

# An Assessment of Change in Cropping Pattern in Madhya Pradesh

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## Abstract

The aim of the present paper is to determine the changes in the cropping pattern in Madhya Pradesh. This paper will also give some suggestion for improving the cropping pattern in Madhya Pradesh. The secondary data was collected for the period of fifteen years viz from 2000-01 to 2015-16. To reveal the absolute and relative changes in cropping pattern of Madhya Pradesh, the analysis was done in four phases i.e., Phase first from 2000-01 to 2005-06, phase second from 2005-06 to 2010-11, phase third from 2010-11 to 2015-16, and phase fourth which is of sixteen years from 2000-01 to 2015-16. It is observed from the study that the gross sown area of state has increased from 17870(000ha) to 24047 thousand hectares during overall reference period. The net sown area has increased to 15316 thousand hectares in the last year of reference period over 14664 thousand hectares during the initial year. It is observed from the study that Madhya Pradesh is mainly a food grain growing state around 64% of its gross cropped area (GCA) was under food grains and 32% under oilseeds in TE 2014-15. Within food grains, about 40% of GCA was under production of cereals while 23.97% was under pulses. Wheat is the most important cereal grown in the state, accounting for around 24% of the GCA. Among pulses, gram is the main crop grown with around 13% of GCA. Further it is revealed from the study that State mostly grows oilseeds, specifically soybean. Around 25.2% of GCA is under soybean cultivation. The farmers are gradually diversifying to commercial crops for the sake of higher earnings. It is revealed that the cropping pattern also points out the diversification of agriculture from subsistence or less profitable crops to commercial or more profitable area in the state.

**Keywords:** *Cropping Pattern, Absolute and Relative change, Madhya Pradesh.*

## 1. INTRODUCTION:

Cropping pattern means the proportion of area under different crops at a point of time, change in this distribution over a period of time and factors affecting this change in distribution (Misra & Puri 2011)<sup>1</sup>. The cropping pattern changes in space and time. The observation of cropping pattern is very important, because it provides evidences about the changes that are taking place in utilization of agricultural land. A change or shift in the cropping pattern implies a change in proportion of the area under different crops which depends to a large extent on the facilities available to raise crops in the given agro-climatic zones. A change in cropping pattern of area under different crops depends largely on agro-climatic, technical and institutional determinants. To be more specific, the cropping pattern advantage in relation to agro-climatic conditions that the conditions of soil and climate influences production. (Bhalla and Singh 1997)<sup>2</sup>. Further, the development of marketing infrastructure and the demand pattern of the people are some other factors which affect cropping pattern. As such cropping pattern plays a vital role in determining the level of agricultural production and reflects agricultural commercialization. The cropping pattern has been used as an index of measuring the extent of commercialization of Agriculture by many researchers. The cropping pattern index refers to the proportion of area under any specific crop to gross sown area. The shift of cropping pattern from subsistence crops to market-oriented crops.

The present study is related to the Madhya Pradesh state. Madhya Pradesh is the second largest state of the country, comprising of 11 Agro-climatic zones with diverse soil and climatic condition, which assists to

<sup>1</sup> Misra, S.K. and Puri, V.K. (2011), *Indian Economy-Its Development and Experience*; Himalaya Publishing House pvt. Ltd.

<sup>2</sup> Bhalla, G. S. and Singh, G. (1997). Recent developments in Indian Agriculture: A state level analysis, *Economic and political weekly*, 32(13).

support to cultivation of a wide range of crops with diversified cropping pattern. It spreads over a geographical area of about 308 lakh ha, which is about 9% of the total area of the country. Favourable soil and climatic conditions helped the state to be a leading producer of cereals, pulses, oilseeds (soybean) in the country. Madhya Pradesh emerged as the state with the highest growth rate in agriculture. Madhya Pradesh's agricultural GDP increased at 8.1% per annum during 2005–06 to 2016–17, surpassing even record holder Gujarat's 6% agricultural growth in the same period. The last three years have been even more spectacular: agricultural GDP increased at 11.8% per annum. The state has got Krish Karmath Award of 2012 for development and extension of newer modern technology of agriculture and honour of the best agriculture state of India in the year 2013 for highest agricultural growth (18% per annum).

