

STATE OF AGRICULTURE IN MADHYA PRADESH



**AGRO- ECONOMIC RESEARCH CENTRE FOR MADHYA PRADESH AND CHHATTISGARH
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.)**

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STATES OF AGRICULTURE IN MADHYA PRADESH

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New Delhi**



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2013

Preface

Madhya Pradesh, the second largest state of the country is located in the central India, comprising 11 Agro – Climatic zones with diverse soil and climatic condition, which helps to support to cultivation of a wide range of crops with diversified cropping pattern. Madhya Pradesh stands in the top most position for producing pulses, oilseeds, garlic and coriander with highest cattle population in India. The diversified cropping pattern and the highest cattle population helped to cultivate organic farming in 40 per cent of the area under of the total agriculture land of the country, which not only helps to minimize the risk associated with rainfed agriculture but also improve the soil health and there by facilitate the sustained the inclusive growth of agricultural sector through sustainable development. 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). In spite of the above progress of agriculture in the state there are so many challenges are exist which needs to be addressed for prolong growth. In order to understand the prevailing pitfall and challenges to agricultural growth in various states the Ministry of Agriculture Government of India propose to carry out state specific report focusing on agricultural scenario which were assign to various AERCs / Unit located at different states in India. The Agro-Economic Research Centre was entrusted to prepare report on agricultural scenario in the state of Madhya Pradesh. “State of Agriculture in Madhya Pradesh” was prepared by using secondary data collected from various sources. This study enlightens the performance of agriculture in Madhya Pradesh along with future option available for accelerated growth with inclusiveness of all the stake holders for the benefit of the farming community.

I am thankful to Dr. Deepak Rathi, Mr. Ravi Singh Chouhan for putting their untiring efforts to complete this profile.

I also thank the Ministry of Agriculture, Government of India for their cooperation and support. It is hope that this profile will be useful to agriculture scientist, economists, non-governmental organization, policy makers and planners for understanding the present condition of agriculture in Madhya Pradesh.

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**(Hari Om Sharma)
Director**

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STATE OF AGRICULTURE IN MADHYA PRADESH

Madhya Pradesh is located in Central India and surrounded by Uttar Pradesh in the North, Chhattisgarh in the East, Maharashtra in the South and Gujarat and Rajasthan in the West. The most commonly spoken language of the state is Hindi, English and Marathi are the other languages used by the people of the state. Bhopal (The capital) Indore, Gwalior, Jabalpur and Ujjain are some of the key cities of the state. (Fig. 1) There are 11 agro-climatic zones and variety of soils available in the state to support cultivation of a wide range of crops. Madhya Pradesh got an honour of the best agriculture state of the India in the year 2013 for highest agriculture growth of 18 per cent per annum. Madhya Pradesh also stood in top most position in India for producing pulses and oilseeds in the year 2013 and also for record production and procurement of wheat at Minimum Support Price (MSP) in the year 2011–12. The state also got “Krishi Karmath Award” of 2012 for development and extension of newer modern technology of agriculture in the country. The state is a leading producer of soybean, gram, garlic and coriander.

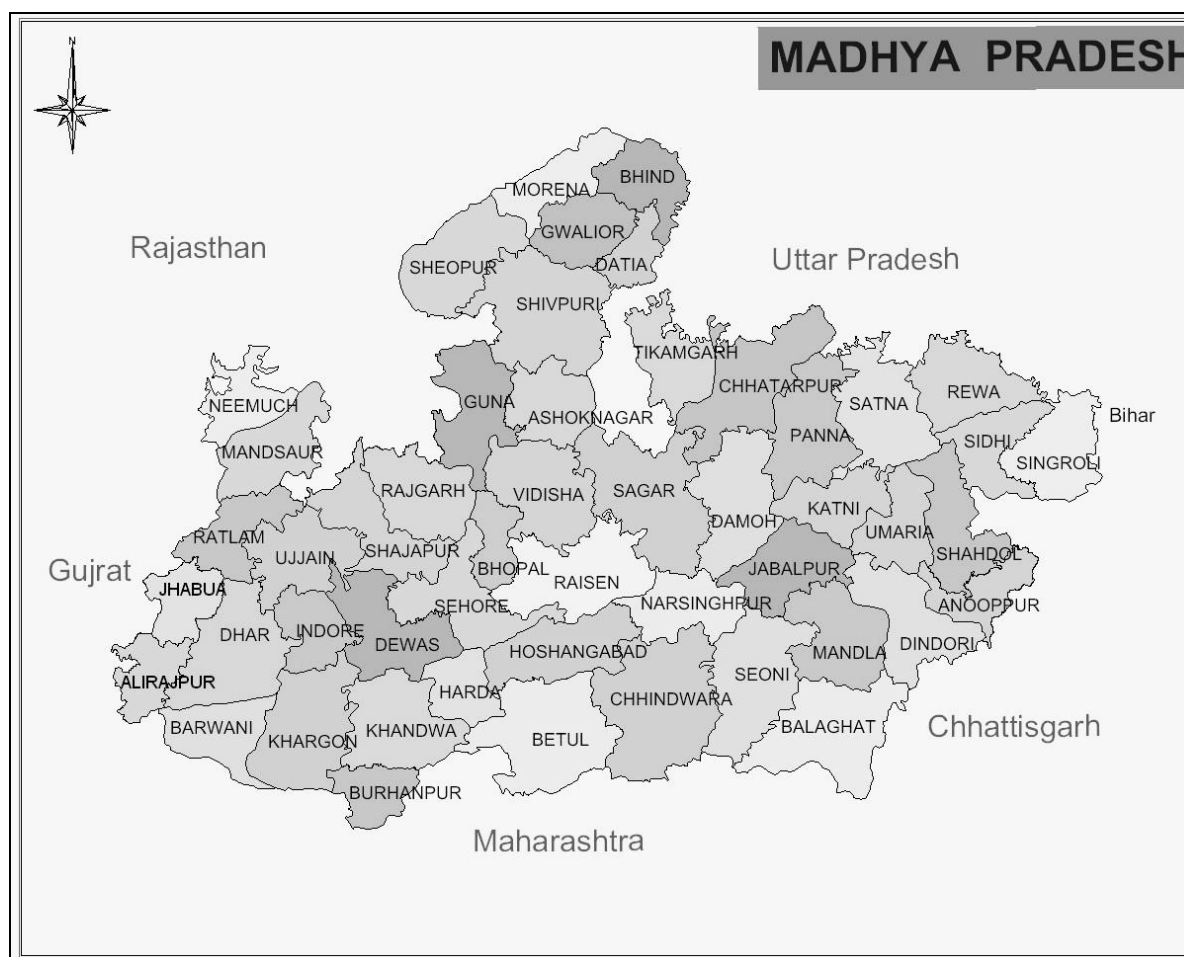


Fig. 1: Districts of Madhya Pradesh.

Table 1.1: Demographic Features of Madhya Pradesh.

Particulars	Figures
Area (in sq.kms.)	308 thousand sq. K.M.
Latitude	21° 53` to 22° 59` N
Longitude	76° 47` to 78° 44` E
Population (Census 2011) (thousand)	72598
Male	37673 (51.81)
Female	34985 (48.19)
Rural	52538 (72.37)
Urban	20060 (27.63)
Scheduled Tribes (%)	20.27 (Census 2001)
Scheduled Castes (%)	15.17 (Census 2001)
Population (0-6 Years)	1.05 Cr
No of districts	50
Number of Tehsils	272
Development Blocks	313
Villages	55393
Gram Panchayats	23012
Literacy (%)	70.6
Male	80.53
Female	60.02
Density of Population (Person/sq.km.)	236
Sex Ratio (Over 1000)	930
Child Sex Ratio (Over 1000)	912

Source : Government of Madhya Pradesh Website, www.mp.gov.in, *Provisional Data – Census 2011, Figures in parenthesis show percentage to total population.

Around 31 per cent land of the state is under forest cover with abundant natural resources. Favorable soil and climatic conditions helped the state to be a leading producer of coarse cereals, pulses, oilseeds (soybean) in the country. Madhya Pradesh has rich mineral resources and the largest reserves of diamond and copper in India. Besides, the state has significant reserves of coal, coal-bed methane, manganese and dolomite. The state is a manufacturing base for a number of large and medium scale industries from diverse sectors; such as automobile and auto-components, cement, agro-processing, consumer goods, pharmaceuticals, etc. It also has a large pool of industrial labour. The state has immense potential for tourism, particularly, wild-life and adventure tourism and eco-tourism because of its dense forest cover. It also has globally renowned locations of historical and religious significance.

1.1 Population

The majority of the population of Madhya Pradesh lives in rural areas as 72.37 percent of total population of M. P. lives in the villages of rural areas. In actual numbers,

males and females were 27,149,388 and 25,408,016 respectively. Total population of rural areas of Madhya Pradesh state was 52,538 thousand. The population growth rates recorded for urban and rural area for this decade (2001-2011) were found to be 25.69 per cent and 18.42 per cent respectively (Table 1.1).

In rural area of Madhya Pradesh state, female sex ratio per 1000 males was more as compared to urban area. The same for the child (0-6 age) was 923 girls per 1000 boys. In Madhya Pradesh, 15.84 per cent children (0-6) live in rural areas, while 12.38 per cent children live in urban areas.

In rural areas of Madhya Pradesh, literacy rate for male and female stood at 74.74 % and 48.49 %. Average literacy rate in Madhya Pradesh for rural and urban areas was 63.94 and 82.85 percent respectively to total population.

Table 1.2: Madhya Pradesh Population Structure. (2011)

Description	Rural	Urban
Population (%)	72.37	27.63
Total Population	526	201
Male Population	271	105
Female Population	254	96
Population Growth (%)	18.42	25.69
Sex Ratio (Over 100)	936	918
Child Sex Ratio (0-6)	923	901
Child Population (0-6)	83	25
Child Percentage (0-6) (%)	15.84	12.38
Literates (%)	283	146
Average Literacy (%)	63.94	82.85
Male Literacy (%)	74.74	88.67
Female Literacy (%)	48.49	69.46

The total working population in Madhya Pradesh was 257.94 lakh out of which 161.94 lakh were male (51.50%) and 95.99 lakh female (33.20%) that constituted about 42.74 per cent of total population (Census 2001). The total number of cultivator to total working population in the state (43.30%) were found to be higher than the country (32.90%). The percentages of total agriculture labour, household industry worker and other worker to total working population were found to be 28.70, 4.00 and 24.50 per cent respectively in the state and 26.5, 4.2 and 37.6 percent respectively in the country.

Table 1.3: Composition of Population in Madhya Pradesh and India. (Lakh)

Particulars	Total Population	Total workers	Cultivators	Agricultural labourers	Household industry workers	Other worker
India						
Total	10287.37	4022.35 (33.09)	1273.13 (31.70)	1061.00 (26.50)	169.57 (4.20)	1511.90 (37.60)
Male	5322.23	2750.14 (51.67)	854.16 (31.10)	573.29 (20.80)	87.44 (3.20)	1235.25 (44.90)
Female	4965.14	1272.20 (25.62)	418.96 (32.90)	494.46 (38.90)	82.13 (6.50)	276.65 (21.70)
Madhya Pradesh						
Total	603.48	257.94 (42.74)	110.38 (42.80)	74.01 (28.70)	10.33 (4.00)	63.22 (24.50)
Male	314.44	161.94 (51.50)	68.83 (42.50)	35.18 (21.70)	5.19 (3.20)	52.74 (32.60)
Female	289.04	95.99 (33.20)	41.55 (43.30)	38.82 (40.40)	5.14 (5.40)	10.48 (10.90)

Source: Primary Census Abstract: Census of India 2001

Figure in the parenthesis shows percentage to total workers which given with bold and in parenthesis show percentage to total population.

1.2 State Domestic Product

At current prices, the Gross State Domestic Product (GSDP) of Madhya Pradesh for 2010-11 was US \$ 57.0 billion between 2004-05 and 2010-1. The average annual GSDP growth rate was 14.6 per cent. (Fig 2)

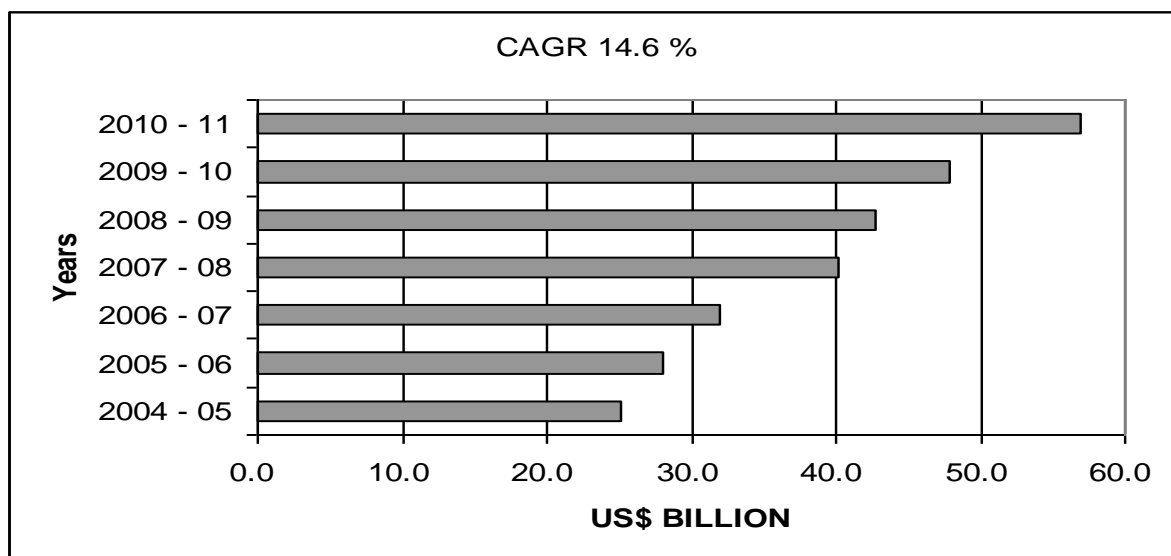


Fig. 2: Gross State Domestic Products of Madhya Pradesh.

The Net State Domestic Product (NSDP) of Madhya Pradesh was about US \$ 50.7 billion in 2010-11. The average NSDP growth rate between 2004-05 and 2010-11, was about 14.7 per cent. (Fig. 3)

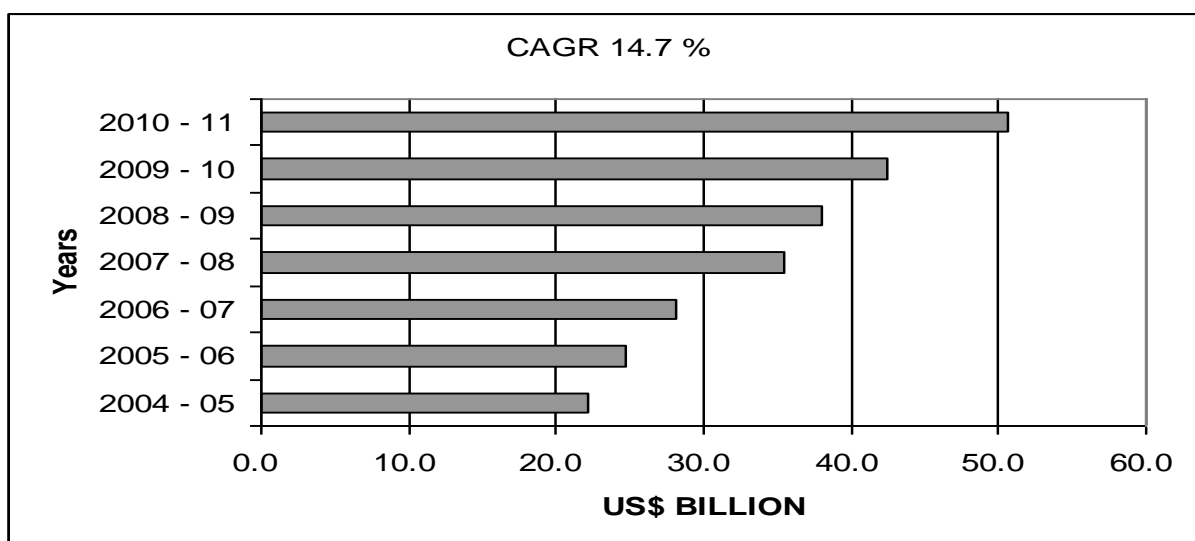


Fig. 3: Net State Domestic Products of Madhya Pradesh.

