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Input management for improving spices productivity in Mungeli district of Chhattisgarh

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Abstract

The present paper reviews the research and development status of spices in India in the last seven decades. Spices are one of the important groups of spice crops being cultivated in the arid and semi-arid region of the country. These crops are attaining importance day by day due to its aromatic and medicinal values; the present era is reflecting high International demand of Indian spices. The research achievements till date have been very concise for developing, numerous high yielding disease resistant or tolerant varieties. The area of research have been focused mainly on designing packages to harvest more, production of better quality and consumer safe produce is yet to come. The problems and challenges in the cultivation of spices are enormous and each has to be answered with the changing climatic scenario in the time to come. New problems are also coming up in many of the spice crops. Economic analysis for input management for improving spices productivity with the objective to work out the cost and return and marketing pattern of the major spices onion, chilli, and coriander in the study area. The study was conducted in Mungeli district of Chhattisgarh state.

Keywords: Cost of cultivation, manure and fertilizer application, major spice crop coriander production, productivity and yield of spices

Introduction

The term spices refer to such natural plants or vegetable products or mixtures in whole or ground form and as used for imparting flavor, aroma and piquancy to and for seasoning of foods. Spices may consist of different parts such as floral parts (clove, saffron), or fruits (Cardamom, Chillies) or berries (Black pepper) or seeds (cumin, celery, coriander) or rhizome (Ginger, Turmeric) or roots (horse radish) or leaves (Mints, Tejpat) or kernel (Nutmegs) or aril (Mace) or bark (Cinnamons) or bulbs (Garlic, Onion) or any other part of spice plants. There are about 70 spices grown in different parts of the world. In India, however, the major spices are pepper, cardamom, ginger, turmeric and chillies. India is also the largest consumer of spices. Commercial cultivation in India is undertaken on 27 spices besides the herbal spices. Among the spices cultivated, black pepper, "the king of spices" is the most important dollar-earning crop in state economics. Kerala is in the foremost position contributing 96% of area and 97% of production of black pepper". India's unquestioned status throughout history as the largest producer and exporter of black pepper in the world is now under threat with the preliminary forecast on production and export data from Vietnam. Cardamom, renamed, as the queen of spices is an important commodity of international trade. India has enjoyed near monopoly in area, production and export of cardamom up to early eighties. As Guatemala stepped up its production from mid-eighties, India was relegated to second position in production, productivity and export of Cardamom. India needs to boost up its production to regain the lost eminence of Cardamom trade.

Spices production is adversely affected by Pest and disease incidences and reduced use of chemical control measures. Many farmers neglect the protection measures, as they are costly. To improve the quality of spices handled at various stages, it is necessary to impart training to farmers, traders and exporters. Various sources such as, 'spices production technology and nursery management', organizing farmers' melas, and seminars to interact with, and to disseminate the latest information generated, to the development of workers as well as farmers are conducted regularly. Spices Board, Cochin has been in the forefront in these activities.

Results and Discussion

Cost of cultivation

(a) Variable cost

This include family human labour wages, hired human labour wages, bullock labour wages, power labour wages, seed cost, plant protection material cost, manure and fertilizer cost, interest on working capital. It is calculated in Rs./ha.

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(b) Fixed cost

This includes rental value of owned land, depreciation, land revenue and interest on fixed capital.

The cost and returns on the basis of cost concept

Cost A1: consist of following 16 items of costs

1. Value of hired human labour (permanent and casual)
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Value of owned machinery
5. Hired machinery charges
6. Value of fertilizers
7. Value of manures (owned and purchased)
8. Value of seed (farm produced and purchased)
9. Value of insecticide and pesticide
10. Irrigation charges
11. Canal water charges
12. Land revenue and other taxes
13. Depreciation on farm implements (bullock drawn and use by human labour)
14. Depreciation on farm building, farm machinery and irrigation structure
15. Interest on working capital
16. Miscellaneous expenses (artisans, ropes and repair to small farm implements)

Cost A2 = Cost A1 + Rent paid for leased in land.

