Plant Archives Vol. 20 No. 1, 2020 pp. 1543-1549 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

SCENARIO OF MAJOR OILSEED CROP IN AGRO CLIMATIC ZONES OF MADHYA PRADESH, INDIA

Shubh Laxmi* and R.M. Sahu[1]

*School of Agriculture, Department of Agricultural Economics and Extension, LPU, Jalandhar, Punjab, India.
[1]Jawahar Lal Nehru Krishi Vishwavidyalay, Jabalpur (M.P.), India.

Abstract

Oilseed crops are the second utmost important supporting factor of agricultural economy, succeeding only to cereals. Oilseed crops add a considerable share to the agricultural GDP. Nine oilseeds are the main supply source of vegetable oils in the country. Annually oilseeds are ploughed over 26.67 million hectares of area yielding 30.06 million tonnes annually (quinquennium ending 2016-17). Oilseeds are cultivated mostly under rainfed environment (70%) (NMOOP, 2018). Soybean, groundnut, rapeseed-mustard, sunflower, sesame, safflower and niger are primary source of edible oil and castor and linseed are non eatable oils. India is yielding about 7-8 million tons of vegetable oils from prime sources and 3 million tons of vegetable oil is being harnessed from secondary sources like cottonseed, rice bran, coconut, Tree Borne Oilseeds and Oil Palm). India ranks first in the production of groundnut, second in rapeseed-mustard, and fifth in soybean (NMOOP, 2018). Main aim of this study was to know the present situation of oilseed crop in different Agro climatic zones. The study based on time-series data of area, production and yield of major oilseed crops of Madhya Pradesh (Soybean, Rapeseed & Mustard, Sesame and Groundnut) and for the calculation of absolute and relative change in different Agro climatic regions. Result shows that amongst the different Agro climatic regions of Madhya Pradesh, soybean area was recorded high in Malwa Plateau, Gird region registered maximum area under rapeseed and mustard, Bundelkhand registered maximum area under both sesame and groundnut crop.

Key words: Soybean, Rapeseed & Mustard, Sesame, Groundnut, Absolute change, Relative change etc.

Introduction

"Yellow Revolution" during early 1990's was the reason for achieving self-adequacy in oilseed. The requirement for edible and non-edible oils together is increasing due to different contributing factors like increasing income, population and urbanization. Nine oilseeds (soyabean, Rapeseed & Mustard, sesame, groundnut, safflower, sunflower, linseed, niger and castor) are the primary source of vegetable oils. Rice bran, cottonseed, coconut, Oil Palm and Tree Borne Oilseeds (TBOs) are secondary sources of vegetable oil. Amongst diverse oilseeds in the country, soybean, rapeseed-mustard and groundnut report for about 80 per cent of area and 87 per cent of production of oilseed (2010-11). Despite the leading position of country in the global oilseed, the actual yield of oilseeds is very low. At national level demand for fats and vegetable oil has been increasing speedily at the rate of 6% per annum, but inland output has been growing just by about 2% per annum. Insufficient and unfair crop nutrition, the slow pace in covering the yield gap and absence of adoption of the suitable agronomic practices and available technologies are some of the key issues associated to the production of oilseed crops. As a result, there is largely decline in the per capita availability of edible oils. Oilseed cultivation in India is mainly dependent on rainfall and this leads to a higher magnitude of variability in production of oilseeds. India is profoundly dependent on imports to meet its edible oil needs, despite being the fifth largest oilseed crop producing country in the world. India is largest importer of vegetable oils in the world (15% share) followed by China & USA. From the imported edible oils, share of palm oil is about 60% followed by soybean oil with a share of 25% and sunflower (12%). During the last decades import growth in respect of edible oils is about 174%. The import number of edible oils during 2015-16 reveals that India imported a total of 15.88 million tonnes of oilseed and vegetable oil

***Author for correspondence :** E-mail : shubhlaxmi15@gmail.com

products worthing Rs. 69331.96 crore (NMOOP, 2018). Thus, there is a kind of virtual unproductivity in most oilseed crops. It is unfortunate that the level of production that is attainable with the accessible technology is not being realized due lack of adoption of technologies by the oilseed cultivators. Agriculture growth in Madhya Pradesh (MP) during the decade long period of 2005-06 to 2014-15 was around 9.7 percent per annum. Which is the highest growth rate recorded in agriculture by any major state of India over a ten year period. Madhya Pradesh stretch over 30.8 million hectares of land and consists of around 6.0 percent of India's population. The state is predominantly an agricultural state, with almost 70 percent of its workforce involved in agriculture, much more than all India average of 55 percent (Agriculture Madhya Pradesh, 2018). The study was formulated with the objectives of analyze and relate the performance of Agro climatic regions with the performance of Madhya Pradesh.