The state's per capita GSDP was US\$ 795.1 (2010-11) as compared to US \$ 388.1 (2004-05). Per capita GSDP has increased at a CAGR (Compound Annual Growth Rate) of 12.7 per cent per annum between the period from 2004-05 and 2010-11 (Fig. 4).

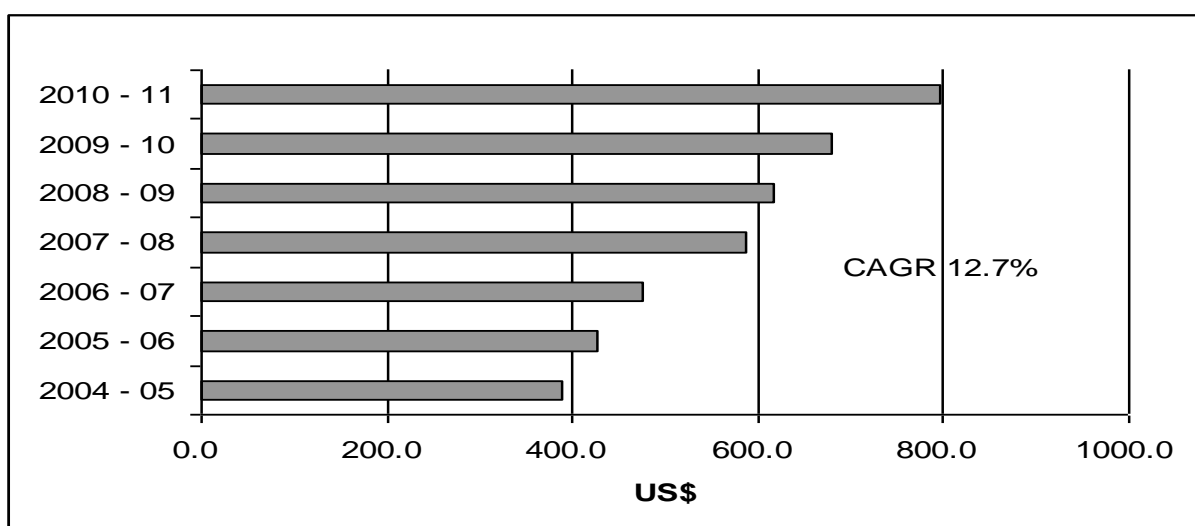


Fig. 4: Per Capita Gross State Domestic Products.

The state's per capita NSDP in was US \$ 707.0 (2010-11) as compared to US \$ 343.5 (2004-05). The per capita NSDP increased at an average growth rate of 12.7 per cent per annum between the period from 2004-05 to 2010-11(Fig. 5).

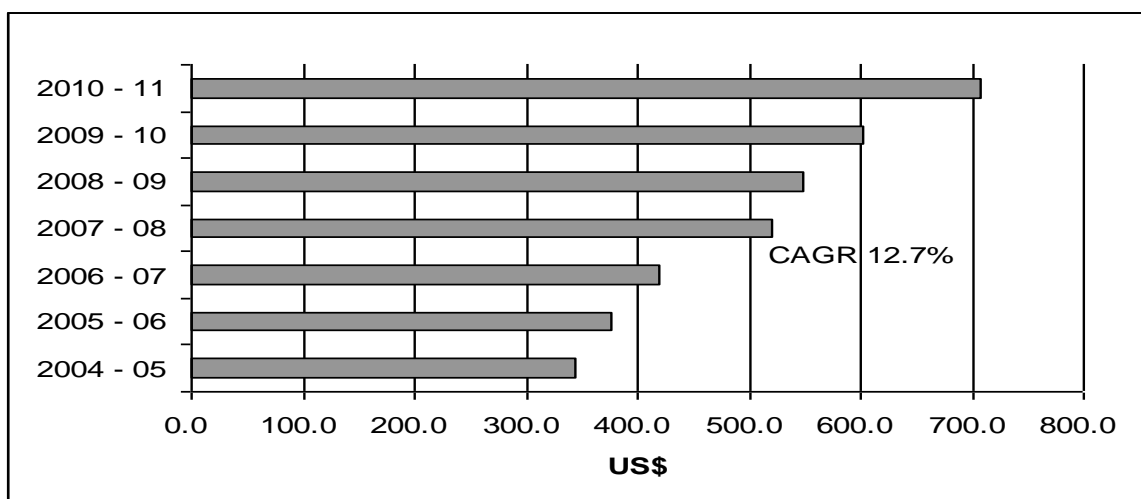


Fig. 5: Per Capita State's Net State Domestic Products.

In Madhya Pradesh the tertiary sector contributed 46.0 per cent to the state's GSDP (at current prices), followed by primary sector (28.5 per cent) and secondary sector (22.5 per cent). The secondary sector (17.7% per annum) found to be fastest growing among the three sectors in the period from 2004-05 to 2010-11. (Fig. 6) It was driven by manufacturing, construction and electricity, gas & water supply. The tertiary sector grew at a CAGR of 15.2 per cent between 2004-05 and 2010-11. The growth had been driven by trade, hotels, real estate, finance, insurance, transport, communications and other services. The primary sector grew at a CAGR of 12.4 per cent per annum between in the period from 2004-05 to 2010-11.

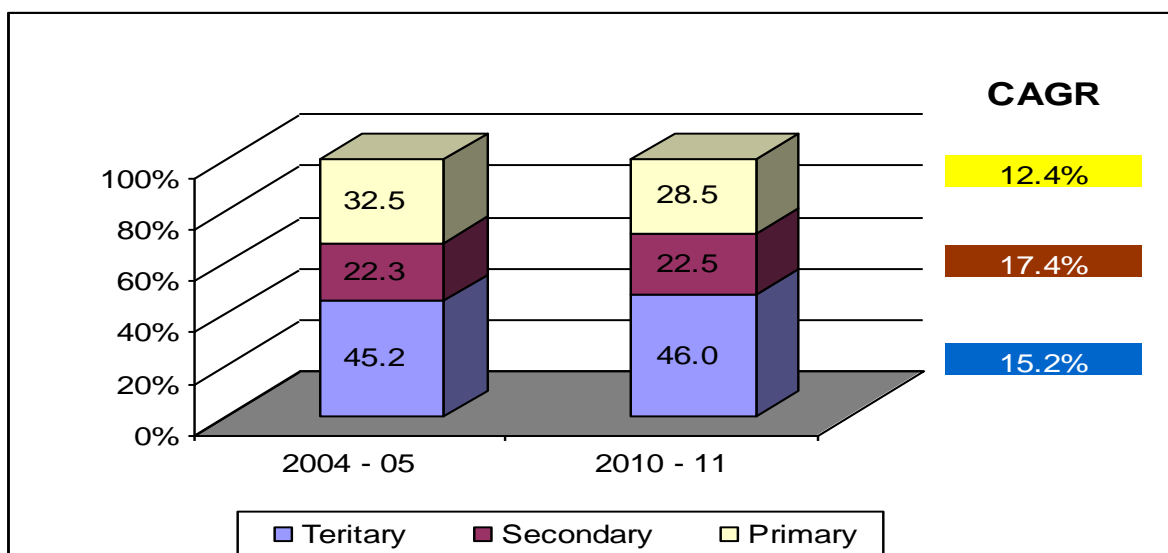


Fig. 6: Contribution of Different Sector in GSDP at Current Prices.

Table 1.4: General Information of Madhya Pradesh.

Parameter	Madhya Pradesh	All-States	Source
Economy			
GSDP as a percentage of all states' GSDP	3.8	100	CMIE, 2010-11, current prices
Average GSDP growth rate (%)*	14.9	15.9	CMIE, 2004-05 to 2010-11, current prices
Per capita GSDP (US\$)	795.1	1,324.3	CMIE, 2010-11, current prices
Physical Infrastructure			
Installed power capacity (MW)	8779.9	199627.0	Central Electricity Authority, as of March 2012
Wireless subscribers (No)	50873737^	903727208	Telecom Regulatory Authority of India, as of January 2012
Broadband subscribers (No)	414100	13350938	Ministry of Communications & Information Technology, as of December 2011
National Highway length (km)	5027	71772	Ministry of Road Transport & Highways, Annual Report 2011-12
Airports (No)	5	133	Airport Authority of India
Social Indicators			
Literacy rate (%)	70.6	74.0	Provisional Data – Census 2011
Birth rate (per 1,000 population)	27.3	22.1	SRS Bulletin (www.censusindia.gov.in), 2011
Investment			
FDI equity inflows (US\$ billions)	0.7*	160.0	Department of Industrial Policy & Promotion, April 2000 to January 2012
Outstanding Investments (US\$ billions)	461.3	11318.3	CMIE (2011-12)
Industrial Infrastructure			
PPP projects (No)	88	881	www.pppindiadatabase.com
SEZs (No)	6	386	Notified as of July 2012, www.sezindia.nic.in

*Including Chhattisgarh PPP: Public Private Partnership, SEZ: Special Economic Zone, SRS: Sample Registration System , *In Indian Rupee Terms ^Including Chhattisgarh

Madhya Pradesh contributed 3.8 per cent GSDP of all states GSDP. The average GSDP growth was found to be 14.9 % against 15.9 per cent per annum of all the state. (Table 1.4) The per capita GSDP (US\$) was found to be low in Madhya Pradesh (795.1\$) as compared to all states (1324.3\$). The FDI equity inflows was found only 0.7 US\$ billion as against 160US\$ billion of all states of India. There were 88 PPP and 6 SEZs found to be working in Madhya Pradesh.

2. Madhya Pradesh Agriculture: Performance and Challenges

The structural transformation, the changing sectoral shares of the economy in Madhya Pradesh, the economic activities have shown structural changes over a period of time and primary sector is experiencing a decline in terms of share in Gross State Domestic Products (GSDP). The sector-wise distribution of GSDP in Madhya Pradesh at constant rate and current rate (2004-05) along with percentage distribution presented in tables 2.1 to 2.4. The

data presented in table 2.1 showed that GSDP of Madhya Pradesh at constant rate (2004-05) found to be increased from Rs. 11292689 lakh in 2004-05 to Rs. 13598571lakh in 2007-08.

Table 2.1: Gross State Domestic Products of Madhya Pradesh at Constant Price. (Lakh)

Particulars	2004 – 05	2005 - 06	2006 - 07	2007 - 08	Percentage change over previous year		
					2005 - 06	2006 - 07	2007 - 08
Agriculture (including animal husbandry)	2753979	2973694	3055971	3001998	7.98	2.77	-1.77
Forestry & logging	342010	342784	336789	341840	0.23	-1.75	1.50
Fishing	27841	27399	29628	27626	-1.59	8.14	-6.76
Primary Sector	3123830	3343877	3422388	3371464	7.04	2.35	-1.49
Mining & quarrying	544934	549690	598917	665800	0.87	8.96	11.17
Manufacturing – Registering	760612	831841	1166644	1201646	9.36	40.25	3.00
Manufacturing - Un Registering	495117	513766	559692	603009	3.77	8.94	7.74
Construction	932423	1013164	1015929	1222070	8.66	0.27	20.29
Electricity, gas & water supply	332722	301425	405049	276044	-9.41	34.38	-31.85
Secondary Sector	3065808	3209886	3746231	3968569	4.70	16.71	5.93
Railways	198495	199365	246656	243531	0.44	23.72	-1.27
Transport by other means & Storage	332432	359100	388945	422881	8.02	8.31	8.73
Communication	132886	158537	189582	222562	19.30	19.58	17.40
Trade, hotels and restaurants	1534159	1565089	1765516	1904838	2.02	12.81	7.89
Banking & Insurance	410720	485558	581573	655046	18.22	19.77	12.63
Real estate, ownership of dwellings and business services	923724	978980	1038278	1103997	5.98	6.06	6.33
Public administration	554567	558118	535024	558514	0.64	-4.14	4.39
Other services	1016068	1033436	1075419	1147169	1.71	4.06	6.67
Tertiary Sector	5103051	5338183	5820993	6258538	4.61	9.04	7.52
Total	11292689	11891946	12989612	13598571	5.31	9.23	4.69

Overall economy of Madhya Pradesh was increased by 5.31, 9.23 and 4.69 per cent in the year 2005-06, 2006-07 and 2007-08 respectively over their previous years. The primary, secondary and tertiary sector contributed 24.79, 29.18 and 46.02 per cent respectively in GSDP of Madhya Pradesh (2007-08). The share of primary sector in GSDP was found to be decreased from 27.66 per cent (2004-05) to 24.79 per cent (2007-08), while the share of secondary sector and tertiary sector increased from 27.15 per cent (2004-05) to 29.18 per cent (2007-08) and 45.19 per cent (2004-05) to 46.02 per cent (2007-08) respectively. The share

of agriculture sector has also been found to be decreased from 24.38 per cent (2004-05) to 22.08 per cent (2007-08) in total GSDP of Madhya Pradesh.

The contribution of agriculture (-1.77%), fishery (-6.76%), electricity, gas and water supply (-31.54%) and railways (-1.23%) has been found to be decreased in 2007-08 over the year 2006-07, while the contribution of forestry and logging (1.50%), mining and quarrying (11.17%), manufacturing (3 to 7.74%) and construction (20.29%), transportation (8.73%), communication (17.40%), trade, hotel and restaurant (7.89%), banking and insurance (12.63%), real state (6.33%), public administration (4.39%) and other services (6.67%) increased during the same period. (Table 2.1)

At current prices the per capita income increased from Rs. 11292689 lakh (2004-05) to 16137939 lakh (2007-08) which accounts for 10.05, 16.34 and 11.62 per cent in the 2007-08 as compared to their previous year. (Table 2.3).

Table 2.2: Percentage Contributions of Different Sectors in Gross State Domestic Products at Constant Price (2004-05).