Cost B1 = Cost A1+Interest on value of owned fixed capital.

Cost B2 = Cost B1+ Rental value of owned land and Rent paid for leased in land.

Cost C1 = Cost B1+ imputed value of family labour.

Cost C2 = Cost B2+ imputed value of family labour.

Cost C3 = Cost C2+10% of cost C2 on account of managerial function performed by farmer.

Income over cost A1 = Output Value – Cost A1

Income over cost A2 = Output Value – CostA2

Income over cost B1 = Output Value – Cost B1

Income over cost B2 = Output Value – Cost B2

Income over cost C1 = Output Value – Cost C1

Income over cost C2 = Output Value – Cost C2

Income over cost C3 = Output Value – Cost C3

Rental value of land

The rental value of major spices included for study was estimated at prevailing market rate which varied from 4700 to 5200 Rs per hectare in the study area. It was calculated only

for specific crop duration. The crop duration was taken as 4 months for coriander, 3 months for chilli and onion.

Marketing pattern followed by the respondents

To study the marketing pattern of the respondents, they were asked to indicate the nature of marketing, it includes where, when, to whom and through which channel, they sell their produce of spices. Responses obtained from the farmers were expressed in frequencies and percentages.

Constraints analysis in production and marketing of major spices

The problem faced in cultivation and marketing of spice growers of the study area were listed out during field survey. From the responses obtained from the spice growers, frequency and percentages were calculated for each constraint faced by the respondent.

Interest rate

The interest on working capital calculated at the rate of 2.67 per cent for 4 month for coriander, and 3 month on other major spices crop.

Cost of cultivation of spices

To estimate the cost of cultivation of spices crop whole cost is divided in to two heads i.e. variable cost and fixed cost. The various cost components like human labour, bullock and machine power, manure and fertilizer, seed, irrigation, plant protection material and chemicals are taken in to consideration in order to work out the per hectare variable cost of cultivation. The interest on working capital involved in the cultivation is also computed at the prevailing rate of interest. The cost of cultivation is estimated by using simple mathematical analysis.

Land use pattern

Mungeli district has total geographical area of 27, 5036 hectares. The forest area has 1,944 ha. Which is 0.70 percent of total geographical area. About 8.32 percent land is not available for cultivation while about 0.92 percent land under fallow of the total geographical area. The net and gross cropped area is about 0.04 percent and 0.07 percent respectively of the total geographical area of the district. The cropping intensity is 0.05 percent only. The detail information about the land use pattern is presented in Table 1.

Table 1: Land use pattern in the study area

S. No.	Particulars	Area (ha)	Percentage
1.	Total geographical area	275036	(100.00)
2.	Area under forest	1944	(0.70)
3.	Area under non-agricultural use	11609	(4.22)
4.	Barren and uncultivable land	0.229	(8.32)
5.	Permanent pastures and grazing land	17618	(6.40)
6.	Fallow land old fallow + current fallow	2554	(0.92)
7.	Net sown area	127906	(46.50)
8.	Gross sown area	208007	(75.62)
9.	Cropping intensity (%)		162

Note: Figures in parentheses indicate percentage to total geographical area.

Source: Commissioner of land record and settlement, Chhattisgarh, Raipur (2011-12)

Irrigation

Category-wise area under various sources off irrigation is presented in Table 3 Shows that bore well and tube well is main sources of irrigation as about 78 percent area is irrigated

by these two sources. Canal is another source of irrigation which contributes about 20 percent to the total irrigation at these farms.