## 2. RESEARCH METHODOLOGY:

### Objectives:

- To analyse absolute and Relative changes in cropping Pattern of the state of Madhya Pradesh.
- To give some suggestion for improving the cropping pattern in Madhya Pradesh.

### Sources of Data and period of study:

In order to show the change in cropping pattern of the state the source of the data was secondary in nature and mainly collected from Agriculture Statistics of Madhya Pradesh (from the Directorate of Agriculture, Bhopal), www.mpkrishi .net, Agricultural economic survey 2016 and from other published and unpublished records. The secondary data was collected for the period of fifteen years viz from 2000-01 to 2015-16. To reveal the absolute and relative changes in cropping pattern of Madhya Pradesh, the analysis was done in four phases i.e., Phase first from 2000-01 to 2005-06, phase second from 2005-06 to 2010-11, phase third from 2010-11 to 2015-16, and phase fourth which is of sixteen years from 2000-01 to 2015-16.

## 3. ANALYTICAL PROCEDURE:

### Absolute and Relative change:

Absolute change as well as relative change was included in the present study.

Absolute change =  $Y_n - Y_0$

Where,  $Y_n$  = value of area for the current year.

$Y_0$  = value of area for the base year

Relative change =  $\frac{Y_n - Y_0}{Y_0} * 100$

Where,  $Y_n$  = Value of area in Base year

$Y_0$  = Value of area under different crops and crop groups in the current year.

## 4. RESULTS AND DISCUSSION:

**Table-1: Area under different Crops and Crop groups in Madhya Pradesh (000ha).**

Crop	2000-2001		2005-2006		2010-2011		2015-2016	
	absolute	%	Absolute	%	Absolute	%	Absolute	%
Paddy	1708.00	9.56	1711.00	8.73	1584.00	7.10	2024.00	8.42
Jowar	636.00	3.56	581.00	2.96	430.00	1.93	204.60	0.85
Maize	840.00	4.70	863.00	4.40	849.00	3.80	1098.30	4.57
Bajra	165.00	0.92	184.00	0.94	162.00	0.73	267.15	1.11
Millets and others	456.00	2.55	348.00	1.77	248.00	1.11	130.40	0.54
Wheat	3311.00	18.53	3785.00	19.30	4645.00	20.82	5911.00	24.58
Barley	85.00	0.48	83.00	0.42	78.00		97.80	0.41
<b>Total cereals</b>	7201.00	40.30	7555.00	38.53	7996.00	35.83	9733.25	40.48
Tur	313.00	1.75	323.00	1.65	487.00	2.18	579.20	2.41
Urad	414.00	2.32	483.00	2.46	601.3	2.6	932.00	3.88
Moong	88.00	0.49	77.00	0.39	80.6	0.36	193.00	0.80

Kulthi and others	42.00	0.24	36.00	0.18	24.3	0.1	15.79	0.07
Gram	1978.00	11.07	2541.00	12.96	2888.00	12.94	3017.00	12.55
Peas	169.00	0.95	219.00	1.12	232.4	1.05	450.45	1.87
Lentil	489.00	2.74	582.00	2.97	587.1	2.63	545.80	2.27
Theora and others	61.00	0.34	71.00		58	.26	31.20	0.13
<b>total pulses</b>	<b>3554.00</b>	<b>19.89</b>	<b>4332.00</b>	<b>22.09</b>	<b>4958.7</b>	<b>22.22</b>	<b>5764.44</b>	<b>23.97</b>
<b>Total foodgrains</b>	<b>10755.00</b>	<b>60.18</b>	<b>11887.00</b>	<b>60.62</b>	<b>12954.7</b>	<b>58.05</b>	<b>15497.69</b>	<b>64.45</b>
Groundnut	215.00	1.20	208.00	1.06	204.00	0.91	235.70	0.98
Soyabean	4475.00	25.04	4590.00	23.41	5552.00	24.88	5906.90	24.56
Sesamum	144.00	0.81	185.00	0.94	290.00	1.30	364.50	1.52
Niger and others	111.00	0.62	109.00	0.56	109.00	0.49	81.00	0.34
Rape/Mustard	419.00	2.34	831.00	4.24	727.00	3.26	617.40	2.57
Linseed and others	165.00	0.92	134.00	0.68	124.00	0.56	131.00	0.54
<b>Total oilseeds</b>	<b>5529.00</b>	<b>30.94</b>	<b>6057.00</b>	<b>30.89</b>	<b>7006.00</b>	<b>31.40</b>	<b>7336.50</b>	<b>30.51</b>
Cotton	498.00	2.79	603.00	3.08	593.00	2.66	562.60	2.34
Sugarcane	44.00	0.25	52.00	0.27	77.00	0.35	103.45	0.43
Raw jute and Mesta	0.80	0.00	0.60	0.00	5.40	0.02	0.00	0.00
Net sown area	14664	82.05	14971	76.35	14775	66.22	15316	63.69
Area more than once	3206	17.94	4637	23.64	7540	33.78	8625	35.86
Gross sown area	17870.0	100.00	19608.00	100.00	22315.00	100.00	24047.0	100.0