Particulars	2004 - 05	2005 – 06	2006 - 07	2007 - 08
Agriculture (including animal husbandry)	24.38	25.01	23.53	22.09
Forestry & logging	3.03	2.88	2.59	2.51
Fishing	0.25	0.23	0.23	0.20
Primary Sector	27.66	28.12	26.35	24.79
Mining & quarrying	4.83	4.62	4.61	4.90
Manufacturing – Registering	6.74	6.99	8.98	8.84
Manufacturing - Un Registering	4.38	4.32	4.31	4.43
Construction	8.26	8.52	7.82	8.99
Electricity, gas & water supply	2.95	2.53	3.12	2.03
Secondary Sector	27.15	26.99	28.84	29.18
Railways	1.76	1.68	1.90	1.79
Transport by other means & Storage	2.94	3.02	2.99	3.11
Communication	1.18	1.33	1.46	1.64
Trade, hotels and restaurants	13.59	13.16	13.59	14.01
Banking & Insurance	3.64	4.08	4.48	4.82
Real estate, ownership of dwellings and business services	8.18	8.23	7.99	8.12
Public administration	4.91	4.69	4.12	4.11
Other services	9.00	8.69	8.28	8.44
Tertiary Sector	45.19	44.89	44.81	46.02
Total	100.00	100.00	100.00	100.00

The share of primary sector in GSDP has also been found to be decreased from 10.47 per cent (2004-05) to 5.40 per cent (2007-08) to their previous year, while the share of secondary sector and tertiary sector increased respectively from 10.12 per cent (2004-05) to 14.05 per cent (2007-08) and 9.75 per cent (2004-05) to 13.75 per cent (2007-08) respectively at current price to their previous year. The share of agriculture sector was found

to be decreased from 11.05 per cent (2004-05) to 5.20 per cent in GSDP at current price to their previous year of Madhya Pradesh.

Table 2.3: Gross State Domestic Products of Madhya Pradesh at Current Price (2004 - 05).

Particulars	2004 – 05	2005 - 06	2006 - 07	2007 - 08	Percentage change over previous year		
					2005 - 06	2006 - 07	2007 - 08
Agriculture (including animal husbandry)	2753979	3058330	3415396	3593132	11.05	11.68	5.20
Forestry & logging	342010	364771	383378	413820	6.66	5.10	7.94
Fishing	27841	27725	33287	31888	-0.42	20.06	-4.20
Primary Sector	3123830	3450826	3832061	4038840	10.47	11.05	5.40
Mining & quarrying	544934	581329	621464	794256	6.68	6.90	27.80
Manufacturing – Registering	760612	859662	1274694	1402849	13.02	48.28	10.05
Manufacturing -Un Registering	495117	531647	616286	703572	7.38	15.92	14.16
Construction	932423	1076884	1155614	1492048	15.49	7.31	29.11
Electricity, gas & water supply	332722	326636	458967	314190	-1.83	40.51	-31.54
Secondary Sector	3065808	3376158	4127025	4706915	10.12	22.24	14.05
Railways	198495	196046	265450	278168	-1.23	35.40	4.79
Transport by other means & Storage	332432	387287	459550	526232	16.50	18.66	14.51
Communication	132886	144709	148886	156035	8.90	2.89	4.80
Trade, hotels and restaurants	1534159	1637451	1971304	2253668	6.73	20.39	14.32
Banking & Insurance	410720	450782	526085	586541	9.75	16.70	11.49
Real estate, ownership of dwellings and business services	923724	1058593	1216285	1455123	14.60	14.90	19.64
Public administration	554567	602717	626567	688236	8.68	3.96	9.84
Other services	1016068	1123030	1284468	1448181	10.53	14.38	12.75
Tertiary Sector	5103051	5600615	6498595	7392184	9.75	16.03	13.75
Total	11292689	12427599	14457681	16137939	10.05	16.34	11.62

As regards to the percentage share of all these sector in total GSDP at current price the share of secondary and tertiary sector were found to be increased from 27.15 per cent (2004-05) to 29.17 per cent in 2007-08 and 45.19 per cent (2004-05) to 45.81 percent (2007-08), while the share of primary sector decreased from 27.66 per cent (2004-05) to 25.03 percent (2007-08) (Table 2.4).

In primary sector the share of agriculture, forestry and fishery to total GSDP found to be decreased from 24.39 per cent (2004-05) to 22.27 percent (2007-08), 3.03 per cent (2004-05) to 2.56 percent (2007-08) and .25 per cent (2004-05) to 0.20 percent (2007-08) respectively.

Table 2.4: Percentage Contributions of Different Sectors in Gross State Domestic Products at Current Price (2004-05).

Particulars	2004 - 05	2005 - 06	2006 – 07	2007 – 08
Agriculture (including animal husbandry)	24.39	24.61	23.62	22.27
Forestry & logging	3.03	2.94	2.65	2.56
Fishing	0.25	0.22	0.23	0.20
Primary Sector	27.66	27.77	26.51	25.03
Mining & quarrying	4.83	4.68	4.30	4.92
Manufacturing – Registering	6.74	6.92	8.82	8.69
Manufacturing - Un Registering	4.38	4.28	4.26	4.36
Construction	8.26	8.67	7.99	9.25
Electricity, gas & water supply	2.95	2.63	3.17	1.95
Secondary Sector	27.15	27.17	28.55	29.17
Railways	1.76	1.58	1.84	1.72
Transport by other means & Storage	2.94	3.12	3.18	3.26
Communication	1.18	1.16	1.03	0.97
Trade, hotels and restaurants	13.59	13.18	13.63	13.97
Banking & Insurance	3.64	3.63	3.64	3.63
Real estate, ownership of dwellings and business services	8.18	8.52	8.41	9.02
Public administration	4.91	4.85	4.33	4.26
Other services	9.00	9.04	8.88	8.97
Tertiary Sector	45.19	45.07	44.95	45.81
Total	100.00	100.00	100.00	100.00

In secondary sector the share of mining and quarrying, manufacturing registering and construction to total GSDP have been found to be increased from 4.83 (2004-05) to 4.92 per cent in 2007-08, 6.74 (2004-05) to 8.69 per cent in 2007-08 and 8.26 (2004-05) to 9.25 per cent in 2007-08 respectively, while the share of manufacturing unregistered, electricity, gas and water supply found to decreased from 4.38 in (2004-05) to 4.36 in 2007-08, 2.95 (2004-05) to 1.95 per cent in 2007-08 respectively.

In tertiary sector the share of all the sectors have been found to be some what constant except transportation and trade and hotels which were found to be increased from 2.94 (2004-05) to 3.26 per cent in 2007-08 and 13.59 (2004-05) to 13.97 per cent in 2007-08 respectively.

2.2 Growth Performance of Agriculture

The growth of area production and yield of all the major crop groups of Madhya Pradesh was found positive in all the plans (Table 2.5) except 9th plan where it was found negative. The growth in area under total cereals (-0.47% per annum) were also found negative during 8th plan. in case of total cereals growth in area, production and yield was found to be 3.03, 15.54 and 12.22 per cent per annum respectively during 11th plan. The growth in area under total pulses was found to be maximum (2.81% per annum) during 11th plan, while maximum growth in production (5.44% per annum) and yield (5.67% per annum) was found during 10th plan.

The maximum growth in area (2.95% per annum) production (13.17% per annum) and yield (10.18% per annum) of total food grains was found during 11th plan. in case of total oilseeds the maximum growth (4.98% per annum) was found during 8th plan, while maximum production (11.42% per annum) and yield (7.14% per annum) growth was observed during 10th plan.

Table 2.5: Area, Production and Yield of Different Crop Groups in Last Two Decades (plan wise) of M.P. (Linear growth)

Five Year Plan	Area	Production	Yield
Total Cereals			
8 th (1992-1997)	-0.47	1.98	2.45
9 th (1997- 2002)	-3.76	-4.01	-0.45
10 th (2002-2007)	1.02	3.01	2.26
11 th (2007-2012)	3.03	15.54	12.22
Total Pulses			
8 th (1992-1997)	2.01	5.17	3.25
9 th (1997- 2002)	-0.92	-2.62	-1.89
10 th (2002-2007)	0.03	5.44	5.67
11 th (2007-2012)	2.81	4.05	1.64
Total Food Grains			
8 th (1992-1997)	0.33	2.43	2.12
9 th (1997- 2002)	-2.81	-3.87	-1.07
10 th (2002-2007)	0.66	3.56	3.16
11 th (2007-2012)	2.95	13.17	10.18
Total Oilseeds			
8 th (1992-1997)	4.98	7.41	2.56
9 th (1997- 2002)	-1.37	-6.66	-5.38
10 th (2002-2007)	4.69	11.42	7.14
11 th (2007-2012)	2.31	4.95	2.69

2.3 Drivers of Growth in Agriculture

Agriculture growth in any region can accrue, because of growth in crop output, diversification of agriculture towards, high value crops and live stock product and increase in value of the given output. Examining these three aspects of agriculture growth in agriculture it is observed that the overall growth of agriculture production and productivity of the entire major crop in Madhya Pradesh is quite impressive from 10th five year plan (2002-2007). (Table 5.5) The only need is to increase the pace of diversification towards the high value cash crops in the state. The implementation of National Food Security Mission and National Horticulture Mission has also emerged as a path of intervention which helps in agriculture diversification towards cash crops in the state. The area and production of cereals, pulses, total food grains and total oilseeds, (Table 2.5) vegetables, fruits, spices, medicinal and aromatic plants have been increased significantly in the state due to effective implementation of NHM. (Table 5.4) The growth of livestock sector is also seen in Madhya Pradesh due to implementing Backyard Poultry Scheme, Subsidy for Quails, Progressive animal owner / trained *Gau Sewak* being given subsidy for bulls to improve Intensive Cattle Breeding Programme, Sufficient fodder development for productive livestock, and Piggery development, with the help of cent percent Central Government assistance (a new piggery farm has been established in Jabalpur) for farmers. So far as the increase in value of agriculture output is concern the farmers are able to get price of their product more than minimum support price because of effective procurement policy of the state government.

The growth of agriculture is also depends on infrastructure facility created in the state viz. road, power, agro based and other industries. The construction of roads in the state is supervise by Madhya Pradesh Road Development Corporation Limited which implements projects taken up under public private partnership and those funded by Asian Development Bank. The state has 67 PPP projects in the road sector at various stages of development as of October 2012. The state has 19 national highways measuring 5064 KM and state highway of 10502 KM. The total road length is around 99914 KM. The state shows impressive progress in road development since 2000. The progress of agro based and other industry are also quite impressive due to various state policy incentives from the state government. Madhya Pradesh State Industrial Development Corporation Limited and its subsidiary “Madhya Pradesh Audyogik Kendra Vikas Nigam” are the key nodal agency for the industrial development in the state. Adani Wilmar limited, Anik Industries Limited, KS Oil Limited and Ruchi Soya

Industries limited are the key partner of state government under agro based industries, as Madhya Pradesh is one of the leading soybean, pulses, oilseeds cotton, spices etc. producing state of India.

2.3.1 Length of Roads

Bus and train services cover most parts of Madhya Pradesh. The state had 99,043 km long road network includes 20 national highways, with 4,948 km long rail network criss-crosses the state, Jabalpur serving as headquarters for the West Central Railway Zone of the Indian Railways. The Central Railway and the Western Railway also cover some parts of the state. The state has a total of 20 major railway junctions. The major inter-state bus terminals are located in Bhopal, Indore, Gwalior and Jabalpur. More than 2000 buses are conducted daily from these four cities. The state does not have a coastline. Most of the sea trade happens through the kandla and Jawaharlal Nehru Port (Nhava Sheva) in the neighboring states, which are well-connected to MP by road and rail networks.

2.3.2 Electricity

The Electricity Regulatory Commission's Act, 1998 (No. 14 of 1998) came into force w.e.f. 25th April, 1998, which provides for establishment of Central Electricity Regulatory Commission's and State Electricity Regulatory Commission's with the objectives of rationalization of tariff of electricity, to promote competition, efficiency and economy in electricity industry, to regulate the operation of power system, to set standards, regulate the working of licensees, etc., with an overall objectives of improving the financial health of SEBs/ Electricity Utilities but keeping into consideration, the interest of the consumers. The "*Madhya Pradesh Vidyut Sudhar Adhiniyam*", 2000 (No. 4 of 2001) has been enacted on 20.2.2001. The State Government has notified 3rd July, 2001 as the date from which the said "*Madhya Pradesh Vidyut Sudhar Adhiniyam*" shall have to come in force consequently the State Electricity Regulatory Commission constituted under Section 17 of the Central Act is deemed to have been constituted under State Act and thereby all the provisions of State Act shall apply to the Commission. The Electricity Act 2003 (No. 36 of 2003) enacted by parliament has come into force w.e.f. 10th June 2003 and the Commission is now deemed to have been constituted and functioning under the provisions of Electricity Act 2003.

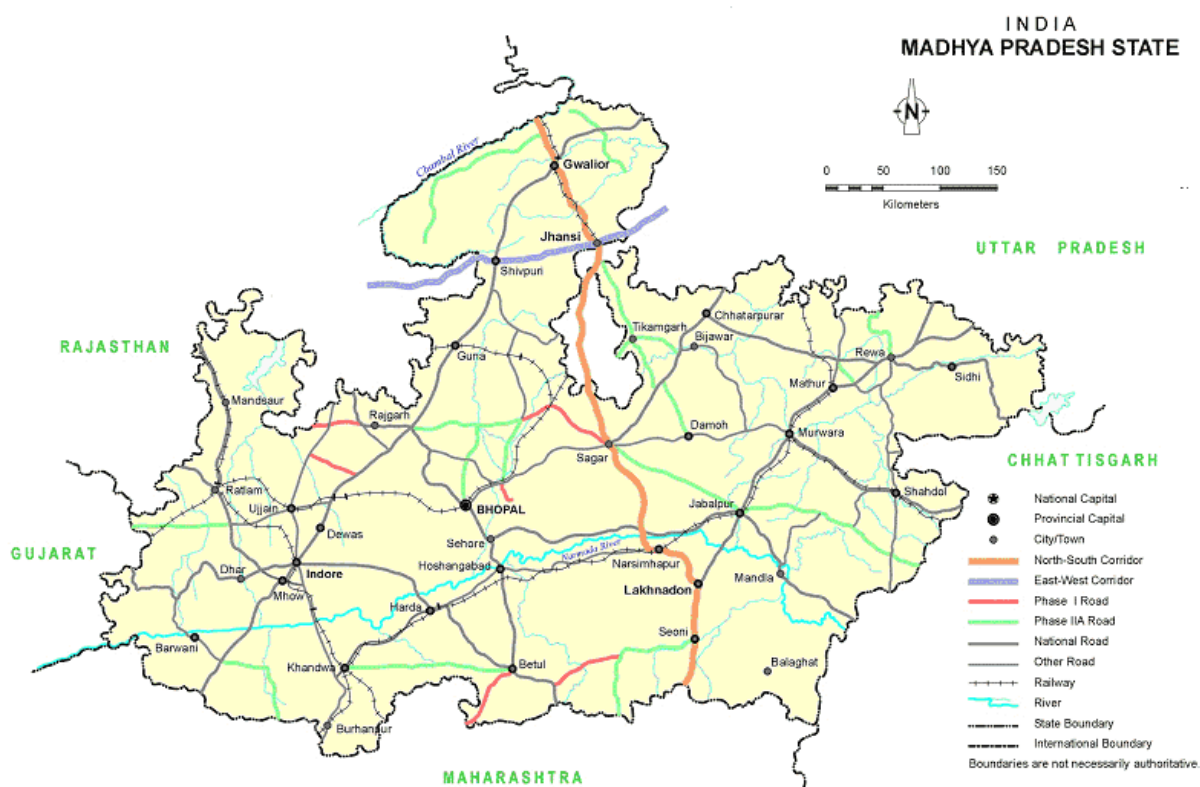


Fig. 7: Road Map of Madhya Pradesh.