Materials and methods

Agro climatic zones as units of research, because in Madhya Pradesh, a marked deviation exists in soil and climate which divided the state in eleven distinct Agroclimatic zones, which lead to great variation in farming patterns and growth rates in area, production and yield in different parts of the state. In order to make the changes easily understandable, different districts were grouped under the following zones instead of accounting them separately.

The study has used time-series data of area, production and yield of major oilseed crops like Soybean, Rapeseed & Mustard, Sesame and Groundnut. Data obtained from published sources from various issues of Agricultural Statistics published by Directorate of Land Record and Directorate of Farmer Welfare and Agriculture Development, Madhya Pradesh. This study covers the period 1991-92 to 2007-08.

Analytical Tools

Absolute change

This methods is used for analyzing comparison into change over time/state/crop is by estimation of absolute change. For measuring the absolute change in area, production and yield, the mean value of each of these elements for the first (base) and the last (current) triennium ending 1991-92 to 2007-08 are used. Absolute change in area, production and productivity are conducted by the formula :-

$$\text{Absolute change} = Y_n - Y_o \quad (1)$$

Where,

Y_n = Mean value (area, production and yield) for the last triennium ending.

Y_o = Mean value (area, production and yield) for the first (base) triennium ending.

The absolute change have been performed for eleven agroclimatic zones and four oilseed crop.

Relative change

In addition to absolute change, relative change has also been included in the present study. Absolute change fails to shows a comparative change among the variables. Relative changes have been worked out by the index number, which is a good measure of relative performance.

$$\text{Relative change} = Y_n - Y_o / Y_o \times 100 \quad (ii)$$

This measure has been driven for the variables for which absolute change has been worked out.

Absolute and Relative changes in Different Agroclimatic zones of the Madhya Pradesh

A crop wise discussion on absolute and relative changes in area, production and productivity in different Agro climatic regions of state have been carried out in the following sections.

Results and Discussion

Soybean

The absolute and relative changes of soybean area among different Agro climatic zones of Madhya Pradesh have discovered an increasing trend over the last 18 years excluding in the Northern hill Regions of Chhattisgarh, Chhattisgarh Plains and Central Narmada Valley as presented in Table 1. It may be observed from the table that there has been 1809.367 thousand ha areas bring under cultivation in the state. So there was an increase of 59.854 percent in the current period above the base period in the M.P. Amongst the different Agro climatic regions of Madhya Pradesh, soybean area was recorded high in Malwa Plateau, supported by Vindhya Plateau, Nimar Plains, Gird Region, Satpura Plateau, Central Narmada Valley and Kymore Plateau & Satpura hills. Malwa Plateau placed first in terms of absolute increase in the area (824.067 thousand ha), followed by Vindhya Plateau, Nimar Plains and Gird Region, whereas Kymore Plateau & Satpura hills showed the lowest increase (2.350 thousand ha) in area between two periods. Nimar Plains had the maximum increase (629.636%) in the current period over the base period, supported by Gird region (230.287%), Jhabua hills (93.040%), Vindhya Plateau (67.852%), Malwa Plateau (54.169%), Bundelkhand (20.968%) and Satpura Plateau (20.952%).

Agro climatic regions registered an increasing trend

in production except Bundelkhand, Northern hill Regions of chhattisgarh and Chhattisgarh Plains. There was a net decline in the production of soybean in Bundelkhand (23.833 thousand tonnes), Northern hill Regions of Chhattisgarh (4.267 thousand tonnes) and Chhattisgarh region (0.200 thousand tonnnes) during the two periods. In terms of absolute change, Malwa Plateau reaped the highest production (1065.967 thousand tones), followed by Vindhya Plateau (414.200 thousand tones), Nimar Plains (388.300 thousand tonnes), Gird Region (256.117 thousand tones) and Satpura Plateau (127.267 thousand tones) during the two periods. On percentage basis Nimar Plains positions first (1105.218%), supported by Gird Region (339.003%), Vindhya Plateau (88.586%), Jhabua hills (85.101%), Malwa Plateau (75.114%) and Satpura Plateau (53.331%). The total production under soybean reported for Madhya Pradesh in the base period was 2749.933 thousand tonnes which was increased by 81.471 percent to 4990.331 thousand tonnes in current period.

