

Original Research Article

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## Management of Black Pepper Economy in Kodagu District of Karnataka, India

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### ABSTRACT

This paper attempts to know the management of black pepper economy in Kodagu district of Karnataka. Today in India, these states fits in with the Kerala, Karnataka, Tamil Nadu and Pondicherry states of India. The Karnataka state production of black pepper is 8048 metric tonnes with covering 28182 ha of area in the period 2013-14. The major districts which grow black pepper in Karnataka state were Kodagu, Chikkamagaluru, Hassan, Dakshina Kannada, Shimoga, Uttara Kannada and Udupi. Kodagu area has 3 taluks. It has been found that all the 3 taluks growing the black pepper which are Virajpet, Madikeri and Somwarpet were chosen for the study. The statistical technique, Benefit Cost Ratio is utilized to know economy of black pepper. Systematic implementation is vital for better production by expanded through higher yield varieties were panniyur series, sreekara etc, and appropriation of superior post-harvest technologies. The privately owned business houses must come up to bolster the growers, especially small and medium growers of black pepper. Processing units should be developed for wide expansion of value added products of pepper, are utilized as a part of pharmaceutical industries, preservatives, antioxidant, antiseptic and antibiotic properties. Besides, they also play quite a significant part in the national economics of India. The black pepper value added products are good in demand nowadays, due to globalization and liberalization have postured the challenges to Indian spices, which is the significant export gaining commodity.

#### Keywords

Benefit cost,  
Black pepper,  
establishment cost,  
Kodagu and  
maintenance cost.

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### Introduction

Black pepper assumed crucial part all through history and it is local to India and broadly developed in tropical areas. Ravindran P N (2012), described that the black pepper has its origins in the ancient Malabar Coast and the black pepper trade was initially restricted to this region, which was trading with Arab countries and pepper plantations which were established in Malaysia and Indonesia islands. In Karnataka state production of black pepper is 7567 metric tonnes with an area of 12265 ha during the 2002-03. In the recent past, area is

increased to little production extent of 8048 metric tonnes with covering of 28182 ha of area during the period 2013-14. The district-wise area and production of black pepper in Karnataka during 2002-03 to 2013-14, the area and production of the black pepper is analyzed by average growth. Kodagu district is the major district in which stands first position with 8845.6 ha, second is Chikkamagaluru with 4399.8 ha, third position Hassan 2917.8 ha followed by Dakshina Kannada with of 2066.8 ha, Shimoga holds 820.66 ha, Uttara Kannada

with 335.16 ha. However other districts have an area 356.58 ha in Karnataka state. In the scenario of Karnataka, major district are taken in that Kodagu district stands first position with 3318.7 metric tonnes, second is Chikkamagaluru with 1833.1 metric tonnes, third position Hassan 1366.3 metric tonnes followed by Dakshina Kannada with of 557.5 metric tonnes, Shimoga holds 257.08 metric tonnes, Uttara Kannada with 153 metric tonnes and Udupi covers with 115 metric tonnes. However other districts have an area 152.53 metric tonnes (Horticulture statistics of Karnataka state at a glance 2013-14). In Kodagu district, three taluks are classified into Virajpet 5674 ha, Madikeri 3383 ha, Somwarpet 1918 ha in 2013-14. Anita Rosli *et al.*, (2013) Farm maintenance requires preparation before and after harvest season to minimize the damages of pepper vines and to maintain quality and quantity of pepper berries. Farm maintenance includes mounding, liming before planting, pruning, weeds control, fertilizing, and pest and disease control. The India's import of black pepper has been diminishing progressively from 17565 metric tonnes in 2011-12 to 15680 metric tonnes in latest year 2013-14, (Spices Board Statistics - 2015).

India has stable in production of 58000 metric tonnes of black pepper (International Pepper Community Statistics, 2015). Pepper marketing channels comprises of growers, middlemen assembling business, Terminal markets then domestic market and exporters. Under the present framework the growers can offer their produce in so many ways.

The most generally practiced marketing channel is collecting directly from the growers by the local merchants, wholesale traders and then that the exporters who is the final link in the chain. The private sector operation is principally through commission agents who collect the produce from the

small growers and discard these produce to the retail exchange, at a cost determined by demand and supply.

The main objectives include to study the area and production of black pepper in Kodagu district. And to examine the marketing cost and growers returns of black pepper in study area.