State government has waived off Rs. 1800 crores for Agriculture consumers. Rs.7983 crores tariff subsidy has been given by State Govt. to MP state electricity companies through Niyaman Aayog for providing electricity in reduced rates to Agriculture consumers from 2004-12. Provision for 2013 is Rs. 1623 crores. All the district of Madhya Pradesh are under 24 hour electricity in “Atal Jyoti Yojana”. The Farmer’s also got electricity 8-10 hour per day for their agricultural operation under this particular scheme.

2.4 Marketing and Warehouse Facility

The **M.P. State Agricultural Marketing Board** MPSAMB (commonly known as Mandi Board) has come into existence in 1973 under the provisions of *M.P. Krishi Upaj Mandi Adhiniyam 1972*. Presently 516 regulated markets are there in the state out of which 246 are main wholesale markets having elaborate infrastructure also known as *Krishi Upaj Mandi* and the balance 270 having lower level of infrastructure known as *Sub Mandi*. In addition to these there are *haat bazars* in the rural areas where farmers and other people congregate periodically to sell their farm marketable surpluses and buy their essential requirements.

The mandi board is a three tire organisation. The first tire consists of **M.P. State Agricultural Marketing Board** (MPSAMB) with the office at the state capital Bhopal. The

second tier of the MPSAMB structural channel is the Regional office, which have their demarcated area of operation and the Mandies situated in the said area of operation are affiliated to the division office for administrative control. There are 7 division offices in the State individually having a minimum 18 to a maximum of 45 Mandi Committees under its jurisdiction. Third tier consists of regulated markets. These are in the nature of physical and institutional infrastructure at the first contact point for farmers to en-cash their farm marketable surpluses. Mandies in the state are of A, B, C and D grade. (Table 2.6)

Table 2.6 : Regulated Market in Different Division of Madhya Pradesh.

(As per different grade)

Grade	Bhopal	Indore	Ujjain	Gwalior	Sagar	Jabalpur	Rewa	Total
A	19	7	11	4	3	6	1	51
B	6	10	7	5	4	6	2	40
C	10	9	12	11	9	6	1	58
D	11	7	11	24	16	15	13	97
Total	46	33	41	44	32	33	17	246

These grades are assigning to the mandies on the basis of their three year average income i.e. Grade A (> Rs. 1.5 crore), Grade B (Rs.75 lakhs to 1.5 crore), Grade C (Rs. 40 lakhs to 75 lakh) and Grade D (< Rs. 40 lakhs). There are 51 A Grade, 40 B Grade, 58 C Grade and 97 D grade mandies in Madhya Pradesh. The information of Grade A mandies are regularly upgraded by the organization and provide the daily rate and arrivals to the farmers through the internet on www.mpmmandiboard.gov.in.

Table 2.7: Change in Average Capacity and Occupancy of Warehouse in Madhya Pradesh.

Year		1999-00	2009-10	Absolute Change	Relative Change (%)
Capacity	Owned	1245283	1167110	-78173	-6
	Hired	455908	245118	-210790	-46
	JVS	0	639047	639047	0
Total		1701191	2051275	350084	21
Occupancy		1469275	1688013	218738	15
Percentage		86	82	-4	-5

M.P. Warehousing & Logistics Corporation (MPWLC) was established in the name of M.P. State Warehousing Corporation in the year 1958 under Agriculture Produce (development and warehousing) Act 1956 with 50% shareholdings of Central warehousing corporation and 50% of State government. Later on, it was repealed by warehousing Corporation act 1962. M.P. Warehousing & Logistics Corporation is an autonomous body engaged in scientific storage of agriculture and associated produce in the state.

As the state is located in the central India and is well connected by rail network and interstate highways, it, storage of foodgrains and consumer goods has an added advantage. MPWLC was started with 6 branches with 11000 tons capacity and has grown manifold with the present storage capacity (own) of 11.00 lakhs tonns (upto Dec-07). The Corporation is a founder member of National Association of Warehousing Corporations.

2.5 Emerging Demand and Supply Mechanics

With the change in taste and preferences of consumer and higher demand of pluses, oilseeds, fruits, vegetables and livestock products as compared to cereals, there is increasing pressure on the prices of such high value commodity. Approximately 50 percent of expenditure was made in total cereals under food items and rest 50 percent under non food items in Madhya Pradesh. The cereals were consumed in large quantity (12.04 kg/capita/month) as compared to other food items. In cereals, the consumption of wheat was found to be more than rice (2.15kg/capita/month) and other cereals (2.25kg/capita/month), the consumption of Vegetable (5.90 kg/capita/month), liquid milk (0.93 liter/capita/month), total pulses (0.78 kg/capita/month), edible oil (0.59kg/capita/month), sugar (0.58kg/capita/month), fruits (0.25 kg/capita/month), poultry meat (0.15 kg/capita/month), milk and milk products (0.11 kg/capita/month) are consumed in small quantity and found the far away from the actual requirement of these items. Thus, demands of agro process foods in the state would be increased in near future. Though, the state has made remarkable efforts for development of agro based industry in the state. That will be help full to fulfill emerging demand of house hold.

3. Natural Resource Management

The Physiographic of the state exhibits a great deal of diversity with areas ranging from less than 50 meter above mean sea level to more than 1200 meter. The state falls under the catchments of Yamuna, Ganga, Narmada, Mahanadi and Godavari. On the basis of broad land features and different soil and rain fall pattern, the state was classified in 5 physiographic regions and 11 agro-climatic zones (Fig. 8 & Table 3.1)

- 1 Northern low lying plains comprising Gwalior, Bhind and Morena districts and extend to Bundelkhand up to the west of Panna range and excludes certain parts of Rewa district between Panna and Kaymore hills of Baghelkhand.

2 The Malwa and Vindhyan Plateau comprises of Vidisha, Shivpuri, Datia, Guna, Ujjain and Mandasaur districts and parts of Sehore, Raisen and Dewas districts. It consists of large undulating plains of black cotton soil dotted with flat-topped hills. It has also hilly Vindhyan Plateau situated to the north of Narmada Valley and to the south of the low-lying regions of Bundelkhand and Baghelkhand. It separated from east of Malwa plateau to Maikal and Doria hills of Satpura range.

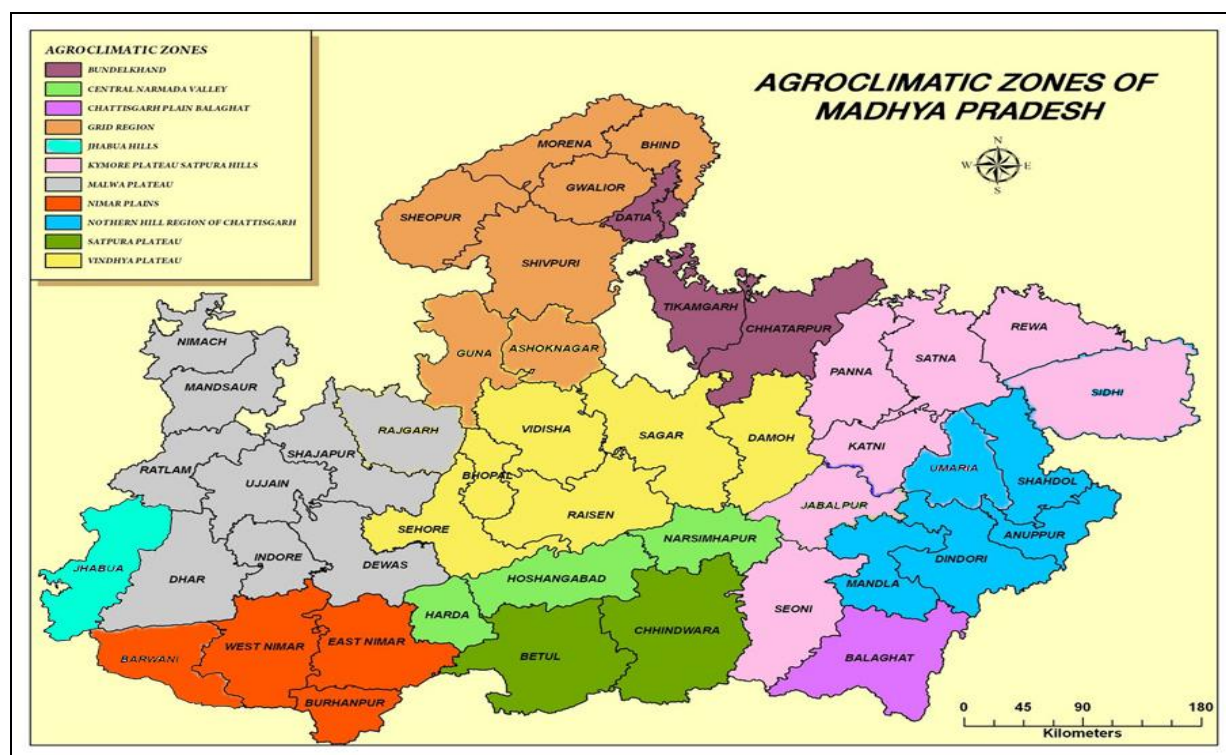


Fig. 8: Agro-Climatic Zones of Madhya Pradesh

3 The Narmada Valley stretching from Jabalpur in the east up to Barwani district in the west. It is nearly 560 Km long and 48 Km wide and is walled on the north by the Vindhyan range and on the south by Satpura range. It covers the districts of Jabalpur, Narsinghpur, Hoshangabad, Khandwa, Khargone, Barwani, Dhar, and some parts of Raisen, Sehore, and Dewas districts.

Table 3.1: Agro-Climatic Regions and Covered Districts /Tehsils in Madhya Pradesh

(Area in Lakh ha)

Agro-Climatic Regions	Districts /Tehsils	Geographical Area
1. Malwa Plateau	Indore, Dhar, (Dhar, Badnawar, Sardarpur tehsils) Shajapur, Mandsour, Nimuch, Ratlam, Ujjain, Dewas Rajgarh districts and Petlawad tehsil of Jhabua district	51.47 (16.74)
2. Vindhyan Plateau	Bhopal, Vidisha, Sehore (Sehore, Ashta, Ichhawar, Narsullaganj tehsils) Raisen (Raisen, Gairatganj, Begamganj, Silwani, Goharganj, Udaipura tehsils), Damoh, Guna (Chachora & Raghogarh tehsils) & Sagar districts	42.59 (13.85)
3. Central Narmada Valley	Hoshangabad (Seoni-Malwa, Hoshangabad, Sohagpur tehsils), Harda, Narsinghpur districts, Budhani and Bareilly tehsil of Sehore and Raisen districts respectively	17.45 (5.67)
4. Satpura Plateau	Betul, Chhindwara districts	21.93 (7.13)
5. Jhabua Hills	Jhabua, Jobat, Alirajpur tehsils of Jhabua district & kukshi tehsil of Dhar district	6.88 (2.24)
6. Gird Region	Gwalior, Bhind, Morena, Shivpur-Kalan, Guna (Mungawali and Ashoknagar tehsils), Shivpuri (Shivpuri, Kalaras, Pohari tehsils)	31.85 (10.36)
7. Kymore Plateau	Jabalpur, Katni, Rewa, Panna, Satana, Sidhi, Seoni and Gopadbanas & Deosar tehsils of Sidhi district.	49.97 (16.25)
8. Bundel Khand Region	Tikamgarh, Chhatarpur, Datia districts, Karela, Pachore tehsil of Shivpuri and Guna tehsil of Guna district	22.82 (7.42)
9. Nimar Valley	Khandwa, Khargone, Barwani district, Manawar tehsil of Dhar district and Harda district	25.17 (8.18)
10. Northern Hills of Chhattisgarh	Shahdol, Umariya Mandla, Dindori district & Singrauli tehsil of Sidhi district	28.17 (9.16)
11. Chhattisgarh plain	Balaghat district	9.25 (3.00)
Madhya Pradesh		307.55 (100.00)

Figure in the parenthesis shows percent to total geographic area.

4 The Satpura range runs from west to east for about 640 Km through Khandwa, Betul, Chhindwara, Seoni, Mandla districts. Its northern spurs go into Hoshangabad and Narsinghpur districts and in the south an extensive spur of 160 Km covers entire Balaghat districts.

5 Madhya Pradesh also covers Balaghat and Shahdol district of Chhattisgarh Plains and Northern Hills of Chhattisgarh zone respectively. The state is bordered on the west by Gujarat, on the northwest by Rajasthan, on the northeast by Uttar Pradesh, on the east by Chhattisgarh, and on the south by Maharashtra.

Table 3.2: Land Use Pattern of M.P. (Lakh ha.)

Particulars	1999-2000	2009-10	Absolute Change	Relative Change (%)
Geographical area	307.50 (100.00)	307.55 (100.00)	0.05	0.02
Forests	86.11 (28.00)	86.89 (27.92)	0.78	0.91
Not available for cultivation				
A. Land put to non-agricultural uses.	18.35 (5.97)	20.70 (6.73)	2.35	12.81
B. Barren and un-culturable land	13.65 (4.44)	13.62 (4.36)	-0.03	-0.22
Total	32.00 (10.41)	34.32 (11.09)	2.32	7.25
Other Uncultivated land excluding fallow land				
A. Permanent pastures & other grazing lands	16.57 (5.39)	13.38 (4.34)	-3.19	-19.25
B. Land under misc. tree crops & groves.	0.15 (0.05)	0.24 (0.06)	0.09	60.00
Total	16.72 (5.44)	13.62 (4.40)	-3.10	-18.54
Total Culturable waste land.	28.42 (9.24)	11.47 (3.77)	-16.95	-59.64
Fallow Land				
A. Current fallows.	4.86 (1.58)	5.47 (1.89)	0.61	12.55
B. Old fallow.	5.75 (1.87)	6.08 (2.02)	0.33	5.74
Total	10.61 (3.45)	11.55 (3.91)	0.94	8.86
Cropped Area				
A. Net area sown.	150.70 (49.01)	149.72 (48.91)	-0.98	-0.65
B. Area sown more than once.	53.49 (17.40)	64.39 (18.58)	10.90	20.38
C. Gross Cropped Area.	204.19 (66.40)	214.11 (67.50)	9.92	4.86
Cropping Intensity in %	122.00	143.00	21.00	

Figure in the parenthesis shows percent to total geographic area.

3.1 Land Use Pattern

The total geographical area of the state is 307.55 lakh ha, which comprises 48.91 per cent net area sown, 27.92 per cent forest, 11.09 per cent area not available for cultivation, 4.40 per cent other cultivated land excluding waste land, 3.91 per cent current (1.89%) and old (2.02%) fallow land (2010). The land put under miscellaneous tree crops and groves (60%), area sown more than once (20.38%), land put under non agricultural uses (12.81%),

current fellow (12.55%), old fellow (5.74%), gross cropped area (4.86%) and forest (0.91%) was found to be increases while garaging land (-19.25%), cultivable waste land (-0.22%) and net area sown (-0.65%) were found to be decreases in 2009-10 as compared to 1999-2000 (Table 3.2). The Cropping intensity of Madhya Pradesh is 146 percent (2009-10) and increased 21 percent as compared to 1999-2000. This was due to increas in double cropped area from 53.49 thousand ha. to 64.39 thousand ha.

3.2 Soils

The main soil types found in Madhya Pradesh are alluvial, deep black, medium black, shallow black, mixed red and black, mixed red and yellow and skeletal soils. (Table 1.4)

Table 3.3: Soil Types and Districts Covered in Madhya Pradesh.