In whole Madhya Pradesh productivity of soybean has risen up from 898.667 kg/ha to 1034.000 kg/ha between the two periods. This rise is of 135.333 kg/ha or nearly 15.059 percent. All Agro climatic regions registered increased productivity except Bundelkhand and Northern hill Regions of Chhattisgarh. Nimar Plains recorded the highest increase in yield of soybean (421.567 kg/ha), supported by Gird Region (304.333 kg/ha), Chhattisgarh Plains (250.000 kg/ha), Satpura Plateau (244.802 kg/ha), Central Narmada Valley (142.028 kg/ha), Malwa Plateau (133.882 kg/ha) and Vindhya Plateau (118.467 kg/ha). Nimar Plains (70.217%) recorded first in relative increase, followed by Gird Region (43.655%) and Satpura Plateau (27.274%).

Rapeseed & Mustard

The data in Table 2 presented the absolute and relative changes in area, production and productivity of rapeseed & mustard in all Agro climatic regions of Madhya Pradesh. It is evident from the table that in the base period, Gird Region occupied the largest area (376.367 thousand ha), followed by Malwa Plateau (55.233 thousand ha), Northern hill Regions of Chhattisgarh (37.733 thousand ha), Kymore Plateau & Satpura hill (16.867 thousand ha), Bundelkhand (27.500 thousand ha).

Reviewing the current period, it is interesting to note that Gird Region has maintained its supremacy, followed by Malwa Plateau, Northern hill Regions of Chhattisgarh, Bundelkhand, Kymore Plateau & Satpura

Table 1: Absolute and Relative change in area, production and productivity of Soybean in different Agro climatic regions of Madhya Pradesh.

AgroclimaticRegions	Area '000 ha		Absolute change	Relative change(%)	Production '000 tonnes		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	0.300	0.100	-0.200	-66.667	0.333	0.133	-0.200	-60.000	1083.333	1333.333	250.000	23.077
Northern Regions Chhattisgarh	12.767	10.133	-2.633	-20.627	9.900	5.633	-4.267	-43.098	749.145	551.249	-197.896	-26.416
Kymore Plateau & Satpura hills	153.750	156.100	2.350	1.528	120.940	128.300	7.360	6.086	757.272	822.483	65.212	8.611
Central Narmada Valley	253.900	252.933	-0.967	-0.381	269.767	305.600	35.833	13.283	1068.232	1210.260	142.028	13.296
Vindhya Plateau	535.433	898.733	363.300	67.852	467.567	881.767	414.200	88.586	871.051	989.518	118.467	13.601
Gird Region	100.297	331.267	230.970	230.287	75.550	331.667	256.117	339.003	697.127	1001.460	304.333	43.655
Bundelkhand	45.467	55.000	9.533	20.968	53.333	29.500	-23.833	-44.688	1126.538	551.229	-557.309	-51.069
Satpura Plateau	263.933	319.233	55.300	20.952	238.633	365.900	127.267	53.331	897.568	1142.370	244.802	27.274
Malwa Plateau	1521.300	2345.367	824.067	54.169	1419.133	2485.100	1065.967	75.114	925.328	1059.210	133.882	14.469
Nimar Plains	56.800	414.433	357.633	629.636	35.133	423.433	388.300	1105.218	600.379	1021.947	421.567	70.217
Jhabua Hills	18.200	35.133	16.933	93.040	13.200	24.433	11.233	85.101	687.765	692.679	4.913	0.714
Madhya Pradesh	3022.967	4832.333	1809.367	59.854	2749.933	4990.333	2240.400	81.471	898.667	1034.000	135.333	15.059

