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Trend in Area, Production, and Productivity of Groundnut in Rajasthan

S. B. Bhusanar [a≡*], Satyveer Singh Meena [aφ] and Aditi Mathur [aφ]

[a] *Institute of Agri Business Management, Swami Keshwanand Rajasthan Agricultural University, Bikaner, India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Groundnut is India's most important oil seed crop, and Rajasthan is the country's second-largest producer (2019-20). The current research looks at groundnut output, area, and productivity in Rajasthan. Secondary data was gathered from INDIASTAT and the Rajasthan state department of agriculture, among other places. Statistical Package for the Social Sciences is used to collect and analyse data (SPSS). From 1990-91 to 2019-20, the average groundnut area, production, and productivity were 352.12 thousand hectors, 513.40 thousand MT, and 1351 kg/ha, respectively. The compound growth rates of groundnut area, production, and productivity were found to be positive and significant (R = 0.652**, 0.940**, and 0.603**, respectively) in an upward trend with CAGRs of 3.2, 6.4, and 2.8 per cent.

Keywords: SPSS; CAGR; groundnut; trend; area; production; productivity.

ABBREVIATIONS

SPSS : Statistical Package for the Social Sciences
CAGR : Compound Annual Growth Rate
SD : Standard Deviation
CV : Coefficient of Variation
HYV : High Yielding Varieties

[≡] *Ph.D Scholar;*
[φ] *Assistant Professor;*
**Corresponding author: E-mail: sbb.iabm@gmail.com;*

1. INTRODUCTION

Groundnut is a globally significant oilseed crop. It is also known as the 'King' of oilseeds and is known worldwide as peanut or monkey nut. This plant is native to Brazil and is grown across the world in tropical, subtropical, and mild temperate climates. Groundnut's botanical name, *Arachis hypogaea* L., is derived from two Greek words: *Arachis*, which means legume, and *hypogaea*, which means below ground. Groundnut is an important crop in Rajasthan, and it is the state's second largest producer after Gujarat, accounting for 20% of total output in 2018-2019 (FAO, 2020). The highest groundnut producing districts in Rajasthan are Bikaner and Jodhpur, which provide 30 percent and 15 percent of overall production, respectively [1]. Since the last decade, global demand for groundnut and groundnut-based confectionery goods has risen dramatically. Rajasthan has a very high potential in terms of production, ranking second, however it ranks seventh in terms of processing and export when compared to other Indian states (APEDA, 2020). Farmers sell their goods in the nearby market; they do not attempt to export due to a lack of knowledge among farmers about the economic and marketing potential.

2. REVIEW OF LITERATURE

Introduced in India in the 16th century, it is now the world's fifth biggest vegetable oil economy, after China, Brazil, and Argentina, with an annual turnover of over 80,000 crores, accounting for 12- 15% of area, 7-8% seed production, 6-7% oil production, 9-12% vegetable oil imports, and 9-10% edible oil consumption (V Bal Krishnan and others). Groundnut is known as the "key" of oilseeds, according to Dr. B. Madhusudhana [2]. It is one of our country's most valuable food and income crops. Groundnut is sometimes known as "wondernut" or "poor man's cashew."

Groundnut, like other legumes, responds well to vitamin supplementation. In soils deficient or marginal in nutrients such as zinc, boron, molybdenum, and copper, the response is strong. The nutritional quality of groundnut in Punjab was examined by Sekhar and Associates in 1978. Zinc, phosphorus, and boron elicited strong reactions.

A. K. Bharti et al. [1] Studied in Uttar Pradesh, the growth rate pattern and technical influence of oil seed were investigated. The area planted to oilseeds in the state has increased at a pace of roughly 1.04 percent every year. The second era had a modest decrease in area growth of 0.21 percent each year. During the first era, however, area rose at a pace of 0.79 percent each year. Production has grown at a favourable rate of roughly 2.68 percent overall. In the second period, it was higher (1.07 percent) than in the first period, which was at 0.97 percent. The productivity of total oilseeds has increased at a rate of roughly 1.63 percent every year. The pattern of oil seed development and its technological influence in Uttar Pradesh were studied. The second period had a higher positive growth rate (1.28 percent) than the first period (0.17 percent). Productivity growth has achieved a certain degree of satisfaction in the state's production.