Types of Soil	Districts covered
Alluvial Soil	Bhind, Morena and Gwalior
Deep Black Soil	Hoshangabad and Nasinghpur
Medium Black Soil	Jabalpur, Sagar, Vidisha, Sehore, Damoh, Guna, Bhopal, Raisen, Rajgarh, Indore, Dewas, Ujjain, Mandsour, Shajapur, Ratlam, Dhar, Khargone and Khandwa
Shallow Black Soil	Betul, Chhindwara and Seoni
Red & Black Soil	Shivpuri, Rewa, Satna, Panna, Sidhi, Chhaterpur, Tikamgarh, Datia and some parts of Guna district.
Red & Yellow Soil	Balaghat.
Gravelly Soil	Mandla.

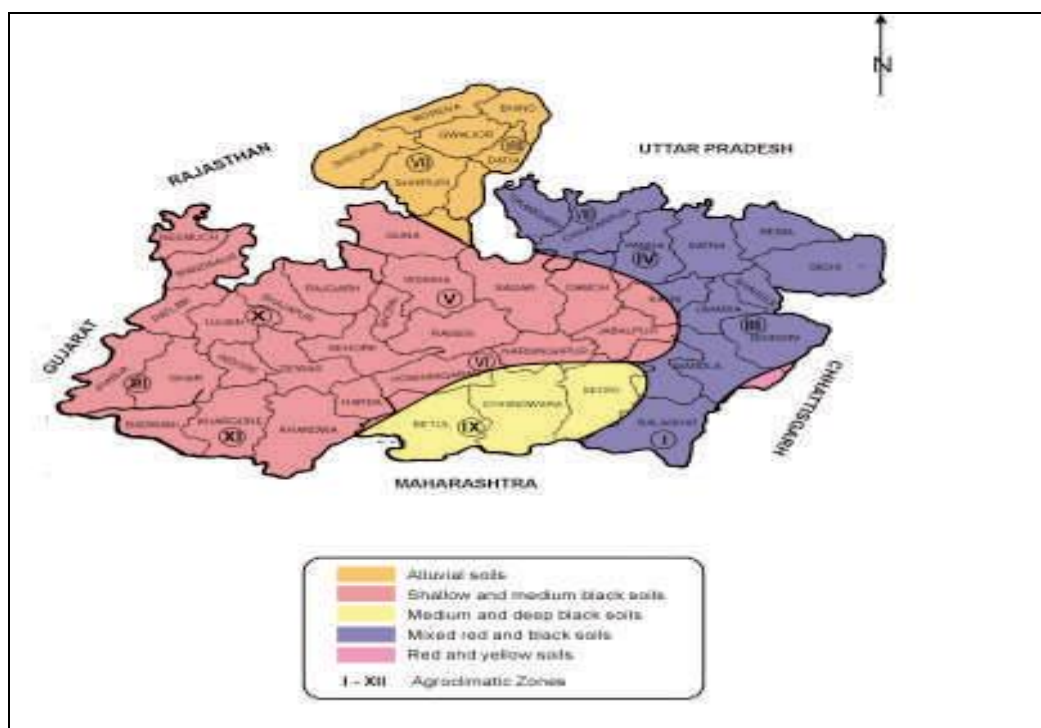


Fig. 9 Soils of Madhya Pradesh.

3.3 Land Ceiling Limit

The ceiling limits of land holding in Madhya Pradesh is found to be at par with the limit suggested in the national guidelines (1972) viz. for land holding irrigated with two crops (7.28 ha.), irrigated with one crop (10.93 ha.) and dry land (21.85 ha.) (Table 3.4).

Table 3.4: Ceiling Limits on Land Holdings.

Particulars	(Ha.)		
	Irrigated with two crops	Irrigated with one crop	Dry land
Suggested in National Guide-lines of 1972	4.05 to 7.28	10.93	21.85
Madhya Pradesh	7.28	10.93	21.85

3.4 Operational Land Holding

The total number of land holding have been found to be increased by 73.59 thousand ha to 88.73 thousand ha, while the area under these holding found to be decreased from 163.69 thousand ha. to 158.36 thousand ha. in the year 2010-11 as compared to 2001-02. The percentage of marginal and small holdings were found to be increased from 38.57 to 43.85 percent, 26.51 to 27.60 percent, while semi medium, medium and large holding were found to be decreased by 20.22 to 18.65 percent, 12.45 to 8.89 percent and 2.26 to 1.00 percent to total number of holding respectively during the period. The percentage area under marginal, small and semi medium holdings was found to be increased from 8.54 to 12.09 percent, 17.28 to 21.89 percent, 25.18 to 28.48 percent, while the percentage area under medium and large was found to be decreased from 33.28 to 28.70 percent and 15.73 to 8.84 percent respectively during the year 2010-11 to 2001-02 (Table 3.5)

Table 3.5: Land Holding in Madhya Pradesh. (Area in Lakh ha and Number in lakh)

Particulars	2001-02				2010-11			
	Number	%	Area	%	Number	%	Area	%
Marginal (Below 1 ha.)	28.38	38.57	13.98	8.54	38.91	43.85	19.15	12.09
Small (1 ha. to 2 ha.)	19.51	26.51	28.28	17.28	24.49	27.60	34.66	21.89
Semi Medium (2 ha. to 4 ha.)	14.88	20.22	41.21	25.18	16.55	18.65	45.10	28.48
Medium (4 ha. to 10 ha.)	9.16	12.45	54.47	33.28	7.89	8.89	45.45	28.70
Large (Above 10 ha.)	1.66	2.26	25.75	15.73	0.89	1.00	14.00	8.84
Total	73.59	100.00	163.69	100.00	88.73	100.00	158.36	100.00

3.5 Water

Madhya Pradesh is dependent on rainfall for its water requirements that range from 60–120 cms in different regions of the state. The amount of surface water available to the state has to account for the water to be made available for downstream states. There are ten major rivers that originate from the State. As Madhya Pradesh is located in the center of India, most of the rivers are interstate rivers. Madhya Pradesh is drained by five major river basins namely Ganga, Narmada, Godavari, Tapi and Mahi. These basins are divided into 11 sub basins and further sub divided into 155 major watersheds out of which 6 watersheds in Son and Narmada sub-basin falls partly in adjoining Chhattisgarh State. The rivers namely Chambal, Sindh, Betwa, Ken flow northward and meet with Yamuna, whereas the river Sone falls directly into Ganga. Narmada, Tapti and Mahi rivers flow westward and meet Arabian Sea whereas Wainganga and Pench rivers meet Godavari in the south. Annual runoff from these rivers within the state is estimated 81,719 hm. out of which about 49, 743 hm can be harnessed for irrigation purpose. The state encompasses drainage areas of five major river basins and can use 56.8 km³ of surface water. Thirty per cent of the surface water available in the state is stored in ponds and lakes and the remaining 70% in irrigation reservoirs. Net Annual Ground Water Availability is 35.33 Billion Cubic Metres (2011-12). The state is currently exploiting 46% of the available ground water. Among the 50 districts, current ground water condition is semi-critical in 23 districts, critical in seven districts and over-exploited in eight districts. About 99% of the drinking water needs are being fulfilled with ground water and 90% of the ground water is being used for irrigation purposes.

3.6 Whether and Climate

The climate of Madhya Pradesh by virtue of its location is predominately moist sub humid to dry sub humid, semi arid to dry sub-humid and semi arid in east, west and central plateau and hills respectively, according to agro-climatic regions of India.

The annual rainfall received in the state varies from 800 mm in the northern and western regions to 1600 mm in the eastern districts. In some years rainfall goes much below to the normal. Most of rainfall is received in the *Monsoon* season from June to September and about 10 per cent of the rainfall is received in the remaining part of the year. The pattern of rainfall given in table 3.6, which showed that all the districts were comes under high and normal rainfall condition except Badwani and Umaria in the year 2010-11.

Table 3.6: Rain fall and Districts Covered in Madhya Pradesh. (2010-11)

Particulars	No.	Districts
Excess rainfall (+20% & above)	14	Singroli, Betul, Harda, Sidhi, Jhabua, Khandwa ,Burhanpur, Hoshangabad, Dewas, Sehore , Rewa,Ujjain, Shivpuri , Indore.
Normal rainfall (+19% to -19%)	34	Ratlam ,Morena., Mandsaur, Bhopal, Datia, Jabalpur, Guna, Alirajpur, Chhindwada, Rajgarh, Katni, Bhind, Shajapur, Gwalior. Neemuch. Mandla Sheopurkala ,Khargone, Damoh, Panna. Satna, Vidisha, Narsinghpur, Ashoknagar, Raisen, Seoni, Tikamgarh, Dhar, Shahdol, Sagar, Dindori, Chhatarpr. Balaghat, Anuppur ,
Deficient rainfall (-20% to -59%)	2	Barwani, Umaria
Normal rainfall of state (mm)		911.9
Actual rainfall of state (mm)		992.4
% Increase		+9%

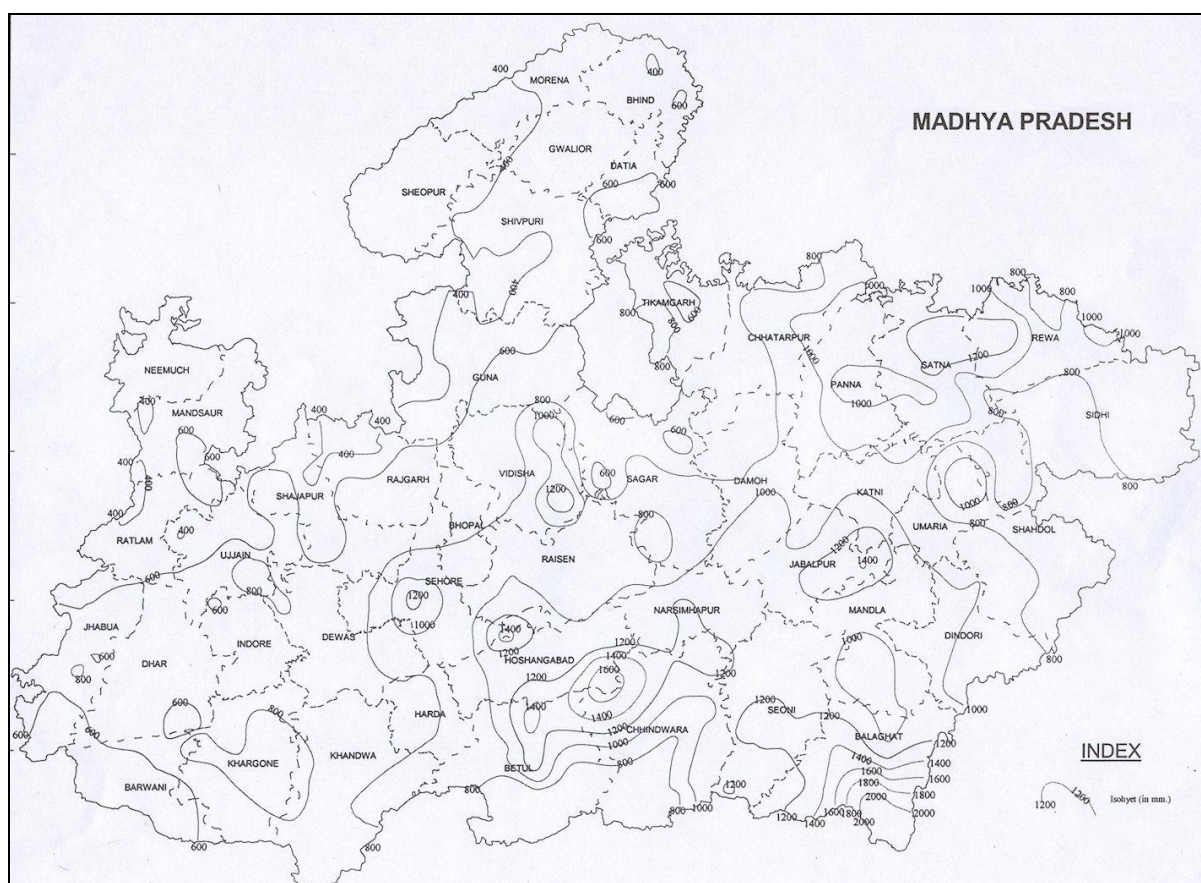


Fig. 10: Rainfall Pattern of Madhya Pradesh.

The maximum temperature during extreme summer reaches as high as 47⁰C and the minimum during winter dips up to 5⁰C. The maximum normal temperature varies between 25

and 35⁰C and minimum normal between 10⁰ to 20⁰C. The relative humidity ranges from 40 to 70 % throughout the year.

4. Farm Input: Requirements, Availability & Price

In present scenario the rate of distribution of input use i.e. high yielding variety seeds, Seed Replacement Rate, fertilizer consumption, plant protection coverage, farm machinery, agriculture credit have been recorded to analyse their relative change in Madhya Pradesh.

4.1 Distribution of HYVs Seed

The distribution of HYV Seeds of all crops showed 325.16 percent increase in the year 2009-10 (1836.82 thousand t) as compare to 1999-2000 (432.03 thousand t). The maximum increase was observed in distribution of HYVs seeds of pulses (498.16%) followed by oilseeds (438.87%), cereals (222.64%) and fiber (88.58%).

Table 4.1: Seed Distribution of HYVS Crops in Madhya Pradesh. (thousand q.)

Particulars		1999-2000	2009-10	Absolute Change	Relative Change (%)
Cereals.	Kharif	29.37	131	101.63	346.03
	Rabi	199.56	607.61	408.05	204.47
	Total	228.93	738.61	509.68	222.64
Pulses.	Kharif	1.77	13.2	11.43	645.76
	Rabi	26.44	155.54	129.10	488.28
	Total	28.21	168.74	140.53	498.16
Oilseeds.	Kharif	167.23	912.53	745.30	445.67
	Rabi	4	10.17	6.17	154.25
	Total	171.23	922.7	751.47	438.87
Fiber.	Kharif	3.59	6.77	3.18	88.58
Fodder.	Rabi	0.07	0	-0.07	-100.00
All Crops	Kharif	201.96	1063.5	861.54	426.59
	Rabi	230.07	773.32	543.25	236.12
Total		432.03	1836.82	1404.79	325.16

The distribution of HYVs seeds of rabi fodder decreased by 100 percent in the year 2009-10 as compared to 1999-2000 (Table 3.1). The percentage increase in distribution of HYVs seeds was found to be more in Kharif season (426.59%) as compared to rabi season (236.16%).

4.2 Seed Replacement Rate

The seed replacement rate of paddy (13.10%), maize (807.88%), jowar (184.03%), bajara (2303.27%), urd (627.45%), moong (2027.00%), arhar (342.37%), til (220.90%), soybean (329.49%), wheat (275.21%), gram (225.17%), peas (70.64%), masoor (7.35%), mustard (127.85%), and lentil (7.35%) and linseed (57.14%) have been found to be increased, while ramtil (-43.04%), sunflower (-33.38%), toria (-95.38%), decreased in the year 2009-10 as compared to 1999-2000. (Table 3.2)

Table 4.2: Seed Replacement Rate of Crops in Madhya Pradesh. (thousand q.)

