

Original Research Article

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## Economic Performance of Robusta Coffee in Tirap District of Arunachal Pradesh, India

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### ABSTRACT

#### Keywords

Robusta Coffee, Economic performance, *Coffea arabica* and *Coffea canephora*.

#### Article Info

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A study was conducted at Technological Evaluation Centre, Arunachal Pradesh, India to analyse the economic performance of robusta coffee in Tirap district of Arunachal Pradesh for the years 2011-12 to 2013-14. The average labourers utilized for all the cultural operations were 344 man days per hectare with an average total cost of cultivation of Rs. 41,412 per ha. Of the total cost, labour wages alone accounted for 65% followed by processing cost (22%) and fertiliser cost (7%). The net returns (including income from inter crops) after deducting the total cost worked out to be Rs. 6,60,155 for the entire farm and Rs. 50,782 per ha. The higher Benefit-Cost ratio of 2.23 for the three years indicated that the coffee is an efficient plantation crop for the tribal growers.

### Introduction

Coffee is one of the most valuable legally traded commodities from the developing world (FAO, 2014). *Coffea arabica* and *Coffea canephora* (robusta) are the coffee species having commercial value; the former is generally preferred for taste qualities, and the latter exhibits higher yield and pest resistance. Robusta coffee prefers hot and humid climate with average annual rainfall of 1000 to 2000 mm. Further timely receipt of blossom shower (25- 40mm) and backing shower (50- 75 mm) during February- March and March- April is essential for better yield.

Coffee is an important plantation crops grown in India. India's share in world coffee

production is 3.83%. The bearing area under coffee is around 3.86 lakh ha of which arabica accounts for 1.86 lakh ha and robusta accounts for the rest 2.00 lakh ha. The robusta varieties suitable for Indian condition are S.274, BR series and CxR. The average annual production of robusta coffee in India is around 2.29 lakh tonne with productivity of 1144 kg clean coffee per ha (Anonymous, 2016). About 75% of coffee produced in India is exported and has contributed nearly Rs. 4,600 crores of foreign exchange to the national exchequer annually. Coffee is mainly cultivated in the southern states of Karnataka, Kerala and Tamil Nadu and to a lesser extent, in non-traditional areas like Andhra Pradesh,

Orissa and North Eastern States. As an agro-based rural enterprise in India, coffee provides direct employment for over one million people in cultivation, processing and trade sectors (Anonymous, 2014). In Karnataka, majority of growers taken pepper as a mixed crop with robusta coffee due to lesser shade requirement for the robusta (John, 2000).

In North Eastern region of India, coffee cultivation covers around 6600 ha benefitting more than 9000 families (Anonymous, 2016). Robusta coffee cultivation is confined over 1273 ha mainly in the states of Arunachal Pradesh, Assam, Meghalaya and Nagaland. In Arunachal Pradesh, robusta coffee is cultivated in Tirap, Changlang, Subansiri and Lohit district (Langthasa and Kamalapuri, 2013) covering 153 ha (Langthasa and Bora, 2013). A comprehensive survey of suitable areas for coffee cultivation in Arunachal Pradesh was conducted during 1970s by the Coffee Board of India and 3980 ha was found suitable in the state. Coffee Board of India is promoting coffee cultivation in Arunachal Pradesh by providing technical and financial support to the tribal coffee growers. Coffee is grown alone or as in combination with other crops like arecanut, orange and black pepper. The main objective of the coffee development programme is not only to increase the production of coffee but also to wean out the age old practice of Jhum / shifting cultivation practised by the tribal people of the state. It also envisaged providing a permanent source of income to the tribals (Langthasa and Bora, 2013) (Table 1).

The main objective of this study was to study the economic viability of robusta coffee as a permanent source of income for the tribal people of Tirap district of Arunachal Pradesh.

### **Materials and Methods**

The study was carried out in the year 2011-12 to 2013-14 at the Technology Evaluation

Centre (TEC), Deomali established by Coffee Board of India in Tirap District of Arunachal Pradesh. The total area under robusta coffee is 13.0 ha. The average number of plants per hectare is 1027 with an average age of 21 years. All the blocks of the TEC are more than 10 years old. The major robusta coffee variety in the TEC is CxR. The intercrops grown with robusta coffee are balck pepper, orange and arecanut.