Source: Compendium of Agriculture Statistics 2009-2010, Madhya Pradesh upto 2010 data and [www.mpkrishi.com](http://www.mpkrishi.com) from 2010-11 to 2015-16.

Table 1 shows the area under different crops and crop groups in the state of Madhya Pradesh. It is revealed from the table that the gross sown area of state has increased from 17870(000ha) to 24047 thousand hectares during overall reference period. The net sown area has increased to 15316 thousand hectares in the last year of reference period over 14664 thousand hectares during the initial year. The area has increased two times from 3206(000ha) in 2000-01 to 8625(000ha) in 2015-16. The area under total food grains has increased from 10755 (000ht) to 15497.6(000ht) in absolute terms and in percentage of gross cropped area of total food grains has increased from 60.18 % to 64.45% during the overall period of study. It is revealed from the table that during the overall reference period area under total oilseeds has been increased from 5529(000ht) to 7336.5(000ht) in absolute terms and in percentage terms area under total oilseeds has almost remained constant at 31%. Area under total cereals has increased from 7201(000ht) to 9733.25(000ht) during overall period of study. Further it is observed from table that area under total pulses has been increased from 3554(000ht) to 5764.44 (000ht) during overall period.

## 5. ABSOLUTE AND RELATIVE CHANGE IN CROPPING PATTERN OF MADHYA PRADESH:

The change in area under different crops and crop groups in the prevailing cropping pattern are mainly point out by absolute and relative change over a whole reference time period. Hence, this section shows the absolute and relative changes in area of main crops and crop groups under cropping patterns during different time in the state of Madhya Pradesh. To reveal the absolute and relative changes in cropping pattern of Madhya Pradesh, the analysis was done in four phases i.e., Phase first from 2000-01 to 2005-06, phase second from 2005-06 to 2010-11, phase third from 2010-11 to 2015-16, and phase fourth which is of sixteen years from 2000-01 to 2015-16.