Base period : Mean value for the first triennium ending
Current period : Mean value for the last triennium ending

hills. For whole Madhya Pradesh, the changes in area under rapeseed & mustard was 175.333 thousand ha which is more by 31.051 percent. Among the Agro climatic regions Gird Region registered the highest net increase (137.500 thousand ha) in acreage, followed by Malwa Plateau (48.010 thousand ha), Northern hill Regions of Chhattisgarh (15.167 thousand ha), Bundelkhand (7.467 thousand ha), Kymore Plateau & Satpura hills (6.400 thousand ha), Satpura Plateau (3.367 thousand ha), Chhattisgarh Plains (0.067 thousand ha). The agroclimatic region Vindhya Plateau (0.833 thousand ha) and Jhabua hills (0.567 thousand ha) registered a decrease in their acreage. In relative term, the picture was quite different. Satpura Plateau had the maximum relative increase (1683.333%) in the current period over the base period, supported by Nimar Plains (99.978%), Malwa Plateau (86.938%), Northern hill Regions of Chhattisgarh (40.194%), Kymore Plateau & Satpura hills (37.945%), Gird Region (36.534%) and Bundelkhand (27.152%).

All the Agro climatic region of state except Chhattisgarh Plains and Vindhya Plateau registered increased production of rapeseed & mustard. The production of rapeseed & mustard increased from 498.333 thousand tones to 718.667 thousand tones between two periods in the state. There was a net increase of 220.333 thousand tones. Gird Region (209.633 thousand tonnes) registered maximum absolute change, followed by Malwa Plateau, Northern hill Regions of Chhattisgarh, Kymore Plateau & Satpura hills, Satpura Plateau, Bundelkhand, Central Narmada Valley and Nimar Plains. In relative terms the picture was very much different. Satpura Plateau had the lead in the current period over the base period in relative position, followed by Malwa Plateau (137.155%), Kymore Plateau & Satpura hills (92.308%), Northern hill Regions of Chhattisgarh (81.263%) and Gird region (61.064%).

Average yield of rapeseed & mustard in the whole Madhya Pradesh has risen up 76.333kg/ha, which is nearly 8.554 percent. Among all Agro climatic regions productivity increased excluding Chhattisgarh Plains and Bundelkhand. Maximum productivity of rapeseed & mustard (314.530 kg/ha) recorded in Central Narmada Valley, supported by Satpura Plateau (243.071 kg/ha), Malwa Plateau (199.955 kg/ha), Gird Region (169.095 kg/ha), Northern hill Region Chhattisgarh (143.694 kg/ha), and Kymore Plateau & Satpura hills (143.635 kg/ha). Nimar Plains (333.333%) topped in relative position, followed by Satpura Plateau (41.198%), Kymore Plateau & Satpura hills

Table 2: Absolute and Relative change in area, production and productivity of Rapeseed & Mustard in different Agro climatic regions of Madhya Pradesh.

AgroclimaticRegions	Area '000 ha		Absolute change	Relative change(%)	Production '000 tonnes		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	3.467	3.533	0.067	1.923	2.800	2.667	-0.133	-4.762	809.494	754.762	-54.732	-6.761
Northern hill Regions Chhattisgarh	37.733	52.900	15.167	40.194	16.367	29.667	13.300	81.263	417.038	560.733	143.694	34.456
Kymore Plateau & Satpura hills	16.867	23.267	6.400	37.945	6.067	11.667	5.600	92.308	354.435	498.070	143.635	40.525
Central Narmada Valley	0.310	0.333	0.023	7.527	0.273	0.400	0.127	46.341	918.803	1233.333	314.530	34.233
Vindhya Plateau	3.967	3.133	-0.833	-21.008	2.690	2.333	-0.357	-13.259	680.835	743.750	62.915	9.241
Gird Region	376.367	513.867	137.500	36.534	343.300	552.933	209.633	61.064	902.060	1071.156	169.095	18.745
Bundelkhand	27.500	34.967	7.467	27.152	12.267	14.467	2.200	17.935	447.301	402.749	-44.551	-9.960
Satpura Plateau	0.200	3.567	3.367	1683.333	0.109	2.967	2.858	2621.713	590.000	833.071	243.071	41.198
Malwa Plateau	55.223	103.233	48.010	86.938	42.799	101.500	58.701	137.155	776.097	976.052	199.955	25.764
Nimar Plains	0.033	0.067	0.033	99.978	000	0.033	0.033	000	000	333.333	117.647	333.333
Jhabua Hills	0.567	000	-0.567	-100	000	000	000	000	000	000	000	00
Madhya Pradesh	564.667	740.000	175.333	31.051	498.333	718.667	220.333	44.214	892.333	968.667	76.333	8.554

Base period : Mean value for the first triennium ending
Current period : Mean value for the last triennium ending

(40.198%), Northern hill Regions of Chhattisgarh (34.456%), Central Narmada Valley (34.233%), Malwa Plateau (25.764%), Gird Region (18.745%) and Vindhya Plateau (9.241%).