Prasad, G et al. [3] He discovered patterns in groundnut acreage, output, and productivity in several districts of Chhattisgarh. Because of increased irrigation infrastructure and farmer motivation to adopt low-cost input technology for groundnut crop, the area of groundnut is favourably and considerably expanding, i.e. (R=0.70**). Groundnut output is growing in all of Chhattisgarh's districts (R = 0.73), which is a good and noteworthy trend. Due to increased fertiliser and pesticide use by farmers and the introduction of high yielding varieties (HYP)., the productivity pattern of groundnut is positively and substantially growing in all districts (R = 0.68**).

3. MATERIALS AND METHODS

The current research is being conducted in Rajasthan, India. Long-term groundnut statistics on area, production, and productivity for groundnuts produced in Rajasthan throughout the kharif and rabi seasons were gathered from the Ministry of Agriculture & Farmers Welfare, Govt. of India (ON2476) published records. An orthogonal polynomial approach was utilized to obtain trends in area production and productivity using a thirty-year data series (1990-1991 to 2019-20). The Area and Productivity impact has been computed using basic regression analysis in order to determine the relative strength of area or productivity in output. For data processing and analysis, SPSS was utilized. For the requisite number of observations (N=30), the tabular values of the have been retrieved from the statistical table.

3.1 Objectives of the Study

1) To study the trends in area, production, and productivity of groundnut in Rajasthan.

3.2 Statistical Analysis

The data was assessed with the help of SPSS, SD, level of significance, compound growth rate model etc. are given below.

3.2.1 Compound growth rate model

$$Y_t = ab^t u$$

Where,

Y_t = Dependent variable in period t (area/yield/production)
a = constant
b^t = (1+r) and 'r' is the compound growth rate
r = (Antilog b -1) ×100
t = time variable (1, 2 .....n)
u = error term

The above model in the Logarithmic form is expressed as,

$$\text{Log } Y_t = \log a + t(\log b) + \log u$$

3.2.2 Coefficient of Variation:-

$$\text{C. V. (\%)} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

The slope shows the area, production, and productivity trends through time.

4. RESULTS AND DISCUSSION

Table 1 shows the temporal trend pattern of groundnut area, output, and productivity in Rajasthan. Groundnut crop area grew dramatically from 1990 to 2020, according on statistics from the previous 30 years. The biggest groundnut area was recorded in 2019-2020 (739.02 thousand hectares), while the lowest was recorded in 2001-02. (195 thousand ha). In terms of production and productivity, the year 2019-20 has the highest output (1619.33 thousand MT) and the highest productivity (2189 kg/ha). From the previous 30 years, there has been an upward trend in output and productivity.

Table 1. Area, production, and yield of groundnut in Rajasthan: 1990-91 to 209-20

Year	Area('000 ha)	Production('000 MT)	Productivity(Kg/ha)
1990-1991	231.8	218.4	942
1991-1992	248.3	334	798
1992-1993	288	242.8	1116
1993-1994	288	287.4	1116
1994-1995	288	249.9	1116
1995-1996	288	334	1116
1996-1997	280	328	1560
1997-1998	288	245.3	1116
1998-1999	288	328.9	1116
1999-2000	288	274.7	1116
2000-2001	195	180.8	694.8
2001-2002	288	242.6	1116
2002-2003	241.8	166.1	687
2003-2004	288	212	1116
2004-2005	287.8	446.8	1552
2005-2006	288	317	1116
2006-2007	288	334	1116
2007-2008	288	276.3	1116
2008-2009	321.5	536.8	1670
2009-2010	326	354.5	1087
2010-2011	418.2	805.3	1926
2011-2012	288	334	1116
2012-2013	398.5	617.3	1549
2013-2014	462	900.9	1950
2014-2015	500.8	1011.2	2019
2015-2016	516.85	1048.72	2029
2016-2017	556.09	1140.61	2051
2017-2018	640.57	1259.36	1966
2018-2019	673.37	1382.32	2053
2019-2020	739.02	1619.33	2191