### **Materials and Methods**

The study has taken into account the both primary and secondary information. Primary data was gathered during 2015 from black pepper growers through well-structured questionnaire. Kodagu area has 3 taluks, it has been found that all the 3 taluks growing the black pepper which are Virajpet, Madikeri and Somwarpet taluks were chosen for the study. There are 296 villages from all the 3 taluks of the Kodagu region. I analyzed 10 per cent of villages which are growing black pepper for my study. I have chosen 7 villages in Madikeri taluk, 14 villages in Somwarpet taluk and 9 villages in Virajpet taluk on the premise of growing villages. Hence, an aggregate 30 villages have been randomly chosen with the end goal of study, from each village 10 black pepper growers have been randomly decided for interviews. The sample size is 300 black pepper growers were chosen and interviewed randomly from the every one of the three black pepper producing taluks for the study.

The respondent's conclusion was gathered from field review from black pepper growers. The statistical techniques are adopted to draw a positive and precise conclusion in the proposed study. The secondary information was gathered from different sources like Spice Board of India, State Horticulture Department, and the International Pepper Community.

**Benefit-Cost Ratio (BCR)**

It is the ratio of discounted cash inflows (project benefits) to the discounted cash outflows (project costs) which must be more than unity for a private enterprise to be considered worthy for investment.

BCR= Present Worth of Benefits/ Present Worth of Costs

$$BCR = \frac{\sum (B_n / (1+d)^{-n})}{\sum (C_n / (1+d)^{-n})}$$

Where,

- B<sub>n</sub> = Benefits in each year
- C<sub>n</sub> = Costs in each year
- N = Number of years
- D = Discount rate

**Results and Discussion**

Table 1 reveals the expenditure on material and labour cost of all activities made for black pepper plantation was classified into establishment cost and maintenance cost. The estimation included both establishment and maintenance cost. The cost spending in establishing the black pepper plantation up to three years formed the total value of the pepper plantation was Rs. 85960 per acre. The establishment cost in the black pepper plantations were classified into material cost and labour cost. The material and labour cost incurred during the first three years were considered. The total value of establishment of black pepper plantations Rs. 85960 and the work force of 100 labourers for 3years. The material cost included items like black pepper plants/ cuttings, FYM, chemical fertilizers (urea, phosphate, potash and lime), irrigation materials and miscellaneous. The first year for establishing material cost per acre was Rs. 32600. The second year material cost for establishment quantity, expenditure of Rs. 700 and Rs. 11330

respectively. The third annual average maintenance cost was Rs. 12430. The total expenditure of establishment cost of materials Rs. 56360 per acre for first three years. The labour cost included the cost of labour employed for land preparation, digging and filling pits, planting, application manure and fertilizers, chemicals application for plant protection, weeding, irrigation and miscellaneous cost includes mulching, thrashing, shade regulation and harvesting. The total labour expenditure on establishment of pepper plantations out of Rs. 29600 for 100 labourers, first year cost Rs. 16500 with the 58 labourers, the second annual establishment slightly lower than first year 6850 cost for 22 labourers. The third year cost with 20 labourers was Rs. 6250. The results are in line with Tejaswi *et al.*, (2006), studied the establishment cost of coffee and black pepper as a mixed crop and also maintenance cost of coffee and pepper plantations.

The annual average maintenance cost in the black pepper plantations were also classified into material and labour cost. The material cost were the cost incurred during the maintenance of the plantation when it started bearing, which is from the third year onwards. The material cost included the cost of FYM, chemical fertilizers, irrigation, lime, fuel, harvesting materials and miscellaneous expenses. The labour cost included the cost of labour employed for the irrigation, application of FYM, application of chemical fertilizers, tying vines, liming application, pruning (mulching and trashing), harvesting, pepper drying, bagging transportation, marketing, miscellaneous expenditure.

**Annual average maintenance cost of blackpepper plantations**

Table 2 exhibits the cost incurred towards material and labour during the bearing period from the annual average maintenance cost.

The cost incurred on FYM was the highest among material cost of Rs. 8000 for black pepper plantations. In this study high amount of chemical fertilizers was required for black pepper maintenance per acre cost was Rs. 2000. The cost of plant protection chemicals accounted for Rs. 2000. Irrigation is very important for plantation and it cost Rs. 2500, Lime was applied every year to pepper and the expenditure was Rs. 4000; due to heavy rainfall in the study area, most of the basic cations namely calcium, magnesium and potassium got leached out of the soil profile. As a consequence of extensive leaching of bases, the pH of the soil got reduces; thereby leading to development of acidic soils. In order to overcome this problem, lime was applied as an antidote at regular intervals. In crucial time they use fuel for generators to pump the water to plantations of Rs. 1000, harvesting bags and miscellaneous cost were Rs. 1000, Rs. 1050 respectively. The total material cost expense was around Rs. 21550 for annual average maintenance of black pepper. The magnitude of labour cost in the total maintenance cost keeps varying depending on the fluctuations in black pepper prices. Labour cost for irrigation Rs.1500 for 6 labourers, application of farm yard manure covers 6 labourers with Rs.1200, and application of chemical fertilizers amounted Rs.1800 for 6 labourers. The application of plant protection chemicals is very important in all the categories of plantations due to the incidence of disease. It may be observed that none of the growers use any plant protection chemicals for black pepper plants as there was no incidence of pests. However, 'pepper wilt' was the most common disease observed, which according to the growers could be overcome by proper drainage. The labour cost includes the expenditure of tying vines (Rs.1250), lime application (Rs.1500), pruning (mulching and trashing) Rs.2500. The growers employ labour as per the actual

