



# GROUNDNUT BENEFITS : TREND AND GROWTH SITUATION IN MADHYA PRADESH, INDIA

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## Abstract

They are obtained from the ground, that's why they are also called as groundnuts. Groundnuts are popularly used as seed oil in India, being an oil seed crop, it contains 40 to 49% oil. It contains vitamin B3 or niacin whose many health benefits include normal brain functioning and boosting memory power. It helps lower cholesterol levels (Copper). The same nutrient which gives groundnuts their memory enhancing power also helps lower and control cholesterol. Present investigation was an endeavor to search out the progress achieved in groundnut despite the Agro Climatic setbacks in Madhya Pradesh, with its large area, enjoys diverse climatic and soil conditions suitable for a broad range of agricultural products. Agriculture sector in Madhya Pradesh forms the backbone of its economy. It contributes almost one-fourth of the Gross State Domestic Product (GSDP) and is the main source of employment for over 70 percent of the population and constitutes about 60- 75 percent of the rural income. This study focused on Agro Climatic zone wise trend of area, production and productivity of Groundnut crop in the state of Madhya Pradesh.

**Key words :** Trend, agro climatic zone, health benefits, groundnut.

## Introduction

Groundnuts produced in the developing countries have been used traditionally since the origin of humanity. Groundnut is rich in oil and protein and has a high-energy value. Developing countries account for nearly 95 percent of world production. Asia accounts for about 70 percent of this amount where the major producers India and China together represent over two-thirds of global output. Groundnut is commonly called the poor man's nut. Today it is an important oil seed and food crop. South America is the native place of Groundnut. The botanical name for groundnut, *Arachis hypogaea* Linn., is derived from two Greek words, *Arachis* meaning a legume and *hypogaea* meaning below ground, referring to the formation of pods in the soil. Groundnut is an upright annual plant. Nuts which are rich in essential nutrients like fiber, protein, minerals, monounsaturated and polyunsaturated fatty acids, and antioxidants have plenty of health benefits by virtue of their unique composition, nuts are likely to

beneficially impact health outcomes. Nut consumption with a reduced incidence of coronary heart disease and gallstones in both genders and diabetes in women and studies consistently show that nut intake has a cholesterol-lowering effect. Groundnuts have great nutritional benefits that make them an important part of a healthy diet. Biotin is technically considered part of vitamin B-complex, biotin is an enormously beneficial nutrient for our physiological well-being. Biotin is involved in dozens of enzymatic reactions in the body, including processes that regulate the expression of our genes. Groundnut is an important oilseed crop in India which occupies first in terms of area and second position in terms of production. China is the largest producer as well as consumer of groundnut in the world with 166.24 lakh tonnes followed by India (68.57 lakh tonnes), Nigeria (30.28 lakh tonnes) and United States (25.78 lakh tonnes). As per the fourth advanced estimates of Government of India, groundnut production was estimated at 91.8 lakh tonnes in 2017-18. In the developing countries, groundnut has to play an

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important role both as oil and food crop. China and India together are the world's leading groundnut producers. Developing countries like South Africa, India, China and Egypt have good potential to utilize the opportunity to export groundnuts or groundnut products to the developed countries. They can earn valuable foreign exchange to improve their economic conditions. India being the world's second largest producer after China. The all-India acreage was 41,52,500 hectares (*Kharif-2017*). Eight states *viz.*, Gujarat, Andhra Pradesh, Rajasthan, Karnataka, Madhya Pradesh, Maharashtra and Tamil Nadu and Uttar Pradesh were identified to have acreages greater than one lakh hectares and these states jointly accounted for 95.5% of the national acreage (IOPEPC *Kharif-2017* Survey of Groundnut Crop, Under Ministry of Commerce, Govt. of India). Vegetable oil has become an indispensable part of present day civilized life, being next to food grains in importance. The production of domestic edible oils (9.97 million tonnes) has not been able to keep pace with the growth in consumption and the gap between production and consumption is being met through imports worth of more than Rs. 73,048 crores (2016-17 prov.).

The specific objective of this paper were: to study absolute and relative changes and trend in area, production and productivity of Groundnut crop in different Agroclimatic regions of Madhya Pradesh.

### Materials and Methods

Madhya Pradesh, as whole was studied, considering its Agroclimatic Regions as units of investigation, because in Madhya Pradesh, a marked variation prevails in soil and climate which divided the state in eleven distinct Agro climatic Regions. The study covered times series data of area, production and productivity of Groundnut from 1991-92 to 2007-08. Agricultural Statistics published by Directorate of Land Record and Directorate of Farmer Welfare and Agriculture Development, Madhya Pradesh. Absolute change in area, production and yield are carried out by the formula :

$$\text{Absolute change} = Y_n - Y_0$$

Where,

$Y_n$  = Mean value for the last triennium ending.