Year	Area('000 ha)	Production('000 MT)	Productivity(Kg/ha)
Mean	**352.62**	**513.40**	**1351.06**
SD	**137.60**	**398.31**	**444.42**
CV	**39.024**	**77.58**	**32.893**

Source: Ministry of Agriculture & Farmers Welfare, Govt. of India. (ON2476) https://www.indiastat.com/data/agriculture/groundnut/data-year/all-years, accessed on 13/05/2021, [4,5]

4.1 Trends in Area

Over a thirty-year period (1990-91 to 2019-20), the total compound annual growth rate of area production on an actual and projected basis has showed a positive trend (Fig. 1). The compound annual growth rate of area is 3.2 percent (Table 2), which is statistically significant (R =0.652**) at the 5% level of significance. It shows that during the previous thirty years, the area of groundnut production has risen. The findings support those of Madhusudhana B. A. [2], Balakrishnama et al. [6].

4.2 Trends in Production

Over a thirty-year period (1990-91 to 2019-20), the total compound annual growth rate of production on an actual and projected basis has showed a positive trend (Fig. 2). The compound annual growth rate of production is 6.4 percent (Table 3), which is statistically significant (R =0.940**) at the 5% level of significance. It indicates that groundnut production has increased over the last thirty years. The findings are consistent with Painkra et al. [7], DA. Patel [5], Sekhon OS et al. [8].

Table 2. Compound growth rates Area Production of Groundnut in Rajasthan

'F' value	60.07
R2	0.652**
CAGR	3.2

(Source: Researcher's own computation from Secondary data)
CAGR- Compound growth rate per cent per annum.
***-Significant at 5% level of significance*

Table 3. Compound growth rate of production of groundnut in Rajasthan

'F' value	54.67
R2	0.940**
CAGR	6.4

(Source: Researcher's own computation from Secondary data)
CAGR- Compound growth rate per cent per annum.
***-Significant at 5% level of significance*