requirement. However, when the prices anticipated are low, the growers reduce the labour employed to almost half of the actual requirement. Harvesting was one of the major labour cost due to the prolonged harvesting period in case of pepper which cost Rs. 5000 for 8 labourers, after harvesting of pepper is dumped on the field and also pepper is spread on tarpaulin mats in the sun drying. Bagging transportation and marketing cost covers Rs.1200. The total labour cost for maintenance of black pepper plantation was incurred Rs. 18950 with 61 labourers in one year of activities for looking after black pepper plants per acre. The interest on working capital with Rs.2525, the fixed cost included rental value of land taken as normal value of Rs. 8000, maintenance of farm equipment's (Rs.500), tarpaulin cost Rs. 1000, mechanical threshers used for pepper separation 3/kg which is around Rs.900, electricity charges (Rs.850) and amortized establishment cost @14 per cent assumed Rs.12979. The total maintenance cost of black pepper plantations per acre amount about Rs. 67254, similar results are in line with Sanusi (2013), examined the profitability of black pepper production in Ogun State, Nigeria.

Table 3 shows the average yield and returns of black pepper plantations undergoes different phases, i.e., increasing yield, stabilized yield and declining yield. The yield of black pepper showed similar trend across plantations. For this study, the life span of black pepper plants was taken as 20 years were considered in order to equate their life span. In case of black pepper, the yield was taken according to the age period of the black pepper plantations (4<sup>th</sup> to 20<sup>th</sup> years). The per acre yield of black pepper across plantations varied from 280kg to 300kg depending upon the plant population.

**Table.1** Establishment cost of black pepper plantation Rs. per acre

A	Materials cost	Units	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 <sup>rd</sup> year		Total value	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
1	Black Pepper plants/ cuttings	(No's)	300	2500	30	250	-	-	330	2750
2	Farmyard manure	(Kg)	200	2500	250	3000	250	3000	700	8500
3	Chemical fertilizers									
	a. urea	(Kg)	100	580	100	640	150	960	350	2180
	b. phosphate	(Kg)	100	780	100	840	150	1260	350	2880
	c. potash	(Kg)	100	1740	100	1800	150	2610	350	6150
	d. lime	(Kg)	120	3000	120	3600	120	3600	360	10200
4	Irrigation	-	-	20000	-	-	-	-	-	20000
5	Miscellaneous	-	-	1500	-	1200	-	1000	-	3700
	Sub total	-	-	32600	-	11330	-	12430	-	56360
<b>B</b>	<b>Labour cost</b>		Labourers	Cost	Labourers	Cost	Labourers	Cost	Labourers	Cost
1	Land preparation (Digging pits, Planting vines)	(No's)	16	4000	2	600	-	-	18	4000
2	Application of fertilizers	(No's)	10	2500	5	1500	5	1500	20	5500
3	Protection of plants	(No's)	10	2500	5	1500	5	1500	20	5500
4	Weeding	(No's)	10	2500	5	1000	5	1000	20	4500
5	Irrigation	(No's)	12	3000	5	1250	5	1250	22	5500
6	Miscellaneous	-	-	2000	-	1000	-	1000	-	4000
	Sub total	-	58	16500	22	6850	20	6250	100	29600
	<b>Total cost</b>	-	-	<b>49100</b>	-	<b>18180</b>	-	<b>18680</b>	-	<b>85960</b>

