

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 4; April 2025; Page No. 141-143

Received: 02-01-2025
Accepted: 05-02-2025

Indexed Journal
Peer Reviewed Journal

To determine area effect, yield effect and interaction effect of major spices crops in northern hills zone of Chhattisgarh

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DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i4c.1752>

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Abstract

Chhattisgarh is one of the important spices producing state in the country with 6.1 lakh metric tonnes of spices production in 2013-14. The main spices produced are chilli, ginger, and turmeric. Keeping the facts in mind the study “dynamics of spices production in northern hills zone of Chhattisgarh” done as a modest effort in this direction for the objectives to determine area effect, yield effect, and interaction effect of spices crop in northern hills zone the analysis data carried out in northern hills zone of Chhattisgarh with the yield played a negative role in the increased production, thus, it can be concluded that whatever the increase observed in the production was due to area expansion or extensive farming and farmer still using old farm production technology like traditional seeds or technologies for various spice production general.

Keywords: Area effect, yield effect, interaction effect, area, production, productivity

Introduction

India is the most important spices producing country in the world, with total area of 3.89 million hectares of spice-growing land. India produces essential spices including Pepper, Cardamom, Chilli, Ginger, Turmeric, Coriander, Cumin, Celery, Fennel, Fenugreek, Ajwain, Dill seeds, Garlic, Tamarind, Clove, and Nutmeg among others.

The total area under spice is 67702 hectare in the Chhattisgarh state with a production of 4,53,604 metric tonnes. Rhizomatous spice crops area under Turmeric (12196 ha.) which is covering 18.01% area of overall Chhattisgarh, and Ginger (9003 ha) which is covers in 13.29%. Turmeric gives the highest production 1,10,057 metric tonnes, and Ginger 93,779 metric tonnes. (agriportal.cg.nic.in 2022). The Northern hills zone of Chhattisgarh rhizomatous spice crops area under Turmeric (5554 ha.) which is covering 45.53% area in Chhattisgarh turmeric area and Ginger (4051 ha) which is covers in 44.99%. Turmeric gives the production 48,804 metric tonnes, and Ginger 45,738 metric tonnes, (agriportal.cg.nic.in 2022).

Materials and Methods

Selection of area

Chhattisgarh State divided into three agro-climate zones. The research was limited to the northern hills region of Chhattisgarh agro-climate zone. Six districts, namely

Surguja, Surajpur, Balrampur, Korea, Jaspurnagar and Dharamjaigarh Tehsil of Raigarh region. are covered under the Northern Hill zone. The northern hills region of Chhattisgarh agro-climatic zones including six districts falling under it, namely Surguja, Surajpur, Balrampur, Korea, Jaspurnagar and Dharamjaigarh tehsil of Raigarh region, were chosen purposively for the study. As the hole state was reading under covered and researcher had limited occurs to of his zones.

Period of the study

The analysis spanned 17 years duration. This research had taken into account data for the period from 2004-05 to 2020-21. To determine area effect, yield effect and interaction effect of spices crops related to spices area, production and productivity for overall period.

Nature and Source of data

This study was based on the secondary data obtained from the officials of the Chhattisgarh agriculture development and farmer welfare and bio-technology department. (Officials website. agriportal.cg.nic.in).

Analytical tools

Decomposition analysis

1. This shows the percentage share of average yield in total production

$$\text{Yield effect (\%)} = YE = \frac{(Y_n - Y_o)A_o}{P_n - P_o} \times 100$$

2. This shows the percentage share of area in total production

$$\text{Area effect (\%)} = AE = \frac{(A_n - A_o)Y_o}{P_n - P_o} \times 100$$

3. This shows the percentage share of area and yield (simultaneous variation) interaction towards total production

$$\text{Interaction effect (\%)} = IE = \frac{(A_n - A_o)(Y_n - Y_o)}{P_n - P_o} \times 100$$

The crop contribution is part of the production due to the additional yield in the base year area and the local contribution is part of the production due to the additional area in addition to the annual base yield. Partnership contribution is part of production due to increased yield, in more space.

Where,

Ao = Triennium average (ending 2004-05 to 2006-07) of

area of Spices Crops.

Po = Triennium average (ending 2004-05 to 2006-07) of production of Spices Crops.