$Y_0$  = Mean value for the first triennium ending.

The absolute change have been worked out for eleven Agro climatic Regions.

Relative changes have been worked out by the index number, which is a good measure of relative performance.

$$\text{Relative change} = Y_n - Y_0 / Y_0 \times 100$$

Trends in area, production and productivity of

groundnut crop in eleven Agro climatic Regions was calculated by

### Linear model

$$Y = a + bX$$

Where,

Y = dependent variable

X = independent variable

a = intercept

b = regression co-efficient

$$\text{Simple growth rate} = b/\bar{y} \times 100$$

### Exponential model

$$Y = ab^x$$

or,  $\log Y = \log a + x \log b$

$$\text{Compound growth rate} = (b - 1) \times 100$$

Where, b = antilog (b)

## Results and Discussion

In table 1, we can see the absolute change in area of groundnut in all eleven Agroclimatic Regions of M.P. It is observed that there was a tendency towards decrease in area from 234.333 thousand ha to 204.333 thousand ha at whole Madhya Pradesh between two periods. Thus, there was a net decrease of 30.000 thousand ha and percentage decrease came to 12.802. It was noted from the table that during base period Nimar plains ranked first (70.933 thousand ha) in acreage followed by Gird region (49.500 thousand ha), Malwa plateau (43.100 thousand ha), Satpura plateau (30.767 thousand ha), Jhabua hills (18.433 thousand ha) and Bundelkhand (11.833 thousand ha). Agro climatic Regions registered an increase in the area of groundnut except Nimar plains, Malwa plateau and Vindhya plateau in the current period. The highest absolute increase in the area was found in Bundelkhand (18.100 thousand ha), followed by Gird region (16.833 thousand ha) and the lowest increase in Satpura plateau, Chhattisgarh plain and Centralnarmada valley. In relative terms, the highest increase in area was found in Central narmada valley (249.998%), followed by Bundelkhand (152.958%), Kymore Plateau&satpura hills (106.667%), Northern hill regions of Chhattisgarh (63.636%) and Gird region (34.007%) and lowest increase was in Satpura Plateau (1.733%). Central Narmada valley showed highest percentage increase but it occupied the smallest area under groundnut in the current and base period.

There was an absolute decrease of 12.000 thousand tons in the production of groundnut in Madhya Pradesh

Table 1 : Absolute and Relative change in area, production and productivity of groundnut in different agroclimatic regions of Madhya Pradesh.

Agroclimatic Regions	Area '000 ha		Absolute change	Relative change (%)	Production '000 tons		Absolute change	Relative change (%)	Yield Kg/ha		Absolute change	Relative change (%)
	Base period	Current period			Base period	Current period			Base period	Current period		
Chhattisgarh plains	0.100	0.400	0.300	300	0.100	0.400	0.300	300.000	1000.00	1000.00	0.000	0.000
Northern hill regions of chhattisgarh	0.367	0.600	0.233	63.636	0.267	0.400	0.133	50.000	750.000	666.667	-83.333	-11.111
Kymore plateau & Satpura hills	2.500	5.167	2.667	106.667	2.333	5.533	3.200	137.143	967.857	1069.102	101.244	10.461
Central narmada valley	0.067	0.233	0.167	249.998	0.033	0.300	0.267	799.982	666.670	1277.778	611.108	91.666
Vindhya plateau	6.367	3.367	-3.000	-47.120	6.033	3.267	-2.767	-45.856	967.479	972.363	4.884	0.505
Gird region	49.500	66.333	16.833	34.007	52.200	76.533	24.333	46.616	1049.688	1156.677	106.989	10.192
Bundelkhand	11.833	29.933	18.100	152.958	14.533	22.167	7.633	52.523	1217.999	731.075	-486.925	-39.977
Satpura plateau	30.767	31.300	0.533	1.733	35.133	38.667	3.533	10.057	1144.052	1235.517	91.466	7.995
Malwa plateau	43.100	13.600	-29.500	-68.445	34.700	12.000	-22.700	65.418	831.450	882.732	51.282	6.168
Nimar plains	70.933	31.100	-39.883	-56.156	60.233	23.300	-36.933	-61.317	850.653	749.720	-100.933	-11.865
Jhabua hills	18.433	19.033	0.600	3.255	11.033	17.467	6.433	58.308	606.184	919.971	313.787	51.764
Madhya Pradesh	234.333	204.333	-30.000	-12.802	216.667	204.667	-12.000	-5.538	930.000	994.000	64.000	6.882

Base period: Mean value for the first triennium ending

Current period: Mean value for the last triennium ending

between two periods. The lowest increase was recorded in Northern hill regions of chhattisgarh in absolute term and in Central narmada valley in relative term. The decrease in the production of groundnut in the current period over the base period was recorded in two Agro climatic Regions namely, Nimar plains and Vindhya plateau.