Sources: Primary data - 2015

**Table.2** Annual average maintenance cost of black pepper plantations for Per acre

<b>A</b>	<b>Materials cost</b>	<b>Units</b>	<b>Quantity</b>	<b>Cost</b>
1	Farmyard manure	(Kg)	2000	8000
2	Chemical fertilizers	(Kg)	300	2000
3	Plant protection chemicals	(liter)	10	2000
4	Irrigation		-	2500
5	Lime	(Kg)	200	4000
6	Fuel	(liter)	17	1000
7	Harvesting bags		-	1000
8	Miscellaneous		-	1050
	Total		-	21550
<b>B</b>	<b>Labour cost</b>		<b>Labourers</b>	<b>Cost</b>
1	Irrigation	(No's)	6	1500
2	Application of farmyard manure	(No's)	6	1200
3	Application of chemical fertilizers	(No's)	6	1800
4	Application of Plant protection chemicals	(No's)	6	1800
5	Tying vines	(No's)	5	1250
6	Liming application	(No's)	5	1500
7	Pruning (Mulching and trashing)	(No's)	10	2500
8	Harvesting	(No's)	8	5000
9	Pepper drying	(No's)	5	1200
10	Bagging transportation and marketing	(No's)	4	1200
	Total labour	-	61	18950
	Interest on working capital		-	2525
	Total variable cost		-	43025
<b>C</b>	<b>Fixed cost</b>			
1	Rental value of land		-	8000
2	Maintenance of farm equipment's		-	500
3	Tarpaulin/Mats		-	1000
4	Mechanical threshing (pepper separation Rs.3/Kg)		300	900
5	Electricity charges		-	850
6	Amortized Establishment cost @ 14%		-	12979
	Total fixed cost		300	24229
	<b>Annual average total maintenance cost</b>		-	<b>67254</b>

Sources: Primary data - 2015

**Table.3** Average yield and returns from blackpepper plantations

SL. No	Black pepper plantations	Quantity (kg)	Value (Rs.)
1.	<b>Black pepper</b>	300	165000
a.	Gross returns	-	165000
b.	Annual average maintenance cost	-	67254
	<b>Net returns</b>	<b>300</b>	<b>97746</b>
	<b>Benefit cost ratio</b>		<b>Rs. 2.45</b>

**Sources: Primary data - 2015**

The curing of pepper either by sun drying or by using traditional driers was the common practice while pepper was drying through sunlight by the growers in the study area. When the anticipated prices of black pepper are more remunerative with 550 per kg, the per acre gross returns generated were about Rs.165000 and corresponding net returns were about Rs.97746. The Benefit Cost Ratio of the investments on black pepper plantations was found to be more than unit indicating that investment in plantations is financially viable BCR 2.45 rupees. Since the BCR is directly proportional to the magnitude of net returns obtained, it was highest in the case of pepper plantations the results are similar to Thankamani (2012), investigated and indicated that intercropping medicinal plants provided income during establishment phase of black pepper. The returns realized over the years could be used for further investment. This aspect of reinvestment and possible returns from such activity is absent in this criteria.

### **Suggestion**

Production must be expanded through cultural practice of higher yield varieties panniyur-2, panniyur-3, panniyur-6, panniyur-7, sreekara, subhakara, panchami, pournami, karimunda, sakthi. Systematic implementation is vital for better production and appropriation of superior post-harvest technologies as well as better planting materials through biotechnology. The

privately owned business houses must come up to bolster the growers, especially small and medium growers of black pepper. This structure reduces risk of the growers and minimizes establishment cost. There is space for extension of more pepper vines in area/small landholdings as intercrop with coconut and arecanut and other crops. Potential outcomes will rise with expanding number of pepper vines; in this way it will significantly enhance the pepper production. Processing units should be developed for wide expansion of value added products of pepper, the pepper products such as white pepper, green pepper, pink pepper, pepper oil and pepper oleoresin. Some are utilized as a part of pharmaceutical industries and other possess preservatives, antioxidant, antiseptic and antibiotic properties. Besides, they also play quite a significant part in the national economy of India and also in the national economics. These products are recent competitors at the pepper exchange and as yet have found an outlet only as specialty items in certain importing consumer markets.

Government policy must be framed separately for pepper extension. Applications should be developed by technology. It must answer inquiries of growers related to advancement of pepper yield by nutrient supply management and also provide proper integrated pest and disease management. More information should be provided about production innovation and management of pepper.

In conclusion, the black pepper production is an economic activity since it comes under high value crop in Kodagu district. From the research study, it is noted that the growers are facing problems such as heavy rainfall, labour scarcity, lack of finance, scarcity of water resources, no integrated pest management system, high cost of organic farming. The growers facing problems in climate that leads to low productivity of black pepper. It is also noticed that there is also required of adopting efficient post-harvest management, and encourage of value added products of black pepper in the study area. The black pepper value added products are good in demand nowadays, due to globalization and liberalization have postured the challenges to Indian spices, which is the significant export gaining commodity.

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