Sesame

Table 3 shows the absolute and relative changes in area, production and productivity of sesame in dissimilar Agro climatic regions of Madhya Pradesh between the two periods. Sesame area increased by 53.000 thousand ha which is 27.320 percent at M.P. level. The tendency of decrease in the area was seen in Central Narmada valley (14.100 thousand ha), Vindhya Plateau (10.767 thousand ha), Nimar Plains (10.033 thousand ha), Northern hill Regions of Chhattisgarh (3.967 thousand ha), Satpura Plateau (3.233 thousand ha) and Malwa Plateau (2.800 thousand ha) between two periods. In terms of net increase in area, the highest increase was found in Bundelkhand (63.233 thousand ha), followed by Gird Region (38.733 thousand ha), however the increase was lowest in Jhabua hills (0.033 thousand ha). Bundelkhand (134.826 %), topped in relatively position, followed by Gird Region (126.718%) and Chhattisgarh Plains (43.478%).

Sesame production in the Madhya Pradesh raised by 45.667 thousand tones which is 97.163 percent . In absolute position, the maximum increase in the production was recorded in Bundelkhand (27.467 thousand tonnes) and Gird region (20.700 thousand tonnes). The lowest increase was seen in Kymore Plateau & Satpura hills, followed by Central Narmada Valley, Chhattisgarh Plain and Northern hill Regions of Chhattisgarh. The maximum shrinkage in the production was detected in Vindhya Plateau (2.267 thousand tones), followed by Satpura Plateau and Malwa Plateau. In terms of relative position, Bundelkhand had the maximum rise (220.912%), followed by Gird Region, Chhattisgarh Plain, Jhabua hills and Kymore Plateau & Satpura hills.

It is significant to note that all the Agro climatic regions have recorded an increase sesame productivity. Sesame yield was highest in Chhattisgarh Plain (818.182 kg/ha), followed by Central Narmada Valley (538.462 kg/ha), Gird Region (454.697 kg/ha), Jhabua hills (444.444 kg/ha) and Malwa Plateau (432.621 kg/ha).

In these Agro climatic regions, the yield were more than the yield of M.P. (375.333 kg/ha). In the remaining Agro climatic regions sesame yield were below the yield of M.P. The highest net increase in the yield was found in Chhattisgarh (425.325 kg/ha), followed by Jhabua hills (277.778 kg/ha), Kymore Plateau & Satpura hills

Table 3: Absolute and Relative change in area, production and productivity of sesame in different agroclimatic region of Madhya Pradesh.

AgroclimaticRegions	Area '000 ha		Absolute change	Relative change(%)	Production '000 tonnes		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	0.767	1.100	0.333	43.478	0.300	0.900	0.600	200.000	392.857	818.182	425.325	108.264
Northern hill Regions of Chhattisgarh	14.733	10.767	-3.967	-26.923	2.133	2.400	0.267	12.500	143.635	222.463	78.828	54.881
Kymore Plateau & Satpura hills	41.533	39.400	-2.133	-5.136	6.400	12.733	6.333	98.958	151.830	322.821	170.991	112.621
Central Narmada Valley	15.200	1.100	-14.100	-92.763	5.533	0.600	2.206	-4.933	442.381	538.462	96.081	21.719
Vindhya Plateau	14.767	4.000	-10.767	-72.912	3.267	1.000	-2.267	-69.388	224.149	250.168	26.019	11.608
Gird Region	30.567	69.300	38.733	126.718	9.733	30.433	20.700	212.671	312.971	454.697	141.726	45.284
Bundelkhand	46.900	110.133	63.233	134.826	12.433	39.900	27.467	220.912	263.597	364.684	101.087	38.349
Satpura Plateau	4.633	1.400	-3.233	-69.784	0.867	0.367	-0.500	-57.692	186.556	283.333	96.778	51.876
Malwa Plateau	7.333	4.533	-2.800	-38.182	1.967	1.933	-0.033	-1.695	276.323	432.621	156.298	56.564
Nimar Plains	14.700	4.667	-10.033	-68.254	4.100	1.833	-2.267	-55.285	258.516	396.645	138.129	53.432
Jhabua Hills	0.200	0.233	0.033	16.667	0.033	0.100	0.067	200.000	166.667	444.444	277.778	166.667
Madhya Pradesh	194.000	247.000	53.000	27.320	47.000	92.667	45.667	97.163	240.333	375.333	135.000	56.172