**Table-2: Absolute and Relative change in Cropping Pattern of Madhya Pradesh (000ha).**

Crop	2000-01 to 2005-06		2005-06 to 2010-11		2010-11-2015-16		2000-01 to 2015-16	
	Absolute change	Relative change	Absolute	Relative change	Absolute change	Relative change	Absolute change	Relative change
Paddy	3.00	0.18	-127.00	-7.42	440.00	27.78	316.00	18.50
<b>Jowar</b>	-55.00	-8.65	-151.00	-25.99	-225.40	-52.42	-431.40	-67.83
<b>Maize</b>	23.00	2.74	-14.00	-1.62	249.30	29.36	258.30	30.75
<b>Bajra</b>	19.00	11.52	-22.00	-11.96	105.15	64.91	102.15	61.91
<b>Millets and others</b>	-108.00	-23.68	-100.00	-28.74	-117.60	-47.42	-325.60	-71.40
<b>Wheat</b>	474.00	14.32	860.00	22.72	1266.00	27.26	2600.00	78.53
<b>Barley</b>	-2.00	-2.35	-5.00	-6.02	19.80	25.38	12.80	15.06
<b>Total cereals</b>	354.00	4.92	441.00	5.84	1737.25	21.73	2532.25	35.17
<b>Tur</b>	10.00	3.19	164.00	50.77	92.20	18.93	266.20	85.05
<b>Urad</b>	69.00	16.67	118.30	24.49	330.70	55.00	518.00	125.12
<b>Moong</b>	-11.00	-12.50	3.60	4.68	112.40	139.45	105.00	119.32
<b>Kulthi and others</b>	-6.00	-14.29	-12.20	-33.89	-8.01	-33.66	-26.21	-62.40
<b>Gram</b>	563.00	28.46	347.00	13.66	129.00	4.47	1039.00	52.53
<b>Peas</b>	50.00	29.59	13.40	6.12	218.05	93.83	281.45	166.54
<b>Lentil</b>	93.00	19.02	5.10	0.88	-41.30	-7.03	56.80	11.62
<b>Theora and others</b>	10.00	16.39	-12.50	-17.61	-27.30	-46.67	-29.80	-48.85
<b>total pulses</b>	778.00	21.89	-957.00	-22.09	805.74	16.25	2210.44	62.20
<b>Total food grains</b>	1132.00	10.53	-516.00	-4.34	2542.9	19.3	4742.69	44.10
<b>Groundnut</b>	-7.00	-3.26	-4.00	-1.92	31.70	15.54	20.70	9.63
<b>Soyabean</b>	115.00	2.57	962.00	20.96	354.90	6.39	1431.90	32.00
<b>Sesamum</b>	41.00	28.47	105.00	56.76	74.50	25.69	220.50	153.13
<b>Niger and others</b>	-2.00	-1.80	0.00	0.00	-28.00	-25.69	-30.00	-27.03
<b>Rape/Mustard</b>	412.00	98.33	-104.00	-12.52	-109.60	-15.08	198.40	47.35
<b>Linseed and others</b>	-31.00	-18.79	-10.00	-7.46	7.00	5.65	-34.00	-20.61
<b>Total oilseeds</b>	528.00	9.55	949.00	15.67	330.50	4.72	1807.50	32.69
<b>Cotton</b>	105.00	21.08	-10.00	-1.66	-30.40	-5.13	64.60	12.97
<b>Sugarcane</b>	8.00	18.18	25.00	48.08	26.45	34.35	59.45	135.11

<b>Raw jute and Mesta</b>	-0.20	-25.00	4.80	800.00	-5.40	-100.00	-0.80	-100.00
<b>Net area sown</b>	307	2.09	-196	-1.3	541	3.66	652	4.44
<b>Area more than once</b>	1431	44.63	2903	62.60	1085	14.38	5419	169
<b>Gross sown area</b>	1738.00	9.73	2707.00	13.81	1732.00	7.76	6177.00	34.57

Source: Compiled by Researcher based on Table 1.

Table 2 shows the variation in cropping pattern of Madhya Pradesh. It is revealed from the table 2 that gross cropped area of the state has increased by 1738(000Ha) i.e. (9.73%) in absolute and relative terms respectively during phase I. During II phase gross cropped area has increased by 2707 thousand hectares and 13.81% in absolute and relative terms. In phase III it has increased by 1732 thousand hectares and 7.76% in absolute and relative terms respectively. The gross cropped area has increased by 6177 thousand hectares and 34.57% in absolute and relative terms during phase IV which includes the overall period of study. The area under total food grains has increased by 10.53%, 8.98%, 19.63% and 44.10 % during phase I, phase II, phase III and phase IV respectively. The change in area under total cereals was found to be increased by 354(000ht), 441, 1737, 2532.25 in absolute terms and by 4.92%, 5.84%, 21.73% and 35.17% during phase I, phase II, phase III, and phase IV respectively. Area under total pulses is revealed to increase by 778, 626.3, 2389.44, 2210.44 thousand hectares in absolute terms and by 21.89%, 14.47, 70.80% and 62.20% in relative terms during phase I, phase II and phase IV respectively. Area under total oilseeds is observed to have increased absolutely by 528, 949, 330.5, 1807.5 thousand hectares and relatively by 9.55%, 15.67%, 4.75% and 32.69% during phase I, phase II, phase III, and phase IV respectively.