Yo = Po/Ao

An = Triennium average (ending 2018-19 to 2020-21) of area of Spices crop.

Pn = Triennium average (ending 2020-21 to 2020-21) of production of Spices crop.

Yn = Pn/An

Results and Discussion

Area, yield and their interaction effect on production of major spices in Northern Hills Zone of Chhattisgarh

In order to measure the contribution of the area and the yield in the rise / fall of the production of large spices during the study period a simple plotting model was used, the part of production attributable to greater yield in expanded acreage is known as yield contribution. In this part, the analysed data of major spices in northern hills zone of Chhattisgarh.

Showed that the area effect (53.23%) contributed more to the increase in spices production in northern hills zone of Chhattisgarh to change in production than yield effect (-) 0.89 percent and interaction effect contributed a negative effect (-) 0.75 percent.

Table: Area, yield and interaction effects of change in production of major spices in Northern Hills Zone of Chhattisgarh (%) during 2004-05 to 2020-21

Crop	Major spices Northern Hills Zone of Chhattisgarh			
	Area effect	Yield effect	Interaction effect	Absolute change in production (000 metric tonnes)
1.Turmeric	47.69 (262.63)	-6.93 (-38.18)	-22.60 (-124.45)	18.16
2.Ginger	26.50 (178.13)	-4.36 (-29.33)	-7.26 (-48.80)	14.88
3.Coriander	6.89 (229.89)	-1.54 (-51.64)	-2.34 (-78.25)	3.00
4.Garlic	2.40 (1265.6)	-1.77 (-934.00)	-0.44 (-231.58)	0.19
5.Chilli	-0.44 (-14.62)	3.57 (118.44)	-0.11 (-3.82)	3.02
6. Other spices	1.66 (17.46)	5.93 (62.27)	1.93 (20.28)	9.53
7. Total spices crop	53.23 (103.21)	-0.89 (-1.74)	-0.75 (-1.47)	51.58

Figures in parentheses shows change in production due to respective effect

The turmeric crop, area effect (47.69%) contributed more to change in production than yield effect (-) 6.93 percent and interaction effect (-) 22.60 percent. The Ginger crop, area effect (26.50%) contributed more to change in production than yield effect (-) 4.36 percent and interaction effect (-) 7.26 percent. The Coriander crop, area effect (6.89%) contributed more to change in production than yield effect (-) 1.54 percent and interaction effect (-) 2.34 percent. The

garlic crop, area effect (2.40%) contributed more to change in production than yield effect (-) 1.77 percent and interaction effect (-) 0.44 percent. The chilli crop, area effect (-) 0.44 percent contributed more to change in production than yield effect (3.57%) and interaction effect (-) 0.11 percent. The other spices crop, area effect (1.66%) contributed more to change in production than yield effect (5.93%) and interaction effect (1.93%).

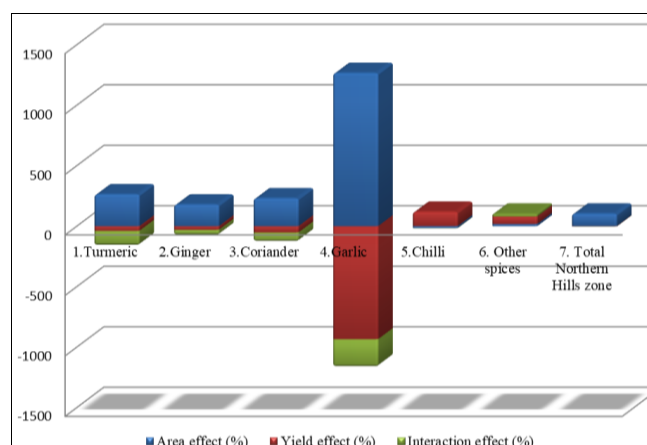


Fig. Area, yield and interaction effects on production of major spices in northern hills zone of Chhattisgarh (%) during 2004-05 to 2020-21

Conclusion

The area effect had the most significant contribution to the change in production for most crops, including turmeric, ginger, coriander, garlic and other spices. However, for the chilli crop, the yield effect played a more substantial role, despite the area effect contributing negatively. The interaction effect consistently showed a negative contribution for all crops, with the exception of turmeric, where it contributed significantly to the overall decrease in production.

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