Table 2: Size of holding and irrigation at sampled of farms (ha./farm)

S. No.	Particulars	Marginal	Small	Medium	Large	Average
1.	Total owned land	0.91 (17.92)	1.45 (87.87)	2.67 (103.89)	3.24 (105.53)	2.06 (99.03)
2.	Leased-in land	0.15 (14.15)	0.19 (11.51)	0 (0.00)	0 (0.00)	0.08 (3.84)
3.	Leased-out land	0 (0.00)	0 (0.00)	0.10 (3.89)	0.17 (5.53)	0.06 (2.88)
4.	Total cultivated area	1.06 (100.00)	1.65 (100.00)	2.57 (100.00)	3.07 (100.00)	2.08 (100.00)
5.	Irrigated area	0.23 (21.69)	0.32 (19.39)	0.68 (26.45)	1.48 (48.20)	0.67 (32.21)
6.	Un-irrigated area	0.83 (78.30)	1.33 (80.60)	1.89 (73.54)	1.59 (51.79)	1.41 (67.78)
7.	Area under spices	0.29 (27.35)	0.36 (21.81)	0.63 (24.51)	0.90 (29.31)	0.54 (25.96)

Table 3: Source-wise irrigated area at sampled farms (ha./farm)

S. No.	Category	Source of irrigation			
		Canal	Tube well	Bore well	Total irrigated area
1.					
2.	Marginal	0.05 (21.73)	0.08 (34.78)	0.10 (43.47)	0.23 (100.00)
3.	Small	0.07 (21.87)	0.11 (34.37)	0.14 (43.75)	0.32 (100.00)
4.	Medium	0.15 (22.05)	0.21 (30.88)	0.32 (47.05)	0.68 (100.00)
5.	Large	0.31 (20.94)	0.48 (32.43)	0.69 (46.62)	1.48 (100.00)
6.	Average	0.58 (19.18)	0.88 (32.47)	1.25 (46.12)	2.71 (100.00)

Note: Figures in the parentheses indicated the percentages in the total irrigated area.

Manure and fertilizer application

Farmyard manure (FYM) or compost @ 30-40 t/ha is applied by broadcasting and ploughed at the time of preparation of land or as basal dressing by spreading over the beds or in to the pits at the time of planting. Fertilizers @ 60 kg N, 50 kg P₂O₅ and 120 kg K₂O per hectare are to be applied in split

doses as given in Table 4 Zinc @ 5 kg/ha may also be applied at the time of planting and organic manures like oil cakes can also be applied @ 2 t/ha. In such case, the dosage of FYM can be reduced. Integrated application of coir compost (@ 2.5 t/ha) combined with FYM, biofertilizer (*Azospirillum*) and half recommended dose of NPK is also recommended.

Table 4: Fertilizer schedule for spices crop (Per ha.)

S. No.	Schedule	Nitrogen	Phosphorus	Potash	Compost/ Cow dusting
1	Basel application	80kg	50kg	50kg	30-40 tonnes
2	After 45 days	30 kg	-	45 kg	-
3	After 90 days	30 kg	-	45 kg	-

Mulching

The crop is to be mulched immediately after planting with green leaves @ 12-15 t/ha. Mulching may be repeated @ 7.5 t/ha at 45 and 90 days after planting after weeding, application of fertilizer and earthing up.

Economics of major spice crop Coriander production

The economics of coriander crop is presented in Table 5 and fig 1. It clearly shows that the cost of cultivation per hectare of coriander was higher on large farms as compared to marginal farms. Over all, on an average the cost of cultivation per hectare of coriander was found to be Rs. 24397.49 per

hectare. The cost of cultivation in case of large farm was higher (Rs. 29105.94 /ha.) as compared to marginal farms (Rs.19715.96 /ha.), small (Rs. 22787.92 /ha.) and medium farms (Rs. 26419.91 /ha.). The cost of cultivation per hectare showed a rising trend with the increase in size of farm. It was due to the fact that the large farmers incurred more expenditure on modern farm input like quality seed, fertilizer, plant protection material, hired labour etc. As their capabilities of investment on major inputs which result better economic status compared to marginal, small and medium farmers.