### **Comparative rainfall data of TEC, Deomali**

The rainfall data was collected from the meteorological observatory of the TEC, Deomali. The average distribution of rainfall from 2011 to 2013 was 3965.7 mm of which 29% (1163 mm) received during January to May, 64% (2556.7 mm) received during June to September due to South-West monsoon and 6% (245.7 mm) received during October to December. The blossom showers were adequate during 2011 and 2012. But during 2013, the blossom shower was less than required, while the backing showers were normal in all the years (Table 2).

The data pertaining to area, rainfall, labour utilization, input usage and other information were obtained from the official record of TEC, Deomali. The analysis was carried out for the pooled group without considering the age of the plants and variety (Babu Reddy *et al.*, 2001). Tabular and cost benefit analysis was done by calculating the benefits-cost ratio and break even yield for the entire farm and on per ha basis. However, while calculating the costs, the managerial cost is not included as Coffee Board of India maintains the farm.

### **Results and Discussion**

#### **Labour man days utilization**

The average labour man- days of 4476 were utilised for the years 2011-12 to 2013-14 for

the entire farm and it worked out to be 344 man-days per ha. The major cultural operations of the TEC are harvesting and processing (32%) followed by bush management 13%, weed control 12%. In TEC Deomali, ripening is not uniform due to running blossom. As a result, more man-days are required for harvesting and processing (Table 3).

**Costs and returns**

Perusal of table 4 indicated that the average total cost of cultivation of the TEC was Rs. 538360 for the entire farm and it worked out to be Rs. 41412 per ha. Of the total cost labour wages alone accounted for 65% followed by processing cost (22%) and fertiliser cost (6%).

**Table.1** Area, plant population and age of different robusta coffee varieties in TEC, Deomali

<b>Selections/ Varieties</b>	<b>Bearing Area(ha)</b>	<b>Aprox. no of plants</b>	<b>Avg. Age (years)</b>
CXR	1.50	1559	11
S-274	1.00	927	30
Rob-mix	0.25	322	30
CXR	1.00	912	30
BR Series	1.00	1200	30
S-274	2.00	2394	29
CXR	1.00	986	26
CXR	1.00	702	24
CXR	0.50	672	23
CXR	2.25	2074	28
CXR	1.50	1601	16
Total	13.00	13349	Avg: 25

**Table.2** Comparative rainfall data of TEC, Deomali

Months	2010 RF in mm	2011 RF in mm	2012 RF in mm	Average annual RF (2010-2012)	Average rainy days (2010-2012)
January to May	1338	730	1421	1163.0	27
June to September	2602	2541	2527	2556.7	75
October to December	252	230	255	245.7	9
Annual total	4192	3502	4203	3965.7	111
Blossom Shower	184	75	15		
Backing Shower	160	81	95		

**Table.3** Comparative statement of man-days utilised for robusta coffee cultivation in TEC, Deomali

Cultural operations	2011-12		2012-13		2013-14		Avg (2011-12 to 2013-14)		% to total
	whole farm	Per ha	whole farm	Per ha	whole farm	Per ha	whole farm	Per ha	
Weed control	444	34	504	38	424	33	557	43	12.44
Fertilizer application	176	13	0	0	0	0	59	4	1.31
Bush management	578	44	625	48	532	41	578	44	12.91
Shade management	47	3	51	4	63	5	54	4	1.2
Plant protection	2	0.15	2	0.15	5	0.38	2	0.13	0.04
Soil management	12	1	22	2	64	5	33	3	0.74
Gap filling	85	7	39	3	53	4	59	5	1.31
Harvesting and processing	1624	125	1442	111	1288	99	1451	112	32.42
Miscellaneous	137	11	42	3	499	38	227	17	5.07
Paid holidays	840	65	832	64	798	61	823	63	18.39
Night watch and ward	295	23	306	24	303	23	301	23	6.72
Fence repair	0	0	9	0.69	0	0	3	0.23	0.07
Fire path cleaning	0	0	0	0	0	0	0	0	0
Other works	456	35	518	40	311	24	328	25	7.33
Annual repair/white washing	0	0	0	0		0	0	0	0
Annual Total	4696	361	4392	338	4340	334	4476	344	100
Construction works	0	0	0		0	0	0	0	
Annual Total	4696	361	4392	338	4340	334	4476	344	

Note: Harvesting and processing includes harvesting of coffee, black pepper, orange and arecanut.