Crops	1999-00	2009-10	Absolute Change	Relative Change (%)
Paddy	9.77	11.05	1.28	13.10
Maize	2.03	18.43	16.40	807.88
Jowar	4.76	13.52	8.76	184.03
Bajra	2.14	51.43	49.29	2303.27
Urad	1.02	7.42	6.40	627.45
Moong	1.00	21.27	20.27	2027.00
Arhar	1.77	7.83	6.06	342.37
Til	0.67	2.15	1.48	220.90
Ramtil	0.79	0.45	-0.34	-43.04
Sunflower	8.00	5.33	-2.67	-33.38
Groundnut	0.17	0.57	0.40	235.29
Soybean	4.51	19.37	14.86	329.49
Cotton (hy.)	100.00	100.00	0.00	0.00
Wheat	3.63	13.62	9.99	275.21
Gram	1.51	4.91	3.40	225.17
Peas	2.35	4.01	1.66	70.64
Masoor (lentil)	0.68	0.73	0.05	7.35
Mustard	9.30	21.19	11.89	127.85
Toria	4.11	0.19	-3.92	-95.38
Linseed	0.35	0.55	0.20	57.14
Sunflower	13.33	NA		
Safflower	11.50	NA		

4.3 Fertilizer Consumption

The consumption of fertilizer has been found to be increased by 81.43 percent in the year 2009-10 (84 kg./ha) as compared to 1999-2000 (46.30 kg./ha.) but it is still found less than the national average (156.30 kg./ha, 2009-10). The consumption of fertilizer in kharif season (136.70%) was found to be more as compared to rabi season (45.99%). The maximum

increase in fertilizer was recorded in potash (K) fertilizers (176.19%) as compared to nitrogenous (N) fertilizer (83.78%) and phosphoric (P) fertilizer (67.21%) in the year 2009-10 as compared to 1999-2000.

Table 4.3: Fertilizer Consumption in Madhya Pradesh. (kg./ha)

Season	Nutrient	1999-00	2009-10	Absolute Change	Relative Change (%)
Kharif	N	17	37.4	20.40	120.00
	P	13.9	35.2	21.30	153.24
	K	1.8	4.8	3.00	166.67
	Total	32.7	77.4	44.70	136.70
Rabi	N	36.4	58.6	22.20	60.99
	P	23.4	25.7	2.30	9.83
	K	2.6	6.8	4.20	161.54
	Total	62.4	91.1	28.70	45.99
Total	N	25.9	47.6	21.70	83.78
	P	18.3	30.6	12.30	67.21
	K	2.1	5.8	3.70	176.19
	Total	46.3	84	37.70	81.43
National average (*) total		95.2	156.3	61.10	64.18

Source :- Directorate of Agriculture, M.P. & (*) - Fertilizer Statistics 2002-03

4.4 Plant Protection Coverage

The plant protection coverage in seed treatment (703.32%), crop treatment (624.86%), weed control (2728.95%), rat control (315.00%), sample tested for quality control of pesticides/insecticides (55.68%) found to be increased, while the sample found sub standard (-48.11%) has been found to be decreased in the year 2009-10 as compared to 1999-2000. (Table 3.4)

Table 4.4: Plant Protection Coverage in Madhya Pradesh.

(kg./ha)

Particulars	2000-01	2009-10	Absolute Change	Relative Change(%)
(A) Coverage (lakh ha.)				
Seed Treatment	18.07	145.16	127.09	703.32
Crop Treatment	7.00	52.00	45.00	642.86
Weed Control	0.76	21.50	20.74	2728.95
Rat Control	4.00	16.60	12.60	315.00
(B) Distribution of Plant Protection Equipment. (Nos.)	16690.00	NA		
(C) 1. Samples tested for quality control of Pesticides/ Insecticides. (Nos.)	634.00	987.00	353.00	55.68
2. Samples found Sub-standard. (Nos.)	106.00	55.00	-51.00	-48.11

4.5 Farm Machinery

The use of farm machinery also found to be increased during the period 2010s. The uses of all the major farm machines and implements viz. diesel pumps (76%), electric pumps (32%), tractors(61%) power driven sugar cane crusher (83%), iron (39%)or even wooden (12%) ploughs have been found to be increased except bullock drawn plough (-38%) in 2009-10 as compared to 1999-2000 (Table 4.5)

Table 4.5: Available Farm Machinery in Madhya Pradesh.

Particular		1999-00	2008-09	Absolute Change	Relative Change (%)
Pumps	Electric	1175625	1551635	376010	32
	Diesel	194662	343500	148838	76
Tractors		186404	299516	113112	61
Sugarcane crusher	Power driven	6619	12102	5483	83
	Bullock driven	6310	3903	-2407	-38
Ploughs	Wooden ('000)	3370	3789	419	12
	Iron ('000)	462	641	179	39

4.6 Water Source and Irrigated Area

The net and gross irrigated area has been found to be increased by 14.93 and 15.20 percent in the year 2009-10 over 1999-2000. The area irrigated from different sources i.e. canal, well and tube wells and other sources was found to be increased by 6.39, 17.70 and 15.46 percent respectively, while area irrigated through tanks was found to be decreased by 1.52 percent.

Table 4.6: Source Wise Irrigated Area in Madhya Pradesh.

(000' ha.)

Sources	1999-00	2009-10	Absolute Change	Relative Change(%)
Canals	1002	1066	64.00	6.39
Tanks	132	130	-2.00	-1.52
Wells & tube-wells.	3712	4369	657.00	17.70
Other sources	815	941	126.00	15.46
Net irrigated area	5661	6506	845.00	14.93
Gross irrigated area.	5828	6714	886.00	15.20
% of net irrigated area to net area sown	37.6	43.2	5.60	
% of gross irrigated area to gross area sown	28.5	32.3	3.80	

As regards to change occurred in crop wise irrigated area, the irrigated area under all the crops, viz. paddy (24.18%), maize (36.36%), barley (41.38%), gram (56.64%), oilseeds (34.16%), sugarcane (5.26%), cotton (29.90%), spices and condiments (8.55%) and vegetable (16.13%) increased in the year 2009-10 over the year 1999-2000 except wheat (-1.38%).

Table 4.7: Crop Wise Irrigated Area in Madhya Pradesh.

(000' ha.)

Crops	1999-2000	2009-10	Absolute Change	Relative Change(%)
Paddy	244	303	59.00	24.18
Maize	11	15	4.00	36.36
Wheat	3399	3352	-47.00	-1.38
Barley	29	41	12.00	41.38
Total Cereals	3684	3711	27.00	0.73
Gram	941	1474	533.00	56.64
Others	138	241	103.00	74.64
Total Pulses	1079	1715	636.00	58.94
Oilseeds	322	432	110.00	34.16
Sugarcane	76	80	4.00	5.26
Cotton	194	252	58.00	29.90
Spices & Condiments	234	254	20.00	8.55
Fruits & Vegetables	186	216	30.00	16.13
Other Crops	39	54	15.00	38.46
All Crops	5814	6714	900.00	15.48

4.7 Agriculture labour and wage rates

Wages of agriculture labour were found to be varied from Rs. 100 (2010) to Rs. 135 (January 2011). The prevailing labour charges of agriculture operations were varied with the operations of cultivations of crops i.e. ploughing, leveling, weeding, transplanting, harvesting and winnowing. The actual wage rates of agriculture labour varied from Rs. 152 to 200 per man day in different operations of the crops. The rates were found to be higher in peak operation period (ploughing of seeds and harvesting of crops). After the implementation of MNREGA in 2006 the availability of agricultural labour was found to be reduced considerably at the time of peak operation period of crop cultivation. With the result of that the wage rates of agriculture labour of various agricultural operations have remarkably increased, which increased the cost of production of crops cultivated in the state.

4.8 Agricultural Credit

In total flow of credit, the share of crop loan was found more as compared to term loan. The commercial banks (61.25%) followed by district cooperative banks (25.08%) and regional rural banks (13.50%) played an important role in disbursement of total agricultural credit from different institutional sources in Madhya Pradesh. The commercial banks

(48.19%) followed by district cooperative banks (34.49%) and regional rural banks (17.32%) also played an important role in disbursement of crop loan from different institutional sources in Madhya Pradesh. The share of commercial banks (95.25%) was also found to be more in disbursement of term loan followed by regional rural banks (3.50%), and district cooperative banks (0.43%) in Madhya Pradesh.

Table 4.8: Change in Agricultural Credit in Madhya Pradesh.

Type of Loan Agency		1999-2000	2009-10	Absolute Change	Relative Change(%)
Crop Loan	Commercial Banks	24487.00 (22.33)	540702.00 (48.19)	516215.00	2108.12
	Dlstd.Coop. Banks	79624.00 (72.61)	387062.00 (34.49)	307438.00	386.11
	DCARDBs	0.00 (0.00)	0.00 (0.00)	0.00	0.00
	Regional Rural Banks	5556.00 (5.07)	194367.00 (17.32)	188811.00	3398.33
	Total	109667.00 (100.00) ((65.54))	1122131.00 (100.00) ((72.36))	1012464.00	923.22
Term loan (MT+ LT)	Commercial Banks	39261.00 (68.09)	409136.00 (95.45)	369875.00	942.09
	Dlstd.Coop. Banks	3369.00 (5.84)	1835.00 (0.43)	-1534.00	-45.53
	DCARDBs	7574.00 (13.14)	2687.00 (0.63)	-4887.00	-64.52
	Regional Rural Banks	7454.00 (12.93)	14992.00 (3.50)	7538.00	101.13
	Total	57658.00 (100.00) ((34.46))	428650.00 (100.00) ((27.64))	370992.00	643.44
Total agri. Credit	Commercial Banks	63748.00 (38.10)	949838.00 (61.25)	886090.00	1389.99
	Dlstd.Coop. Banks	82993.00 (49.60)	388897.00 (25.08)	305904.00	368.59
	DCARDBs	7574.00 (4.53)	2687.00 (0.17)	-4887.00	-64.52
	Regional Rural Banks	13010.00 (7.78)	209359.00 (13.50)	196349.00	1509.22
	Grand Total	167325.00 (100.00) ((100.00))	1550781.00 (100.00) ((100.00))	1383456.00	826.81

The flow of credit from institute to farmers has also been increased manifolds during 2010 in Madhya Pradesh. The flow of institutional credit from all the sources viz. commercial banks (1389.99%), Districts cooperative banks (368.59%), Regional Rural Banks (1509.22%) found to be increase in the year 2009-10 as compared to 1999-2000 except from

Districts Cooperative and Rural Development Banks(-64.52%) in Madhya Pradesh. The flow of crop loan increased by 3398.33 (Regional Rural Banks) 2108.12 percent (Commercial Banks)) and 386.11 per cent (District Cooperative Banks) due to the low rate of interest declared by Government of M.P. during this period. (Table 3.6).

M.P. is the first state in India to make available credit to farmers at 0 % interest by cooperatives and the credit given by cooperative bank was 1273 crores in 2003-04 which reached 7447 crore in 2011-12. The Total KCC issued by the banks was 71.37 lakhs in which cooperative banks and commercial banks issued 42.95 lakh and 28.42 lakh respectively however the Total No. of Farmers in M.P. is 73.23 lakhs.

5. Major Crops – Area, Production & Yield

Madhya Pradesh is the land of diversity. The various crops are grown in Madhya Pradesh. Soybean (26.51%) followed by wheat (22.18%), gram (13.79%) and paddy (7.56%) are the major crops of the state. (Fig 11) Jawar, bajra, maize, kodo, kutki, lentil, tur, cotton, mustard, pea, barley, moong, urd, linseed, seasm, niger, groundnut, teora and sugarcane are also grown by the cultivators of the state.

5.1 Change in Cropping Pattern

The gross cropped area of Madhya Pradesh has been found to be increased by 9.12 per cent in the year 2009–10 (20944 thousand ha) over the year 1999 – 2000 (19194 thousand ha). The area under total kharif crops (12.54%) was increased more as compared to Rabi crops (5.26%). The area under total pulses found to be increased by 23.26 per cent, while the area under cereal and oilseeds decreased by -6.78 per cent and -0.71 per cent during the period. The crop wise analysis shows that the increase in area was found to be highest in maize (510.79%) followed by sesame (163.50%), tur (106.43%), lentil (37.87%), pea (26.53%), soybean (25.05%), cotton (21.52%), rapeseed and mustard (16.13%), gram (12.16%) and sugarcane (11.63%). The area under paddy (-8.97%), jowar (- 36.50%), bajra (- 74.87%), kodo – kutki (-45.85%), moong (-5.50%), kulthi (-51.22%), niger (-23.97%), linseed (-58.67%) and sunflower (-85.71%) were found to be decreased during the period from 1999-02 to 2009-10

5.2 Change in Production

The total production of crops in Madhya Pradesh found to be increased by 14.33 per cent in the year 2009 – 10 (25399 thousand t) over the year 1999 – 2000 (22215 thousand t).

The total production of Kharif and Rabi crops showed 30.71 & 2.04 per cent increase during the period. The production of cereal and oilseeds found to be increased by 7.00 & 41.57 percent respectively, while the production of pulses decreased by 11.61 per cent. As regards to production of major crops the production of paddy (1.37%), jowar (13.23%), maize (5.51%), bajra (178.42%), wheat (6.22%), urd (60.90%), moong (6.90%), groundnut (37.39%), soybean (42.88), sesamum (474.19%), rapeseed & mustard (31.04%), cotton (140.28%) and sugarcane (3.16%) found to be increased, while the production of kodo – kutki (-35.94%), barley (-1.98%), tur (-24.07%), kulthi (-12.05%), gram (-10.65), pea (-33.00%), lentil (-26.28%), toria (-57.14%), niger (-22.22%), linseed (-64.57%), and sunflower (-100.00%) found to be decreased during the period.

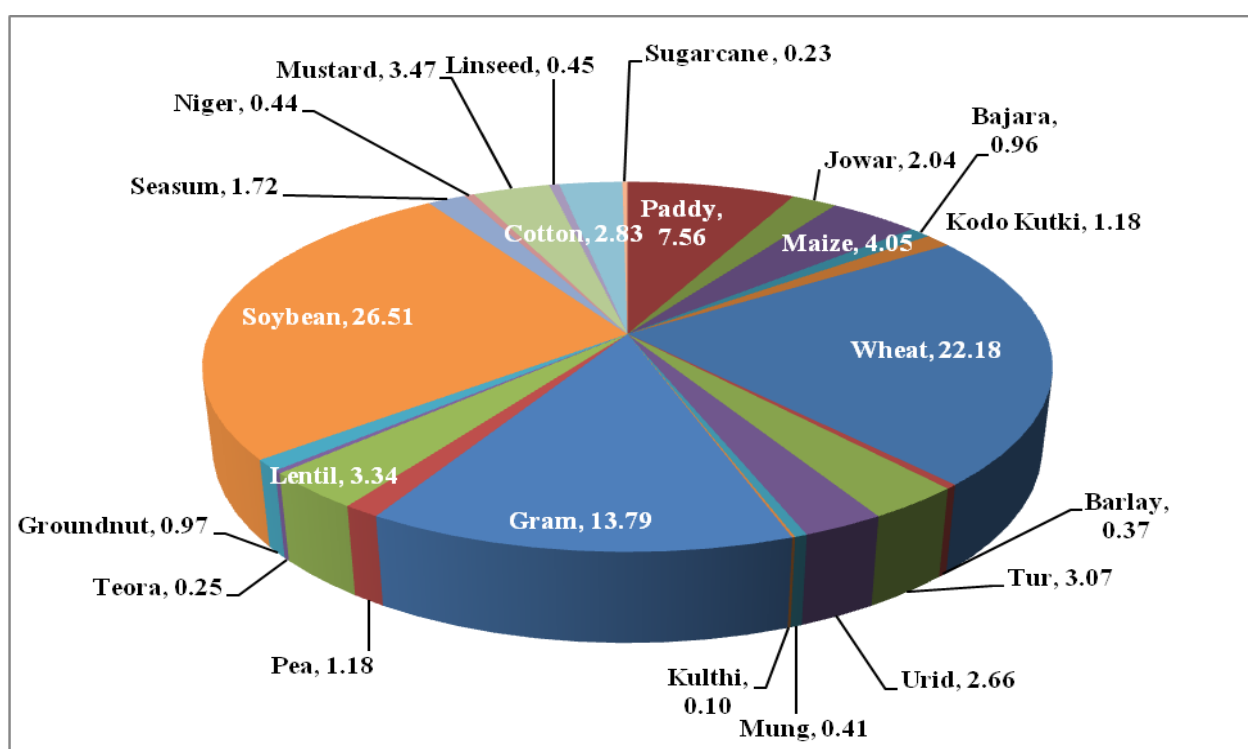


Fig. 11: Cropping Pattern of Madhya Pradesh. (%)

5.3 Changes in Productivity

The productivity of all the crops have been found to be increased except paddy (-8.50%), maize (-13.68%), kodo kutki (-2.50%), tur (-8.62%), gram (-0.51%), pea (-4.48%), lentil (-7.61%) and toria (-31.92%) in the year 2009-10 as compared 1999-2000. The maximum increase in productivity of crops was noticed in sesame (80.87%) followed by kulthi (62.81%), cotton (59.28%), sunflower (54.20%), jowar (53.44%) bajra (37.50%), urd (21.47%), barley (12.58%), moong (3.11%), linseed (2.99%) and sugarcane (1.28%) during this period.