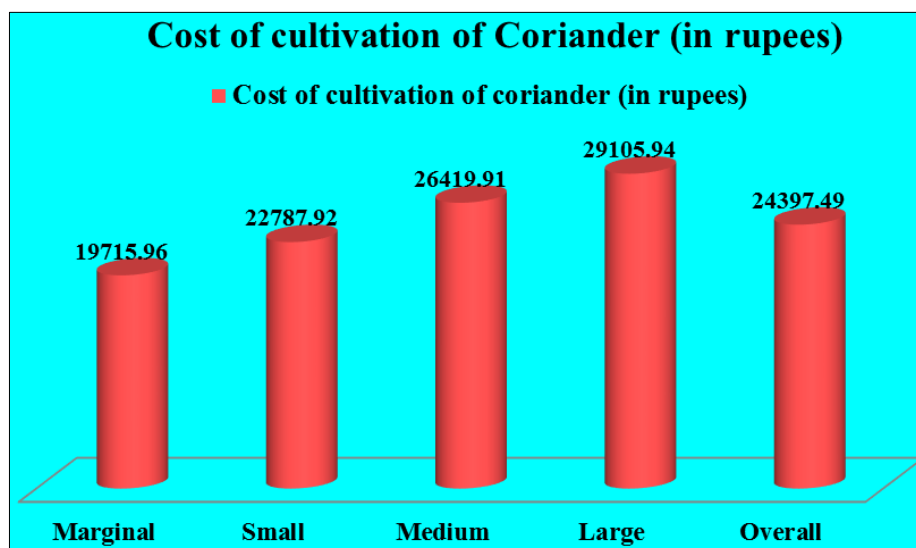
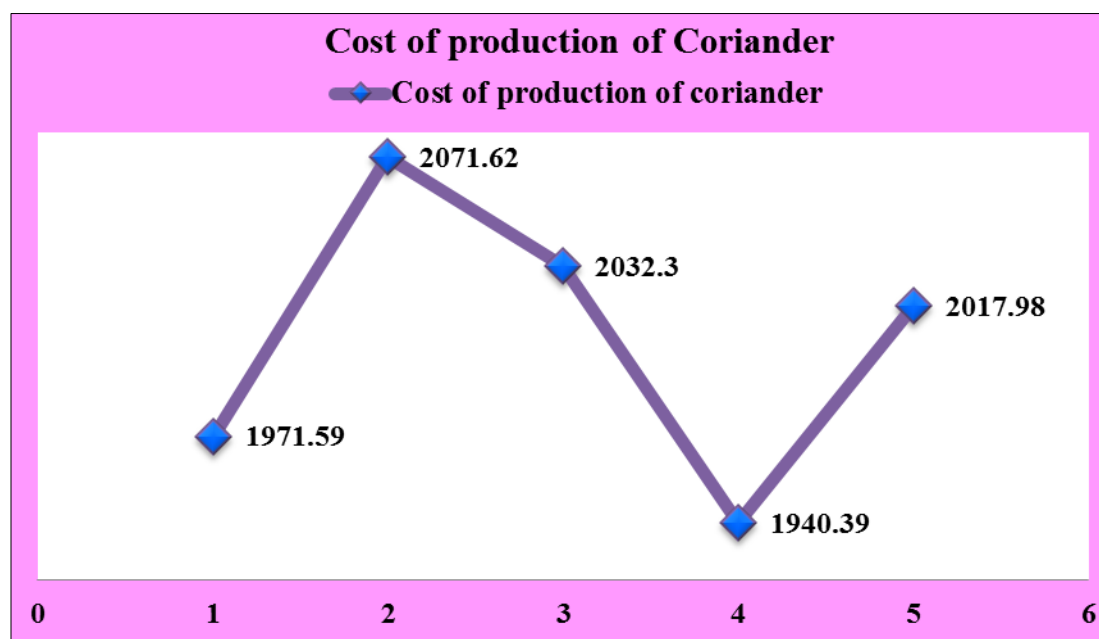
**Fig 1:** Cost of cultivation of Coriander on the sample farms (Rs./ ha.)

Table 5: Economics of Coriander on different size groups of farms (Rs./ha.)