Base period : Mean value for the first triennium ending
Current period : Mean value for the last triennium ending

(170.991 kg/ha), Malwa Plateau (156.298 kg/ha) and Nimar Plains (138.129 kg/ha). Relatively the maximum increase in the yield was witnessed in Jhabua hills (166.667%), followed by Kymore Plateau & Satpura hills, Chhattisgarh Plains, Malwa Plateau, Saypura Plateau and Gird Region.

Groundnut

It is observed that there was a tendency towards drop in groundnut area from 234.333 thousand ha to 204.333 thousand ha in whole Madhya Pradesh (Table 4). So, there was a net decrease of 30.000 thousand ha and percentage decrease came to 12.802. Table 4, illustrate that 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). All Agro climatic regions recorded 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 Central Narmada Valley. In relative expression, the highest increase in area was found in Central Narmada Valley (249.998%), followed by Bundelkhand (152.958%), Kymore Platea & 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 tones in the production of groundnut in Madhya Pradesh 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. Nimar Plains and Vindhya Plateau recorded decline in production of groundnut.

Vindhya Plateau show lowest rise in both absolute (4.884 kg/ha) and relative (0.505%) terms. The Agro climatic regions Bundelkhand, Nimar Plains and Northern region Chhattisgarh showed decreased yield. Whole state's yield of groundnut was 994.000 kg/ha, which was 6.882 percent more than the base period yield.

Conclusion

Assessment of the data comes with these ends:

1. It was noted from the analysis that among the four major oilseed crops (soybean, rapeseed & mustard,

Table 4: Absolute and Relative change in area, production and productivity of Groundnut in different Agro climatic Madhya Pradesh.

AgroclimaticRegions	Area '000 ha		Absolute change	Relative change(%)	Production '000 tonnes		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

sesame and groundnut), largest area brought under soybean supported by rapeseed & mustard in the whole state.

2. Malwa Plateau ranks first in terms of absolute increase in the area and production of soybean, whereas Kymore Plateau & Satpura hill showed the lowest increase in area. In relative terms change in area, production and productivity of soybean was found highest in Nimar Plain. Nimar Plain registered the highest increase in productivity of soybean.
3. In terms of absolute change Gird Region registered the highest area and production of rapeseed & mustard. Whereas Vindhya Plateau and Jhabua hill registered a decrease in their acreage. For productivity Central Narmada Valley showed the highest absolute change. The relative change in area and production was found highest in Satpura Plateau, whereas in production relative change was highest in Nimar Plain.
4. Bundelkhand registered highest net and relative increase in area and production of sesame crop, whereas in productivity Chhattisgarh Plain showed the highest absolute change.

Gird region recorded highest increase in the area and production of groundnut. In relative terms Chhattisgarh Plain showed the highest change in area. Central Narmada Valley showed the highest absolute and relative productivity and production change respectively.

References

Ahirwar, R.F., P.K. Mishra and S.K. Rajak (2005). Status and performance of oilseed production in India, International conference on sustainable crop production in stress environments. Manag. and Gene. Options, 345-346.

Angles, A. (2001). Production and Export of Turmeric in South India: An Economic Analysis. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.

Bhatnagar, S. and K.K. Saxena (2000). An estimate of area and production of wheat in Haryana by 2002. *Agri. Situa. India,* **56(11):** 665-667.

Das, Hem Chandra Lal (1993). Trends in area, production and yield of oilseeds in Bihar. *Ind. J. Agril. Eco.,* **48(3):** 380.

Gupta, Satendra P. (1997). Growth performance and variability of Groundnut crop in India .A Statewise analysis. *Ind. J. Agril. Eco.,* **52(3):** 460.