7 Period of Study

Primary data were collected from Coffee planters and merchant middlemen. The research was undertaken during the months from March to August 2016. Primary data were collected from the growers relating to the year 2015-16.

1.8 Tools of Analysis

The Cobb-Douglas type of production function was used to analyze the determinants of Coffee yield.

To evaluate the resource use efficiency of Coffee cultivation, the marginal value productivity of each type of the input variable was equated with the acquisition cost.

To assess capital productivity involved in the investment in Coffee cultivation, pay back period, net present value and internal rate of return were calculated.

Price spread worked out for the domestic market using the concurrent margin method.
To measure the marketing efficiency of the various channels in the marketing of Coffee, Shepherds' formula has been used.

1.9 Limitations of the Study

The study is confined to Pulney Hills only. The researcher has depended on the information and data supplied by the Coffee planters who are not used to keeping proper records on the cost of manures, seeds and the actual prices received for their produce. Hence the study suffers from the respondents' recall bias; these have been minimized by suitable interaction with the cultivators as well as cross checks then and there with the Agricultural Departmental field staff during the survey.

2.1 Profile of the Study Area and Characteristics of the Sample Respondents

The Pulney Hills are situated in Kodaikanal Taluk of Dindigul District. Pulney is a small, distinct hill range adjoining the famous Kodaikanal Hill resort in the southernmost tip of the Western Ghats. Pulney Hills comprise of with four zones namely extension centers namely Perumalmalai zone, Adalur zone, Pannaikadu zone, Perumbarai zone.

2.2 Zone-wise Area under Coffee Cultivation in 2016

The zone-wise area under Coffee cultivation in Dindigul district in the year 2016 is presented in

Table 1,Zone-wise Area Under Coffee Cultivation in 2016 in Pulney Hills

Name of the zone	*Planted area in hectare*		
	Arabica	*Robusta*	*Total*
Perumparai	2354	280	2634
Pannaikadu	3341	69	3410
Perumalmalai	3911	31	3942
Adalur	4465	600	5065
Total	14071	980	15051

Source: Annual Report of Coffee Board Extension Wing, Batlagundu, 2016.

In the Pulney Hills 93 per cent of the area is planted with Arabica and only seven per cent of the total area is under Robusta Coffee cultivation.

2.3 Zone-wise Production of Coffee in 2016

The zone-wise production of Coffee cultivation in Dindigul district during 2016 is presented in Table 2.

Table 2,Zone-wise Production of Coffee in 2016 in Pulney Hills

Name of the zone	*Metric Tonnes*		
	Arabica	*Robusta*	*Total*
Perumparai	2275	265	2540
Pannaikadu	2000	50	2050
Perumalmalai	1110	–	1110
Adalur	2200	100	2300
Total	7585	415	8000

Source: Annual Report of Coffee Board Extension Wing, Batlagundu, 2016.

In the Pulney hills, Arabica Coffee produced in the year was 7585 MT and robusta production 415 MT contributing 95 per cent of Arabica and only 5 per cent of robusta Coffee.

2.4 Characteristics of Sample Respondents

Table 3 exhibits the sample respondents selected for the present study. . The sample respondents selected for the study are small farmers with below 10 hectare in the study area.

Table 3,Zonal-wise Classification of Respondents

Zone	*Age*			*Total*
	20–30	*30–50*	*50 and above*	
Perumparai	20 (20)	30 (30)	25 (25)	75 (25)
Pannaikadu	32 (32)	20 (20)	23 (23)	75 (25)
Perumalmalai	23 (23)	30 (30)	22 (22)	75 (25)
Adalur	25 (25)	30 (30)	20 (20)	75 (25)
Total	100	100	100	300

Source: Survey data.

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Figures in brackets are percentages of the total.

Cost and Returns Analysis

An attempt has been made to analyze the cost of production, returns and capital productivity of Coffee cultivation in order to assess the financial viability of Coffee plantation.

Table 4, Average Cost of Coffee Production

Sl.No.	*Cost Item*	*Amount in Rs /Acre)*	*Percentage*
I.	Total variable cost	12177.49	42.06
II.	Fixed cost		
1.	Land Revenue	5.00	0.02
2.	Rental value of land	8980.00	31.01
3.	Other Fixed Cost	6513.28	22.50
4.	Annual share of net establishment	1278.47	4.42
	Total Fixed Cost (1 to 4)	16776.75	57.94
	Total Cost of Production (I & II)	28954.24	100.00

Source: Primary data.