S. No.	Cost	Farm size				
		Marginal	Small	Medium	Large	Overall
(A)	Variable cost					
1.	Human labour					
(a)	Family labour	7400.11 (37.53)	6400.09 (28.09)	4000.15 (15.14)	2500.21 (8.59)	5196.74 (21.30)
(b)	Hired labour	1100.08 (5.58)	2400.12 (10.53)	6300.04 (23.85)	8200.08 (28.17)	4364.21 (17.89)
	Total human labour	8500.19 (43.11)	8800.21 (38.62)	10300.19 (38.99)	10700.29 (36.76)	9560.95 (39.19)
2.	Bullock labour	450.16 (2.28)	210.00 (0.92)	150.19 (0.57)	00.00 (0.00)	206.59 (0.85)
3.	Machine labour	1150.12 (5.83)	1440.11 (6.32)	2150.13 (8.14)	2600.04 (8.93)	1803.62 (7.39)
4.	Seed cost	1850.05 (9.38)	2150.31 (9.44)	2500.00 (9.46)	3500.16 (12.03)	2418.02 (9.91)
5.	Manure & fertilizers	1075.11 (5.45)	2650.00 (11.63)	3240.11 (12.26)	3580.21 (12.30)	2669.66 (10.94)
6.	Plant protection	350.17 (1.78)	950.13 (4.17)	1250.13 (4.73)	1620.00 (5.57)	1037.40 (4.25)
7.	Irrigation	402.00 (2.04)	520.02 (2.28)	650.12 (2.46)	720.11 (2.47)	571.75 (2.34)
8.	Interest on working capital	367.16 (1.86)	445.14 (1.95)	538.04 (2.04)	605.13 (2.08)	487.14 (2.00)
	Total variable cost	14144.96 (71.74)	17165.92 (75.33)	20778.91 (78.65)	23325.94 (80.14)	18755.13 (76.87)
(B)	Fixed cost					
1.	Depreciation	59.94 (0.30)	105.25 (0.46)	122.48 (0.46)	250.00 (0.86)	124.42 (0.51)
2.	Land revenue	5.00 (0.03)	5.00 (0.02)	5.00 (0.02)	5.00 (0.02)	5.00 (0.02)
3.	Rental value of owned land	5000 (25.36)	5000 (21.94)	5000 (18.93)	5000 (20.49)	5000 (20.49)
4.	Interest fixed capital	506.49 (2.57)	511.02 (2.24)	512.74 (1.94)	525.05 (2.10)	512.94 (2.10)
5.	Total fixed cost	5571.00 (28.26)	5621.06 (24.67)	5640.02 (21.35)	5780.05 (23.13)	5642.36 (23.13)
	Total cost = (A+B)	19715.96 (100.00)	22787.92 (100.00)	26419.91 (100.00)	29105.94 (100.00)	24397.49 (100.00)

**Fig 2:** Cost of production of Coriander on the sample farms (Rs./ ha.)

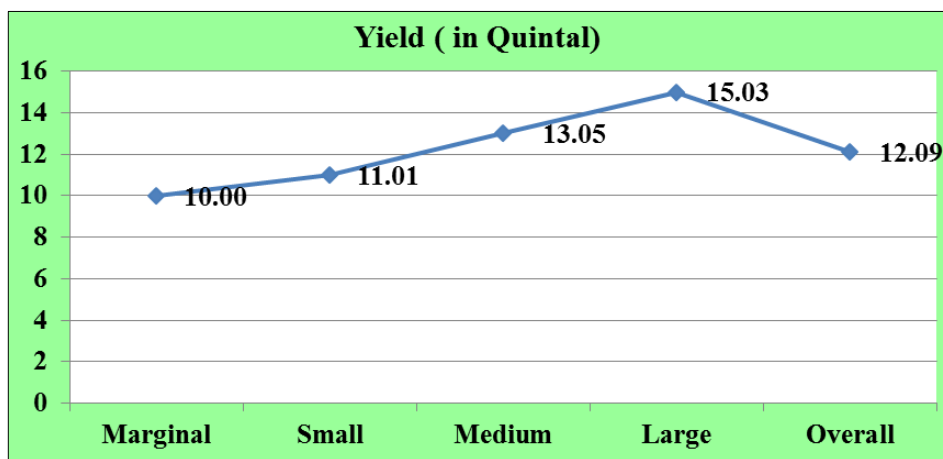


Fig 3: Yield of Coriander (Quintal/ha.)