**Table.4** Statement of cost of production in TEC, Deomali

Cultural operations	2011-12		2012-13		2013-14		Avg (2011-12 to 2013-14)		% to total
	whole farm	Per ha	whole farm	Per ha	whole farm	Per ha			
<b>1. Cost of cultivation(Rs)</b>									
a) Labour wages inclusive of all allowances and benefits	354552	27273	342453	26343	340562	26197	345856	26604	65.15
b) Input costs									
Fertilizers	105100	8084	0	0	0	0	35033	2695	6.6
Pesticides	98	8	81	6	156	12	112	9	0.022
Processing costs	121599	9354	109057	8389	114619	8817	115091	8853	21.68
Fuel charges/ Electricity bill	25282	1945	23102	1777	18296	1407	22227	1710	4.19
c) Land revenue	13	1	13	1	13	1	13	1	0.002
d) Depreciation on capital items	7500	577	7500	577	7500	577	7500	577	0.01
Other charges	13458	1035	12226	940	11899	915	12528	963	2.36
Total cost of cultivation	627602	48277	494432	38033	493045	37926	538360	41412	100
Cost per kg of clean coffee (Rs.)	51		62		47		52		

**Table.5** Statement of returns and economic analysis in TEC, Deomali

	2011-12		2012-13		2013-14		Avg (2011-12 to 2013-14)		% to total
	whole farm	Per ha	whole farm	Per ha	whole farm	Per ha	whole farm	Per ha	
<b>II Yield realization (kg)</b>									
Robusta Cherry	23655	1820	15433	1187	20148	1550	19745	1519	99.54
Quantity of seed coffee	123	9	118	9	57	4	99	7	0.5
<b>Total yield</b>	23778	1829	15551	1196	20205	1554	19845	1526	100
<b>Yield of clean coffee</b>	12292	946	7940	611	10560	812	10264	790	
<b>III Gross revenue Rs.</b>									
a) Value of seed coffee	24600	1892	23600	1815	11400	877	19867	1528	1.66
b) Value of clean coffee	1320148	101550	1097076	84390	1071871	82452	1163032	89464	97.04
<b>Gross income from coffee</b>	1344748	103442	1120676	86206	1083271	83329	1182898	90992	98.70
c) Value of products from inter crops(pepper, orange)	3800	292	6250	481	36800	2831	15617	1201	1.30
<b>Total gross revenue Rs.</b>	1348548	103735	1126926	86687	1120071	86159	1198515	92194	100
Gross revenue per kg of cc	110		142		106		119		
<b>IV. Net Revenue (Rs.)</b>	720946	55458	632494	48654	627026	48233	660155	50782	
Net Revenue per kg of cc	59		81		60		67		
<b>V. Cost benefit ratio</b>	2.15		2.28		2.27		2.23		
<b>VI. Break Even Yield (cc)</b>	5737	441	3503	269	4806	370	4617	355	

The average gross revenue realised per ha from all sources was Rs. 92,194 while it was Rs. 90,992 from the sale of coffee. The gross revenue from coffee worked out to be Rs. 119 per kg while the net revenue was Rs. 67 per kg after deducting the total cost of cultivation of Rs. 52 per kg.

### **Break –even analysis**

The benefit-cost ratio of 2.23 for the three years from the coffee cultivation without including the returns from inter crops and 2.26 when the income from inter crop was included indicating that the TEC is performing efficiently. The break-even yield showed that an average yield of 355 kg clean coffee per ha has to be produced to meet the cost of cultivation.

Based on the obtained results, it could be concluded that under the prevailing condition of Tirap district of Arunachal Pradesh, the average productivity of robusta coffee for three years (2011 to 2013) was 790 kg clean coffee/ha. Though it is less than the Indian national average of 1144 kg clean coffee per ha but with a benefit cost ratio of 2.33 it can act as a viable plantation crop for the tribal growers of the district as a permanent source of income.

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