The data revealed that the total cost of Coffee production per acre worked out to Rs28,954.24. The total variable cost per acre worked out toRs12,177.49 which constituted 42.06 per cent of the total cost of production.It was found that the total fixed cost worked out to Rs16,776.75 per acre constituting 57.94 per cent of the total cost of production.

4.5 Productivity and Unit Cost of Production

The output of Coffee per acre and its unit cost of production were computed. The results are presented in Table 5.

Table 5,Productivity and Unit Cost of Production

Total Cost (Rs.per acre)	*Output (Kgs. Per Acre)*	*Cost of production (` Per Kg.)*
28954.24	421.94	68.62

Source: Primary data.

4.5 Profitability

Table 6, Statement of Income in Coffee Cultivation (per acre/annum)

Sl.No.	*Particulars*	*Amount (`Rs)*
1.	Gross sales	41835.35
2.	Less: Marketing Cost	5683.53
3.	Gross Returns	36151.82
4.	Less: Variable Cost	12177.49
5.	Contribution	23974.33
6.	Less: Fixed Cost	16776.75
7.	Net Profit	7197.58
8.	Net Profit Ratio	19.91

Source: Primary data.

The net profit ratio indicates that the producer's margin was 19.91 per cent of the gross returns during the period under study.

Determinants of Coffee Yield

The Cobb-Douglas type production function is fitted to test the relationship between the yield of Coffee and the independent variables.

The results are presented in Table 7.

Table 7.Cobb-Douglas Production Function for Coffee Cultivation

Sl.No.	*Variable*	*Notation*	*Elasticity Co-efficient*	*Standard Error*	*'t' statistics*
1.	Yield (kgs per acre)	Y	–	–	–
2.	Constant	b_0	6.084**	1.124	5.415
3.	Labour (man days/acre)	X_1	0.654**	0.068	9.615
4.	Manure (`/acre)	X_2	0.057^{NS}	0.037	1.526
5.	Fertiliser (`/acre)	X_3	0.26**	0.015	17.367

6.	Pesticide (`/acre)	X_4	0.011^{NS}	0.013	0.866
7.	Cost of irrigation	X_5	0.104*	0.033	3.122
8.	Age of the plants (in years)	X_6	–0.011*	0.003	–3.719

Source: Primary data.

Sum of elasticity co-efficient 1.075

R^2 0.764

F-test 190.075

*Significant at one per cent level.
**Significant at five per cent level.
NS–Not Significant.

Among the independent variables, human labour, fertilizer, cost of irrigation, age of the plant were found to be statistically significant.

4.8 Capital Productivity Analysis

Coffee being a perennial crop, the commercial production starts from the fifth year onwards and continue to yield nearly forty years of the life the coffee plant. Therefore it is necessary to find the present value of the expected future income to justify the investments made.

Table 8.Pay back period for Coffee Cultivation

Sl.No.	*Particulars*	*Pay back period*	*Cutoff year*	*Remarks*
1.	Present selling price at `85.68 per kg.	9.26 years	10 years	Viable project
2.	Estimated selling price at `95.68 per kg.	8.42 years	10 years	Viable project

Source: Primary data.

Net Present Value

Table 9.Net Present Value of Coffee Cultivation

Sl.No.	*Particulars*	*Net present value*	*Acceptance criteria*	*Remarks*
1.	Present selling price at `85.68 per kg.	79892.12	Positive	Acceptable
2.	Estimated selling price at `95.68 per kg.	1,21,933.50	Positive	Acceptable

Source: Primary data.

If the selling price is increased by `10/- the net present value becomes large and Coffee cultivation is economically more beneficial.

Internal Rate of Return

Table 10.Internal Rate of Return for Coffee Cultivation

Sl.No.	*Particulars*	*Opportunity cost of capital*	*IRR*	*Remarks*
1.	Present selling price at Rs.85.68 per kg.	10%	16%	Acceptable
2.	Estimated selling price at Rs.95.68 per kg.	10%	19%	Acceptable

Source: Primary data.

From the capital productivity analysis it is inferred that Coffee cultivation is an economically viable one. The investment in Coffee cultivation can be preferred to other alternatives.