Table 5.1: Cropping Pattern of Madhya Pradesh.**(000'ha)**

Crops	1999-2000	2009-10	Absolute Change	Relative Change (%)
Paddy	1740.00	1584.00	-156.00	-8.97
Jowar	674.00	428.00	-246.00	-36.50
Maize	139.00	849.00	710.00	510.79
Bajara	801.00	202.00	-599.00	-74.78
Kodo Kutki	458.00	248.00	-210.00	-45.85
Other Cereals	72.00	23.00	-49.00	-68.06
Kharif Cereals	3884.00	3334.00	-550.00	-14.16
Wheat	4669.00	4645.00	-24.00	-0.51
Barlay	85.00	77.00	-8.00	-9.41
Other Cereals	9.00	5.00	-4.00	-44.44
Total Rabi Cereals	4763.00	4727.00	-36.00	-0.76
Total Cereals	8647.00	8061.00	-586.00	-6.78
Tur	311.00	642.00	331.00	106.43
Urid	426.00	557.00	131.00	30.75
Mung	90.00	85.00	-5.00	-5.56
Kulthi	41.00	20.00	-21.00	-51.22
Other Pulses Kharif	4.00	4.00	0.00	0.00
Toal Pulses Kharif	872.00	1308.00	436.00	50.00
Gram	2575.00	2888.00	313.00	12.16
Pea	196.00	248.00	52.00	26.53
Lentil	507.00	699.00	192.00	37.87
Teora	63.00	53.00	-10.00	-15.87
Other Pulses Rabi	13.00	13.00	0.00	0.00
Total Pulses Rabi	3354.00	3901.00	547.00	16.31
Total Pulses	4226.00	5209.00	983.00	23.26
Total Food grain kharif	4756.00	4642.00	-114.00	-2.40
Total food grain Rabi	8117.00	8628.00	511.00	6.30
Total food grain	12873.00	13270.00	397.00	3.08
Groundnut	224.00	204.00	-20.00	-8.93
Soybean	4440.00	5552.00	1112.00	25.05
Seasum	137.00	361.00	224.00	163.50
Niger	121.00	92.00	-29.00	-23.97
Other oilseed	4.00	0.00	-4.00	-100.00
Total Kharif oilseeds	4926.00	4926.00	0.00	0.00
Rape seed & Mustard	626.00	727.00	101.00	16.13
Linseed	231.00	95.00	-136.00	-58.87
Sun flower & others	7.00	1.00	-6.00	-85.71
Total Rabi oilseeds	864.00	823.00	-41.00	-4.75
Total oilseeds	5790.00	5749.00	-41.00	-0.71
Cotton	488.00	593.00	105.00	21.52
Sugarcane (G)	43.00	48.00	5.00	11.63
Total Kharif	10170.00	11445.00	1275.00	12.54
Total Rabi	9024.00	9499.00	475.00	5.26
Gross Cropped Area	19194.00	20944.00	1750.00	9.12

Table 5.2: Production of Different Crops in Madhya Pradesh. (000't)

Crops	1999-2000	2009-10	Absolute Change	Relative Change (%)
Paddy	1750.00	1774.00	24.00	1.37
Jowar	529.00	599.00	70.00	13.23
Maize	1270.00	1340.00	70.00	5.51
Bajara	139.00	387.00	248.00	178.42
Kodo Kutki	128.00	82.00	-46.00	-35.94
Other Cereals	26.00	9.00	-17.00	-65.38
Kharif Cereals	3842.00	4191.00	349.00	9.08
Wheat	8687.00	9227.00	540.00	6.22
Barlay	101.00	99.00	-2.00	-1.98
Other Cereals	7.00	5.00	-2.00	-28.57
Total Rabi Cereals	8795.00	9331.00	536.00	6.09
Total Cereals	12637.00	13522.00	885.00	7.00
Tur	270.00	205.00	-65.00	-24.07
Urid	133.00	214.00	81.00	60.90
Mung	29.00	31.00	2.00	6.90
Kulthi	8.00	7.00	-1.00	-12.50
Other Pulses Kharif	2.00	2.00	0.00	0.00
Toal Pulses Kharif	442.00	459.00	17.00	3.85
Gram	2536.00	2266.00	-270.00	-10.65
Pea	100.00	67.00	-33.00	-33.00
Lentil	274.00	202.00	-72.00	-26.28
Teora	70.00	30.00	-40.00	-57.14
Other Pulses Rabi	5.00	5.00	0.00	0.00
Total Pulses Rabi	2985.00	2570.00	-415.00	-13.90
TOTAL Pulses	3427.00	3029.00	-398.00	-11.61
Total Fodd grain kharif	4284.00	4650.00	366.00	8.54
Total food grain Rabi	11780.00	11901.00	121.00	1.03
Total food grain	16064.00	16551.00	487.00	3.03
Groundnut	222.00	305.00	83.00	37.39
Soybean	4743.00	6777.00	2034.00	42.88
Seasum	31.00	178.00	147.00	474.19
Niger	27.00	21.00	-6.00	-22.22
Other oilseed	2.00	0.00	-2.00	-100.00
Total Kharif oilseeds	5025.00	7281.00	2256.00	44.90
Rape seed & Mustard	625.00	819.00	194.00	31.04
Linseed	93.00	33.00	-60.00	-64.52
Sun flower & others	2.00	0.00	-2.00	-100.00
Total Rabi oilseeds	720.00	852.00	132.00	18.33
Total oilseeds	5745.00	8133.00	2388.00	41.57
Cotton	216.00	519.00	303.00	140.28
Sugarcane (G)	190.00	196.00	6.00	3.16
Total Kharif	9525.00	12450.00	2925.00	30.71
Total Rabi	12690.00	12949.00	259.00	2.04
Gross Cropped Area	22215.00	25399.00	3184.00	14.33

Table 5.3: Productivity of Crops in Madhya Pradesh.**(Kg/ha.)**

Crops	1999-2000	2009-10	Absolute Change	Relative Change %
Paddy	1059.00	969.00	-90.00	-8.50
Jowar	784.00	1203.00	419.00	53.44
Maize	1586.00	1369.00	-217.00	-13.68
Bajara	1008.00	1386.00	378.00	37.50
Kodo Kutki	279.00	272.00	-7.00	-2.51
Wheat	1938.00	1895.00	-43.00	-2.22
Barlay	1192.00	1342.00	150.00	12.58
Tur	870.00	795.00	-75.00	-8.62
Urid	312.00	379.00	67.00	21.47
Mung	322.00	332.00	10.00	3.11
Kulthi	193.00	313.00	120.00	62.18
Gram	985.00	980.00	-5.00	-0.51
Pea	513.00	490.00	-23.00	-4.48
Lentil	539.00	498.00	-41.00	-7.61
Teora	1106.00	753.00	-353.00	-31.92
Groundnut	992.00	1162.00	170.00	17.14
Soybean	1068.00	1120.00	52.00	4.87
Seasum	230.00	416.00	186.00	80.87
Niger	225.00	229.00	4.00	1.78
Other oilseed	333.00	355.00	22.00	6.61
Rape seed & Mustard	998.00	1056.00	58.00	5.81
Linseed	402.00	414.00	12.00	2.99
Sun flower & others	286.00	441.00	155.00	54.20
Cotton	442.00	704.00	262.00	59.28
Sugarcane (Harvested)	4378.00	4434.00	56.00	1.28

5.4 Horticulture

The area under horticultural crops i. e. fruits (96.76%), vegetable (12.00%) and flowers (125.15%) except spices (-1.95%) was found to be increased in the year 2009-10 as compared to 1999-2000. The production of all the horticultural crops i.e. fruits (81.38%), vegetables (30.89%), flowers (200.00%) and spices (28.48%) were found to be increased in the year 2009-10 as compared to 1999-2000. The productivity of all the horticultural crops i.e. vegetable (16.87%), flowers (33.25%) and spices (31.04%) except fruits (-7.82%) have been increased in the year 2009-10 as compared to 1999-2000. (Table 5.4)

Table 5.4: Area, Production and Yield of Horticultural Crops in Madhya Pradesh

Particulars		1999-2000	2009-10	Absolute Change	Relative Change (%)
Fruits	Area (000'ha)	57.48	113.10	55.62	96.76
	Production (000'tonns)	1579.00	2864.00	1285.00	81.38
	Yield (qnt./ha)	27.47	25.32	-2.15	-7.82
Vegetables	Area (000'ha)	223.84	250.70	26.86	12.00
	Production (000'tonns)	2378.00	3112.60	734.60	30.89
	Yield (qnt./ha)	10.62	12.42	1.79	16.87
Flowers	Area (000'ha)	3.42	7.70	4.28	125.15
	Production (000'tonns)	2.00	6.00	4.00	200.00
	Yield (qnt./ha)	0.58	0.78	0.19	33.25
Spices	Area (000'ha)	293.23	287.50	-5.73	-1.95
	Production (000'tonns)	322.00	413.70	91.70	28.48
	Yield (qnt./ha)	1.10	1.44	0.34	31.04

5.5 Five Year Plan Wise Growth

The growth of area production and yield of major crops of Madhya Pradesh in different five year plans has been analysed in last two decades and the growth of area found positive in all the plans for all the major crops except wheat (-6.70% per annum) and gram (-0.93% per annum) in 9th plan, paddy (-0.01% per annum) and gram (-0.04% per annum) in 10th plan and paddy (-0.10% per annum) in 11th plan. The growth of production found positive in all plans except soybean (-6.95% per annum), wheat (-7.63% per annum) and gram (-2.43% per annum) in 9th plan. The productivity of all major crops were also found positive in all plans except soybean (-7.26% per annum), wheat (-0.04% per annum) and gram (-1.69% per annum) in 9th plan. This was might be due to drought of the year 1999-2000.

Table 5.5: Linear Growth of Area, Production and Yield of Major Crops in last 2 Decades (Plan Wise) of M. P.

(Percent Per Year)

Five Year Plan	Soybean	Paddy	Wheat	Gram
	Area (000' ha)			
8 th (1992-1997)	8.07	1.08	3.33	3.25
9 th (1997- 2002)	0.32	2.58	-6.70	-0.93
10 th (2002-2007)	3.15	-0.01	3.76	-0.04
11 th (2007-2012)	2.22	-0.10	6.63	3.35
Five Year Plan	Production (000' Tonns)			
8 th (1992-1997)	9.39	6.19	7.92	5.47
9 th (1997- 2002)	-6.95	3.23	-7.63	-2.43
10 th (2002-2007)	10.61	3.72	6.96	6.32
11 th (2007-2012)	4.19	12.56	19.01	9.28
Five Year Plan	Yield (Q./ha)			
8 th (1992-1997)	1.64	0.35	4.77	2.48
9 th (1997- 2002)	-7.26	1.97	-0.04	-1.69
10 th (2002-2007)	7.62	4.81	3.52	6.70
11 th (2007-2012)	2.03	11.25	3.98	6.34

6. Agricultural Research, Education and Extension

The agriculture research, education and extension in Madhya Pradesh is quite good with better future prospects.

6.1 Agriculture Research

There is a vast research are being conducted in the field of agriculture in Madhya Pradesh from 9 Zonal Agricultural Research Stations (ZARS) (Jabalpur, Powarkheda, Tikamgarh, Chhindwara, Morena, Sehore, Khargone, Jhabua and Indore); 8 Regional Agricultural Research Stations (Rewa, Sagar, Dindori, Waraseoni, Gwalior, Khandwa, Mandsaur and Ujjain); 8 Agricultural Research Stations (ARS) (Naugaon, Garhakota, Sausar, Tendini, Bagwai, Jaora, Bhind and Badwah) in M.P. through the Jawaharlal Nehru (JNKVV) and Rajmata Vijayaraje (RVSKVV). In these Universities research are conducted through All India Coordinated Research Project on various crops viz. Maize, Rice, Niger, Linseed, Soybean, Chickpea, Millets, Wheat, Maize , Moong, Urd, Lentil, Lithayras, Rajma and Pea, Pearl Millets, Safflower, Cotton, Sorghum, Pigeon pea, Groundnut, Rapeseed & Mustard and Arid Legumes.

The various research programmes are also carried out through Crop Improvement Projects on Sugarcane, Micro-nutrients of Soils, Soil Test Crop Response, Long Term Fertilizer Experiments, Nematode Pests & their control, Agro-Forestry, Forage Crops, Dry land Agriculture, Breeder Seed Production Unit, Seed Technology Research Unit, Vegetables Seed production, Production of Breeder Seeds of Annual oil crop, Arid Zone Fruits, Biological control of crops, pests and weeds, Spices at various locations. The universities are also have All India Network Project on Medicinal, Aromatic plants & Betelvine, Soil Biodiversity - Biofertilizer (BNF), Organic Farming, Management of Salt affected soils, Weed control, Water Management and Horticulture Projects, Medicinal & Aromatic Plants, Sub Tropical Fruit Grape and Farm Implements & Machinery, Optimization of Ground water resources through wells & pumps, Harvest & Post Harvest Technology, Renewable Energy Sources. Research on Agro-meteorology data are also carried out in Faculty of Agricultural Engineering under JNKVV Jabalpur. Both the universities have Indian Meteorological Department (Government of India) and Agro met Advisory Services.