The lowest absolute and relative increase was in the Vindhya Plateau(4.884 kg/ha) and (0.505%), respectively. The Agro climatic Region Bundelkhand, Nimarplains and Northern region Chhattisgarh showed decreased yield in the current period over the base period. In the current period Yield of groundnut in the state was 994.000 kg/ha, which was 6.882 percent more than the base period. Madhya Pradesh as a whole showed no significant increase in trend of area, production and productivity of groundnut during the period under study. Area denoted a negative but significant trend, production denoted negative but non-significant trend, whereas productivity showed positive but non-significant trend. Agro climatic Regionwise analysis exhibited that for area, production and productivity trend coefficient were positive in Kymore plateau & Satpura hills, Gird region and Satpura plateau. In the Gird region, trend value for area and production were positive and significant, whereas in case of productivity, it was positive but insignificant. Therefore, it could be concluded that groundnut was an important crop in Gird region. The trend value for all the components in Satpura plateau was positive but non-significant. The trend coefficient of area, production and productivity were found positive and highly significant in the case of Chhattisgarh plain, but the sign attached to the trend coefficient of area in this Agro climatic region was negative and for production, it was positive.

It could be concluded that the production per hectare increased sufficiently. Positive slope of area was highest in Bundelkhand, followed by Gird region, Kymore plateau & Satpura hill, Satpura plateau and Northern hill regions of chhattisgarh and lowest in Chhattisgarh plain, Central narmada valley. Vindhya plateau, Malwa plateau, Nimar plain and Jhabua hills revealed negative 'b' values associated with

**Table 2** : Trend in Area, Production and Productivity of groundnut in different Agro climatic Regions.

Agro climatic regions	Area		Production		Productivity	
	Constant a	Coefficient b	Constant a	Coefficient b	Constant a	Coefficient b
Chhattisgarh plains	0.015	-0.018**(0.004)	0.029	0.016** (0.005)	1125.000	-7.353** (21.840)
Northern hill regions of Chhattisgarh	0.365	0.017**(0.002)	0.295	0.011* (0.004)	795.956	-3.472 (7.575)
Kymore plateau & Satpura hills	1.912	0.257**(0.043)	2.040	0.317** (0.072)	1090.982	6.796 (11.926)
Central Narmada valley	0.001	0.015**(0.003)	-0.046	0.020** (0.003)	1993.875	-55.964 (112.349)
Vindhya plateau	5.062	-0.099(0.078)	4.651	-0.064(0.084)	921.752	5.784 (7.731)
Grid region	49.118	1.211**(0.186)	49.126	1.890* (0.890)	1001.974	9.879 (13.090)
Bundelkhand	12.618	1.402**(0.214)	20.059	0.731 (0.498)	1356.223	-30.847* (11.271)
Satpura plateau	31.367	0.088(0.088)	36.735	0.227 (0.396)	1172.274	3.682 (11.461)
Malwa plateau	41.437	-2.033**(0.278)	34.980	-1.606** (0.220)	876.644	3.051 (6.879)
Nimar plains	78.825	-3.103**(0.177)	63.844	-2.648** (0.326)	816.602	-4.057 (5.302)
Jhabua hills	17.201	-0.013(0.079)	8.290	0.488** (0.151)	500.390	27.007** (8.272)
Madhya Pradesh	240.147	-2.069**(0.463)	221.485	-0.309 (1.735)	926.500	6.559 (7.479)

\* and \*\* denotes level of significance at 5 percent & 1 percent respectively

Figures in parentheses shows Standard error of coefficients

**Table 3** : Simple growth rate in area, production and productivity of groundnut in different Agro climatic Regions.

Agroclimatic Regions	Area	Production	Productivity
Chhattisgarh plains	10.139**	9.195**	-0.694
Northern hill regions of chhattisgarh	3.267**	2.799*	-0.454
Kymore plateau & satpura hills	6.082**	6.480**	0.590
Central narmada valley	11.051**	14.855**	-3.755
Vindhya plateau	-2.374	-1.584	0.594
Gird region	2.018**	2.858*	0.906
Bundelkhand	5.556**	2.745	-2.860*
Satpura plateau	0.274	0.586	0.305
Malwa plateau	-8.785**	-7.821**	0.337
Nimar plains	-6.098**	-6.618**	-0.520
Jhabua hills	-0.073	3.848**	3.633**
Madhya Pradesh	-0.933**	-0.141	0.665