Table 2 also reveals that change in the area has increased for Mustard(98%) followed by Peas(50%), Sesamum (28.57%), Gram (28.46), Cotton(21%), Lentil(19.08%), Sugarcane(18.08), Urad (16.6%), Wheat (14.32), Maize (2.7%), Paddy (18%) during the first phase .The area under Jowar (-8.65%), Millets and other coarse cereals (-23.6%), Moong (-12.5%), Kulthi and others (-14.2%), Linseed (-18.79%), raw jute (-25%), Groundnut (-3.26) is observed to have decreased during first phase of the reference period.

During phase II the Table 6.1.1 shows the relative change in the area under Sesamum (56.76%), Tur (50.77%), Sugarcane (48%), Urad (24%), Wheat (22%), Soyabean (20.96%) observed to have increased. But during the same phase of the reference period the relative change in the area under Jowar (-25.9%), Bajra (-11.9%), Millets and other coarse cereals (-28.74%), Paddy (-7.4%), Barley (-6.02), Kulthi (-33.89%), Mustard (-12%) is observed to have decreased.

Table 2 also depicts that during phase 3rd the relative change in area under paddy (27.78%), maize (29.36%), bajra (64.9%), Wheat (27.26%), Urad (55%), Tur (18.9%), Moong (139%), Peas (93.8%), Groundnut (15.5%), Sesamum (25.69%), Sugarcane (34.3%) was increased. But the relative change in area under Jowar (-52%), Millets and others (-47.4), kulthi and others (-33.66), Theora and others(-46.67%), Mustard (-15.08%) was decreased.

During phase 4th which deals with the period from 2000-01 to 2015-16. The table 6.1.1 reveals that the relative change in area to be increased under paddy (18.5%), maize (30.75%), bajra (61.91%), wheat (78.53%), urad (125.12%), tur (85.5%), moong (119.32%), gram (52.53%), peas (166.54%), soyabean (32%), sesamum (153.13%), mustard (47.35%). During the same period the crop wise negative relative change in area was observed in jowar (-67.83%), millets and other coarse cereals (-71.4%), kulthi and other rabi coarse cereals (-62.4%), theora (-48.85%), niger (-27.03%), linseed (-20.61%). Thus, the cropping pattern also points out the diversification of agriculture from subsistence or less profitable crops to commercial or more profitable area.

## 6. CONCLUSION AND SUGGESTION:

The observation of cropping pattern is very important, because it provide evidences about the changes that are taking place in utilization of agricultural land. In this study the change in area under different crops and crop groups in the prevailing cropping pattern are mainly point out by absolute and relative change over a whole reference time period. It is revealed from the table that the gross sown area of state has increased from 17870(000ha) to 24047 thousand hectares during overall reference period. The net sown area has increased to 15316 thousand hectares in the last year of reference period over 14664 thousand hectares during the initial year. It is observed from the study that Madhya Pradesh is mainly a food grain growing stat around 64% of its gross cropped area (GCA) was under food grains and 32% under oilseeds. Within food grains, around 40% of

GCA was under production of cereals while 23.97% was under pulses. Wheat is the most important cereal grown in the state, accounting for around 24% of the GCA. Among pulses, gram is the main crop grown with around 13% of GCA dedicated to the crop (63% of pulse area), followed by arhar (2% of GCA and 10% of area under pulses). The State mostly grows oilseeds, specifically soybean. Around 25.2% of GCA is under soybean cultivation. It is observed from the study that the subsistence or less profitable crops such as jowar, kulhi, theora, linseed, millets and other coarse cereals shows negative relative change in the area during the whole reference period while as more profitable crops like Wheat, Rice, Soybean, maize, gram etc shows positive relative change in terms of area. Thus, the cropping pattern also points out the diversification of agriculture from subsistence or less profitable crops to commercial or more profitable area.

## 7. SUGGESTIONS:

It is essential to take steps to enhance link across production, processing, marketing and crop management. Efforts should be made for providing High Yielding Variety Seeds of high value commercialised crops on time and at subsidized rates to improve the productivity of selected crops. Contract farming should be encouraged by the Government agencies to boost the production. With the increasing importance of the horticultural sector, there is a need to expand and strengthen infrastructure such as cold storage, warehouses, processing units and organised retail for value chain development

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