Yield, value of output and cost of production per quintal

The yield, value of output per hectare and cost of production per quintal of coriander on the sample farms have been worked out in Table 6 and Fig 2 & Fig 3. It indicates that the average yield per hectare of coriander was 12.9 quintal on the sample farms. The cost of production per quintal of coriander on an average was worked out to Rs.2017.98. It came to Rs. 1971.59, Rs. 2071.62, Rs. 2032.30 and Rs. 1940.39 for marginal, small, medium and large farm size respectively. It decreased with the increased in the size of farm due to higher yields in return to the cost of cultivation on the large farm. The average value of production per hectare came to Rs. 64830.77. It was Rs. 52000.16, Rs. 58300.11, Rs. 70200.31 and Rs.82500.19 on marginal, small, medium and large farmer respectively. The higher value of output on large farms was associated with the higher yield.

Conclusion

Chhattisgarh is an agricultural chief land and due to large production of rice, Chhattisgarh is known as the rice bowl. Apart from paddy, spices are also grown. The immense diversity in agro-climatic condition in Chhattisgarh enables to produce large varieties of spices. Area under spices production in Chhattisgarh state is around 82,638 ha. Total spices production from this area is around 54,139 metric tonnes (National Horticulture Mission, Chhattisgarh 2011-12). Coriander, chilli and onion are major spices crop grown in Chhattisgarh. Mungeli district covers 2.77 percent share in total spices area in Chhattisgarh. The prosperity of the region and economic stability to the growers mainly depends upon the optimum scale of the spices production. High risk involves in the production of spices growing to its perishable nature.

References

- Amutha G, Kandan A, Nargis S. Cardamom - Katte disease Marble disease Mosaic. Spice India, (Malayalam). Spices Board, Government of India. 2001; 4(4):3-4.
- Anonymous. Status paper on spices. Trade Information Centre, Spices Board Government of India, Kochi, 1995.
- Benjamin G. Inter cropping of Ginger. Spice India, (Malayalam), Spices Board, Government of India. 2001; 14(4):19-20.
- Chandran KV. Harvesting and Processing of Turmeric. Mathmbhoomi (Malayalam daily) Kochi, 2001, 9-2-2001.
- Das P, Sarma SK. Drying of Ginger using solar cabinet dryer. J Food Science & Technol. 2001; 38(6):9-621.
- Malhotra SK. Development Strategies for spices production in India. Indian J Arecanut, spices, medicinal plants. 2014; 16(2):13.
- Mehta RS, Patel BS, Singh R, Meena SS, Malhotra SK. Growth and yield of fenugreek as influenced by irrigation levels and weed management practices. J Spices Indian Journal of Arecanut, Spices & Medicinal Plants. 2010; 18(1):3-18.
- Malhotra SK. Augmenting Export of Spices. 3rd NNS National Seminar and Exhibition on Spices and Herbs. NASC Pusa, New Delhi. 2010; 11(4):49-55.
- Ravindran PN, Babu NK, Shiva KN, Kallapurackal JA. Advances in Spices Research History of Achievements of Spices Research in India Since Independence. Agrobios (India), Jodhpur, Rajasthan, 2006, 994p.
- Sundria MM, Mehriya ML, Rathore BS, Choudhary BR. Cumin (*Cuminum cyminum* L.) Sustainable Production Technology in Rajasthan. Agricultural University, Jodhpur, Rajasthan, 2014.
- Jose KP, Joy CM. Spices and solar energy. Spice India, (Malayalam). Spices Board, Government of India. 2002; 15(4):20-21.
- Jose KP, George PP, Joy CM. Renewable energy for spice processing. Spices India (English). Spices Board, Government of India. 2001; 14(5):16-22.