\* and \*\* denotes level of significance at 5 percent & 1 percent, respectively.

time indicating that their area has a tendency to fall in successive time periods in these Agro climatic Regions. The positive slope in production of groundnut was highest in Gird Region, followed by Bundelkhand, Jhabua hill, Kymore plateau & Satpura hill, Satpura plateau, Central Narmada valley and Chhattisgarh plain and lowest in Northern hill regions of Chhattisgarh, but negative in Nimar plain, Malwa plateau and Vindhya plateau. Slope were positive and highest for productivity in Jhabua hill, Gird region, Kymore plateau & Satpura hill, Vindhya plateau,

Satpura plateau and Malwa plateau and negative in Central Narmada valley, Bundelkhand, Nimar plain and Northern hill regions of Chhattisgarh.

The fourth most important oilseed crop of this state is groundnut. The table3 show simple growth rate in area, production and productivity of groundnut in different Agro climatic Regions of the state. The simple growth rate of area of this crop were positive in most of the Agro climatic Region except Malwa plateau (-8.785), Nimar plain (-6.098), Vindhya plateau (-2.374) and Jhabua hill

**Table 4 :** Compound growth rate in area, production and productivity of groundnut in different agro climatic regions.

Agro climatic Regions	Area	Production	Productivity
Chhattisgarh plains	9.005**	-2.316**	-10.386**
Northern hill regions of Chhattisgarh	3.587**	3.125**	-0.446**
Kymore plateau & Satpura hills	6.946**	7.891**	0.883**
Central Narmada valley	63.186**	101.938**	23.748**
Vindhya plateau	-1.493**	-0.964**	0.536**
Gird region	2.135**	2.824**	0.675**
Bundelkhand	6.942**	3.453**	-3.263**
Satpura plateau	0.268**	0.583**	0.314**
Malwa plateau	-7.818**	-7.426**	0.426**
Nimar plains	-6.149**	-6.592**	-0.473**
Jhabua hills	-0.096**	4.287**	4.388**
Madhya Pradesh	-0.932**	-0.190**	0.688**

\* and \*\* denotes level of significance at 5 percent & 1 percent, respectively

(-0.073). Chhattisgarh plain, Kymore plateau & Satpura hill, Gird region and Satpura plateau had shown positive linear growth rate of area, production and productivity during the period under study. Among the groundnut producing Agro climatic Regions of the state Central Narmada valley showed a highest and positive simple growth rate of 11.051 percent and 14.855 percent respectively in area and production. These figures were statistically significant. In production, remarkable growth were visible in Central Narmada valley (14.855), Chhattisgarh plain (9.195) and Kymore plateau & satpura hill (6.480). In Malwa plateau (-7.821), Nimar plain (-6.618) and Vindhya plateau (-1.584) there have been a declining trend in production. Jhabua hill (3.633) topped in linear growth rate of groundnut productivity. Central Narmada valley (-3.755), Bundelkhand (-2.860), Northern hill regions of chhattisgarh (-0.454), Chhattisgarh plain (-0.694) and Nimar plain (-0.520) had registered negative simple growth rate for productivity. Singh *et al.* (1993) also found similar results in growth rate of groundnut, linseed and other oilseed have shown a continuous decline in area and production of at higher rate.

The fourth most important oilseed crop of this state is groundnut. The above table shows the compound growth rates in area, production and yield of groundnut crop in different Agro climatic Region of the state. At whole Madhya Pradesh level, area under groundnut decreased 0.932 and production 0.190 percent per annum. As a result yield has been increasing at the rate of 0.688 percent per annum. The compound growth rates of area, production and productivity of this crop were positive in most of the Agro climatic Regions. The area in Nimar plain (6.149%), Malwa plateau (7.818%), Vindhya plateau

(1.493%) and Jhabua hills (0.096%) have shown a declining trend. These figures were statistically significant. Among the groundnut producing Agro climatic Regions of the state, Central narmada valley showed the highest growth rate of 63.186 percent per annum in area. In production, remarkable growth was visible in Central Narmada valley (101.938%) and Kymore plateau & satpura hills (7.891%). In Malwa plateau, Nimar plains, Chhattisgarh plain and Vindhya Plateau, there have been a declining trend in production. Central narmada valley (23.748%) topped in growth of groundnut productivity. Nimar plain had registered negative growth rate for area, production and yield. On the basis of above discussion, it may be concluded that the Agro climatic Region like Central Narmada valley showed the highest growth rate of 63.186 percent per annum in area, 101.938 percent per annum in production and 23.748 percent per annum in productivity.

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