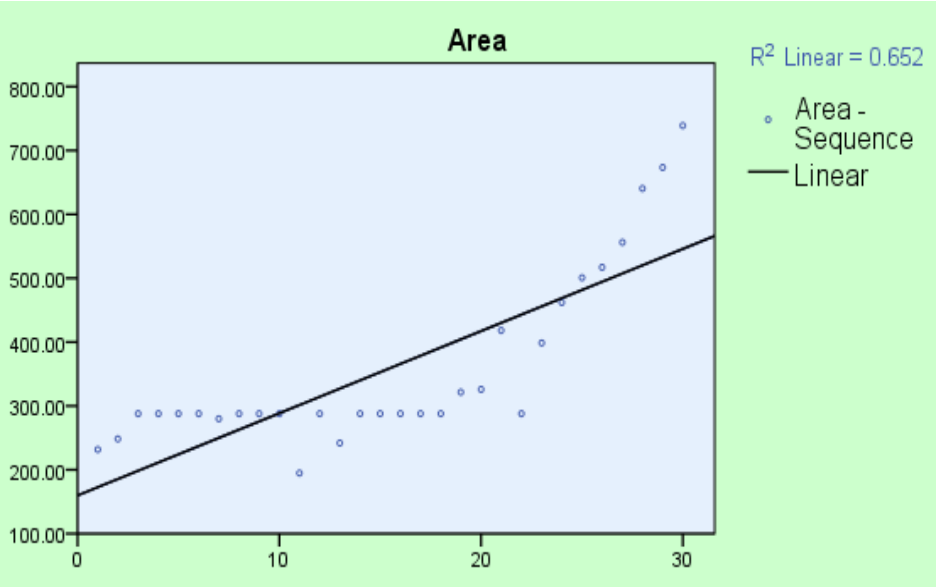

Fig. 1. Trends in area of groundnut in Rajasthan

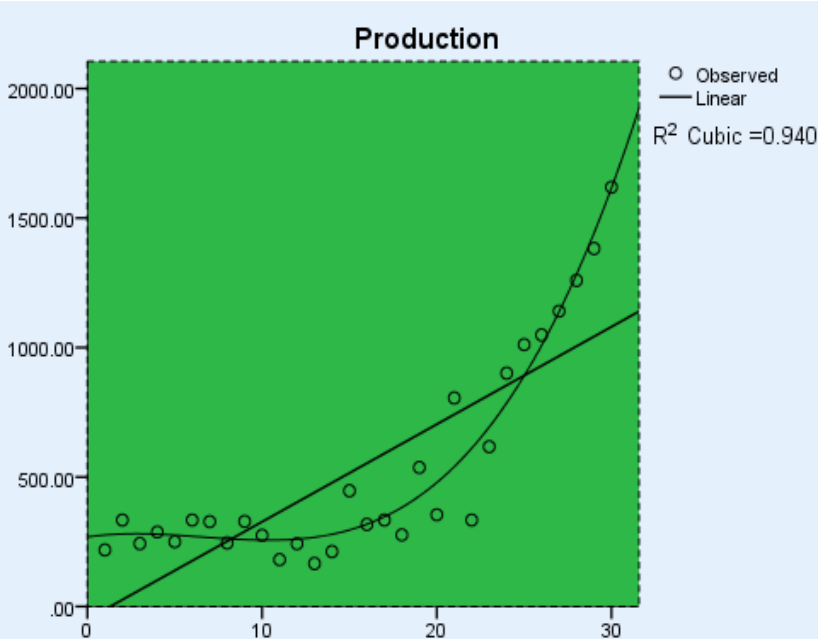

Fig. 2. Trends in production of Groundnut in Rajasthan

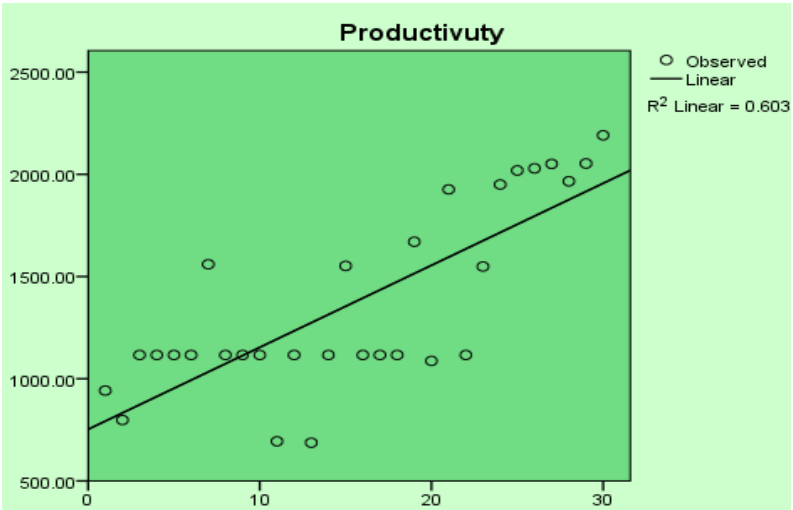

Fig. 3. Trends in area of productivity of groundnut

4.3 Trends in Productivity

Over a thirty-year period (1990-91 to 2019-20), the total compound annual growth rate of productivity on an actual and projected basis has showed a positive trend (Fig. 3). The compound annual growth rate of productivity is 2.8 percent (Table 4), which is statistically significant (R =0.603**) at the 5% level of significance. It indicates that the groundnut productivity has increased over the last thirty years. The findings support those Choudhary R, et al. [9], Dr A, Sastri et al. [10], Misra CM. [11].

Table 4. Compound growth of productivity of groundnut in Rajasthan

'F' value	33.886
R2	0.603**
CAGR	2.8

(Source: Researcher's own computation from Secondary data)
CAGR- Compound growth rate per cent per annum
***-Significant at 5% level of significance*

5. CONCLUSION

Following a review of the literature, a trend analysis, and an examination of the groundnut

research in Rajasthan, it was observed that the groundnut area, production, and productivity have all grown in the previous thirty years. Due to the farmers' widespread adoption of groundnut farming in Rajasthan during the previous thirty years, there has been a huge increase in both area and productivity. In terms of productivity, the pace of increase is slightly lower than the area and production of campers. Farmers are lagging behind in adopting new technologies such as current farming methods, HYV, and so on. It is necessary to Improving extension programs by focusing farmers on using scientific approaches can also assist boost productivity. Increased use of better farming methods will undoubtedly provide long-term effects.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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