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5.9 Price Spread in Coffee Trade

The difference between the price paid by the consumer and the price received by the producer for an equivalent quantity is known as price spread

Table 11.Price Spread for Coffee Trade

Particulars	*Channel–I*		*Channel–II*	
	Cost (`/Quintal)	*Percentage*	*Cost (`./Quintal)*	*Percentage*
Producer				
Net price received	7786.2	35.51	9349.8	42.64
Marketing cost	1063.8	4.85	1630.2	7.43
Gross price received	8850	40.36	10980	50.07
Village Trader				
Price paid	8850	40.36		
Marketing cost	911.75	4.16		
Marketing margin	1218.25	5.56		
Price received	10980	50.07		
Wholesaler				
Price paid	10980	50.07	10980	50.07
Marketing cost	3811.75	17.38	3811.75	17.38
Marketing margin	1708.25	7.79	1708.25	7.79
Price received	16500	75.25	16500	75.25
Retailer				
Price paid	16500	75.25	16500	75.25
Marketing cost	4100	18.70	4100	18.70
Marketing margin	1327.72	6.05	1327.72	6.05
Price received/Price paid by consumer	21927.72	100.00	21927.72	100.00

Source: Primary data.

It could be observed from Table 11 that the producer's share in the price paid by consumer is estimated to be 35.51 per cent in Channel I and 42.64 per cent in Channel II.

5.14 Problems Faced By the Small Growers of Coffee

In order to analyze the problems faced by the small growers of Coffee, the researcher has used Garrett's ranking method to rank the important problems faced by the small growers in Coffee plantation.

TABLE 12.

Problems Relating to Production of Coffee

Sl.No.	*Factor*	*Garrets Mean Score*	*Rank*
1.	High cost of inputs	49.87	II
2.	Inadequate natural water sources and failure of blossoming showers	56.38	I
3.	Loss due to animal movement	38.26	VI
4.	Lack of skilled labour	45.15	III
5.	Problems due to pests/insects	39.95	V
6.	Lack of sufficient credit facility	41.07	IV

Source: Primary data.

Table 12 reveals that the factor "inadequate natural water sources and failure of blossoming shower has the highest mean score of 56.38 and it stands first among the various problems relating to the production of Coffee.

Reasons for Low Productivity of Coffee

Table 13.Reasons for Low Productivity of Coffee

Sl.No.	*Factor*	*Garrets Mean Score*	*Rank*
1.	Biological wealth of the soil	47.58	II
2.	Usage of inorganic fertilizers	43.35	III
3.	Lack of proper plant management	35.17	V
4.	Change in climatic conditions	48.16	I
5.	Divided attention due to multiple cropping system	36.68	IV

Source: Primary data.

Findings

- The net profit ratio indicates the producer's margin was 19.91 per cent of the gross returns during the period under study.
- Any step taken to improve the efficiency of labour and manure and fertilizer would result in the reduction of the cost of production.
- The payback period for Coffee cultivation was 9.26 years.
- The net present value of Coffee cultivation was Rs.79,892.12 at 16 per cent discount rate; it was positive investment in Coffee farm and is worthy enough.
- The analysis revealed that Coffee cultivation in the study area fetched 16 per cent internal rate of return which exceeds the cut off rate (opportunity cost of capital) and so the investment is economically viable and lucrative.

Suggestions and Conclusion.

- Intensive cultivation practices should be adopted. Vietnam has tripled its production only by Intensive cultivation practices.
- Biological wealth of the coffee land can be increased by using organic fertilizers to maintain sustainability and fertility of the soil.
- Participation of young generation by applying modern techniques can improve coffee productivity.
- Coffee Stabilization Fund should be maintained by the Coffee Board to help small growers to ensure better price.
- To increase the productivity level immensely cultivation practices like higher spacing complete irrigation and adequate fertilizer use are the key constituents

Conclusion

The present study has brought into focus various issues relating to the production and marketing of Coffee. The policy implications suggested, if properly implemented, may result in increased revenue for the nation and the people concerned. Based on the experience of the researcher, the following issues have been identified for further research.

- Economics of Coffee Cultivation–A Cost Effect Analysis
- Production and Marketing of Organic Coffee – A Study
- Production and Marketing of Coffee in Traditional Areas in India–A Comparative Analysis
- Socio-Economic Condition of Coffee Labourers and Planters in India– A Study
- Export Marketing of Coffee – A Study.

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