The social studies have also been carried out in Madhya Pradesh by Agro- Economic Research Centre and M.P., Institute of Social Science Research at Ujjain and Cost of Cultivation scheme Jabalpur. There is also a Zonal Project Directorate Zone VII at Jabalpur

to monitor the extension research activities of the Krishi Vigyan Kendras etc. in the States of Madhya Pradesh, Chhattisgarh and Orissa. There are also 7 National and International Research Institutions working in Madhya Pradesh i.e. Advanced Materials and Processes Research Institute (AMPRI) (Bhopal), Indian Institute of Soil Sciences (Bhopal), Central Institute of Agricultural Engineering (Bhopal), Directorate of Soybean Research (Indore), Directorate of Weed Science Research (Jabalpur), Directorate of Pluses improvement Development (Bhopal) and International Maize and Wheat Improvement Center, BISA (Borlaug Institute for South Asia) at Jabalpur (M. P.). The Institute of Pulse Research Kanpur has also established a Regional Research Centre at Bhopal (M. P.) in recent year (2013).

6.2 Agriculture Education

In Madhya Pradesh the agricultural education has been carried out by mainly by two Agricultural Universities viz. Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur and Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya(RVSKVV), Gwalior. The JNKVV, Jabalpur has five Agriculture Colleges at Jabalpur, Rewa, Tikamgarh, Ganjbasoda (Vidisha dist.) and Waraseoni (Balaghat dist.) and an Agricultural Engineering College at Jabalpur District. The students also offering B.Sc. in Forestry at Jabalpur campus. A Horticulture Vocational Education Institute also working in Sagar District. This Institute provides two years vocational courses (Diploma Course) on dry land horticulture & nursery management and Seed Production Technique. The RVSKVV, Gwalior also has four Agriculture Colleges at Gwalior, Indore, Khandwa, Sehore and a Horticulture college at Mandsaur. In Madhya Pradesh both the universities provide education to student at graduation, post graduation and Ph.D. level for all the major courses of agriculture. Besides JNKVV, Jabalpur also providing MBA (Agriculture) to student from the year 2001. Apart from this now a days, facility of Agriculture and Agriculture Engineering education is being also provided by Mahatma Gandhi Chitrakoot Gramoday University, Satna, AKS University, Satna and Swami Vivekanand University, Sagar in Madhya Pradesh.

6.3 Agriculture Extension

There are 47 Krishi Vigyan Kendras are in operations to carry out extension activities in Datia, Ashoknagar, Burhanpur, Neemuch, Mandla, Badwani, Umaria, Sheopur, Dewas, Katni, Chhatarpur, Shivpuri, Hoshangabad, Morena, Sagar, Khargone, Betul, Shajapur, Ujjain, Mandsaur, Harda, Damoh, Narsinghpur, Raisen, Dindori, Gwalior, Rewa, Betul, Panna, Dhar, Sehore, Bhind, Indore, Khandwa, Tikamgarh, Seoni, Rajgarh, Guna, Ratlam,

Sidhi ,Shahdol, Balaghat., Vidisha, Satna, Jhabua, Chhindwara and Bhopal districts under the jurisdiction of JNKVV and RVSKVV. One Central Farm Machinery Training & Testing Institute also working in Budhni M.P. and two Agriculture Technology Information Centre (ATIC) Centers Jabalpur and Bhopal also working in Madhya Pradesh. Kisan Call Centre (KCC) in which all agricultural information provides to farmers by agriculture specialist on farmers mobile without any payment. This KCC is currently working in Jabalpur at Madhya Pradesh. The State Government of Madhya Pradesh has also a vast network for providing crops and farm technologies to the farmers at village level. There are Joint Director and Deputy Director Agriculture posted in all the divisions and at all the districts of Madhya Pradesh. The extension activities are carried out by Assistant Director Agriculture, Senior Agriculture Development Officer, Agriculture Development Officer and Rural Agriculture Extension Officer at Block and villages levels in Madhya Pradesh.

7. Animal Husbandry, Dairying & Fisheries & Growth

The livestock population in Madhya Pradesh showed increasing trend over the years. The total livestock population (41629.46 thousand) found to be increased by 1.90 per cent per year in the year 2007 as compare to the year 1992 (32400.06 thousand) with the annual growth of 1.90 per cent (Table 7.1). As regards to the population of different livestock is concerned, the population of cattle, buffalo and goat found to be increased with growth of 0.56 per cent, 7.07 per cent 3.58 per cent per annum, while the population of horse and pony (-4.09% per year), donkey (-4.18% per year), sheep (-2.65% per year), camel (-4.20% per year) and mule (-6.16% per year) showed negative growth rates over the years. Among the different livestock, the population of buffalo (7.07% per year) showed maximum annual growth rates followed by goat (3.58% per year) and cattle (0.56% per year).

Table 7.1: Number of Livestock 1992-2007.

Particulars	(Thousands)				
	1992	1997	2002	2007	AAGR (%)
Cattle	20207.04	19496.87	19512.61	21915.44	0.56
Buffalo	4430.60	6648.26	7575.31	9129.15	7.07
Horse & Pony	84.85	75.14	41.79	32.76	-4.09
Donkey	70.65	63.51	46.75	26.31	-4.18
Sheep	760.67	788.02	689.40	458.54	-2.65
Goat	6384.69	6472.05	8143.99	9810.70	3.58
Camel	18.33	16.44	13.83	6.79	-4.20
Pig	434.62	486.63	470.60	249.14	-2.85
Mule	8.60	7.12	4.64	0.65	-6.16
Total Live stock	32400.06	34054.03	36498.90	41629.46	1.90

The Veterinary and Animal Husbandry department is responsible for multifarious activities in Madhya Pradesh. The department is implementing 2305 departmental institutions to cover 52806 villages (2001) and has provided veterinary treatment to 68.18 lacs animal, medicine distribution to 38.42 lacs beneficiaries and preventive inoculation against infectious disease 117.29 lacs animal have been carried out for this purpose. The department is also providing veterinary aid facilities in deep forest areas where the animal owners are shifting their livestock during the scarcity of water and fodder. So far in 390 gaeries 1.1 lacs livestock were kept and in which 57221 animals were treated 51547 animal were vaccinated and 1232 animals castrated. The average strength in each gaeries was 300. The department has taken account of gaeries in each district by way of their registration and providing necessary departmental facilities. The facility of live stock Insurance have been implemented under which premium of amount 1.25 paisa/annum/livestock amount of Rs. 2500 Rs/- have been restricted.

There is sufficient improvement of poultry of high breed in Madhya Pradesh. The *Kadakhnath* breed of cock (Jhabua) is famous for their taste and dark black bones and blood. Government is implemented a Cockerel scheme for uplifting of poor class, under this day old chick have been provided to beneficiaries. In order to provide effective veterinary health cover the D.I. Labs have been examined 190393 samples from various livestock.

There is no outbreak of RINDERPEST DISEASE (RD) since last 10 years for which the effective surveillance have been maintained as a result of effective implementation of National Project on R.P. the disease has not been eradicated from the state. The State Government implementing Backyard Poultry Scheme, Subsidy for Quails, Progressive animal owner / trained *Gau Sewak* being given subsidy for bulls to improve Intensive Cattle Breeding Programme, Sufficient fodder development for productive livestock, and Piggery development, with the help of cent percent Central Government assistance (a new piggery farm has been established in Jabalpur) schemes for farmers.

Box 1: Animal Husbandry in Madhya Pradesh: At a glance

- Highest cattle population in India- 2.08 million.
- Buffalo (4th in India) - 0.87 million.
- Goat (6th in India) - 0.87 million.
- Milk production (7th in India) – 6.2 million tonne per annum.
- Milk processing capacity is less than 10%.
- Potential for Marketing and Processing in Goat sector especially for meat and feta cheese and 25.8% Growth of Goat Population in MP during last five year.
- Potential for Marketing and Processing in Poultry sector. Low cost of egg (2.55 US cents per egg). 61 % Growth of Poultry in MP during last five years.
- Fisheries: 172 species, Production – 68466 MT – expected to be 100'000 M.T. by 2016-17, Cooperative based activities, 1749 cooperative societies - 60612 members.

In Madhya Pradesh there is 3.56 lakh ha. area under tanks and ponds out of which 2.94 lakh ha. is watershed area, while 0.62 lakh ha. in rural areas tanks and ponds. About 3.49 lakh ha. area is under fisheries, out of which 2.92 lakh ha. of watershed area and 0.576 lakh ha. of rural ponds and tanks. Fish seed is a main component of fish production. Madhya Pradesh produces 62 corers standard fry of seed as against the total demand of 83 corers standard fry (2011). The state produces 66678 ton of fish production in which 45346 ton produces through rural ponds and tanks, 14457 ton from watershed and 6857 ton from various rivers. The productivity of fish production is found more in rural pond (1267 kg/ha.) as compared to watershed (63 kg/ha). Fish production is carried out by fisheries cooperative societies (1911). These societies operated in leased tanks and rivers.

8. Post Harvest Management and Value Addition

The Madhya Pradesh has tradition of production of a number of varieties suitable for processing of agricultural commodities including grains, oil seeds, spices, fruits and vegetables and export potato, soybean etc At present there are 550 Large and medium food processing industries related to soybean, gram, rice, wheat, durum wheat etc., 73 Beverages and 151 other agro based industries are running in the state. Many crops has been identified as key crops as thrust areas for value addition in Madhya Pradesh i.e. Banana, Mango, Orange and Papaya in fruits, Potato, Onion, Peas, Tomato and Brinjal in vegetables, Wheat, Rice, Maize and Jowar in cereals, gram, tur and lentil in pulses, Soybean, Groundnut,

Mustard in oil seeds, Garlic, Coriander, Chilies, Ginger and Fenugreek in spices and Jrianis, Bel, Aloe vera and Aonla in medicinal plants.

The concept of Food Park is also introduced in Madhya Pradesh under public private partnership in 2004. “Jaggakhedi” in Mandsaur, “Nimrani” in West Nimar, “Babai” in Hoshangabad, “Borgoan” in Chhindawara, “Maneri” in Mandla and “Malanpur” in Morena have been selected for development of Food parks in Madhya Pradesh. ITC, Hindustan Unilever Limited, Khaitan Group, Bhaskar Group, Ruchi Soya, K.S. Oils, Daawat Foods, Maral Overseas, Maikal Industries and Rallis India are the Major players in value added products in Madhya Pradesh. There is huge potential for diversifying agriculture and developing the Agri Business sector including food processing industry in the state, which will give a strong boost to rural incomes and have major multiplier effect on employment and equitable income growth throughout the economy. A strong and dynamic food processing industry can play a vital role in diversification and commercialization of agriculture and ensure value addition to the agriculture produce, generate employment, enhance income of farmers and create surplus for export of processed products.



Fig. 12: Food Parks in Madhya Pradesh.

9. Agricultural Sector Development

9.1 Salient Features of Developing Madhya Pradesh

- ❖ Madhya Pradesh achieved 9.04 percent agricultural growth against the targeted Agriculture Growth Rate in XI five year plan
- ❖ Ranks 1st in production of Soybean (59%), Gram (39.5%), total pulses (25.3%) and oilseeds (25.2%) in the country.
- ❖ Ranks 2nd in production of lentil (28.4%), 3rd position in sorghum (7.9%) and 4th in mustard (10.2%) in the country.
- ❖ State is steadily improving wheat production every year, with production of 127.20 lac MT during 2011-12 the state is slated to be included in the top 3 highest wheat producing states in the country.
- ❖ SRR of soybean is 33.56, wheat 30.2, gram 9.97 and mustard is 42.8%.
- ❖ At present average power consumption is 0.85 k.w. per ha.
- ❖ The Productivity of wheat 2705 Kg/ ha achieved in 2011-12, which is 42.74% more than the Productivity of 2008-09.
- ❖ Wheat procurement in the state during 2008-09 was 24.10 lakh metric ton which is increased to 49.65 lakh metric ton with 106.05% increase during the year 2011-12.
- ❖ Consumption of fertilizer was 31.22 lakh metric tons in 2008-09 and increased to 45.38 lakh metric ton in 2011-12 with increase of 32.89% increase.
- ❖ Madhya Pradesh accounts 40% area of the total agricultural land under organic farming of the country.
- ❖ Irrigated area in the state is increased from 9 Lakh ha. to 16.35 lakh ha. during 2011-12 due to new projects.
- ❖ Kisan Call Center are being run in the state from the establishment of these call centres during the year 2008-09,2009-10,2010-11 and 2011-12 KCCs' received 111699, 146281, 184261 and 154459 number of calls respectively.
- ❖ From 2008-09, 8 PPP were working with the ATMA in the state which is increased to 25 in the year 2011-12.

9.2 Policy Initiatives

- ❖ Krishi Cabinet constituted at the state level to take immediate decision about Agriculture Policy matters during the year 2011-12 comprising of allied departments of the agriculture.
- ❖ Distribution of credit to farmer for crop loan at 0 % interest through cooperatives.
- ❖ Govt. announced special bonus on wheat and paddy @ Rs. 100/- per Qtl.
- ❖ Direct transfer of subsidy to the farmers' Bank account.
- ❖ Advance storage scheme of fertilizer – 1st March to 31st May (Kharif) & 1st Aug. to 15th Sep. (Rabi) 2012 to ensure adequate availability of fertilizers
- ❖ To make agriculture profitable, new scheme have been initiated along with new strategies to achieve this goal.
- ❖ Government of Madhya Pradesh is also introducing separate *Krishi Budget* in the State legislature from the year 2012-13. GoMP has also taken a conscious decision to introduce Agriculture Economic Survey of Madhya Pradesh from the year 2012.
- ❖ Promoting sprinkler irrigation through 30% Top up subsidy.
- ❖ Promotion of Hybrid Maize production through 90% subsidy on the distribution of hybrid maize seed to the SC/ST farmers.
- ❖ Promoting Bullock drawn agricultural implements through 25% top up subsidy.
- ❖ Promotion of the deep ploughing practice through assistance of Rs. 1500 per ha. under Haldhar Yojana.
- ❖ 850 custom hiring centers are being run at district level to facilitate farmers with power drawn implements.
- ❖ Distribution of Farmer Soil health cards - 8.90 lakh (No.)
- ❖ To adopt organic farming on large scale- Organic policy launched in the state since 2011.

9.3 Best Practices adopted by the State in India

- ❖ Seed Treatment on large Scale.
- ❖ Increasing Seed Replacement Rate (SRR)
- ❖ Water management and augmentation of Ground Water.
- ❖ Balram Talab Scheme for life saving irrigation, with the assistance of upto Rs.1.00 Lakh.
- ❖ Promoting sprinkler irrigation through Topping up subsidy.

- ❖ Promoting IPM and INM technology.
- ❖ Transfer of technology through various schemes.
- ❖ Capacity building of field functionaries.
- ❖ Conducting demonstration on Production / Protection Technology (at least one demonstration per village)
- ❖ Distribution of soil health card on large scale under R.K.V.Y. to the farmers of all the district of the state.
- ❖ Transfer of technology on large scale through kisan mitra who works as trainer1-
- ❖ SRI – System of Rice Intensification has covered 1.81 lakh ha. area in the state in kharif 2012.
- ❖ Special programme for Basmati Rice
- ❖ Planting of Arhar (Pigeon Pea) on the field bunds
- ❖ Replacement of upland Paddy area by Pulses
- ❖ Utilization of Rice fallow area by Rabi Pulses
- ❖ Inclusion of Pulses under inter-cropping system.
- ❖ Ridge planting of Arhar (Pigeon Pea)
- ❖ Promotion of Line Sowing in place of broadcasting system of sowing
- ❖ Sowing with treatment of Rhizobium + PSB Culture + Molybdenum one gram per Kg. seed resulted into considerable enhancement of yield per ha.
- ❖ 1217 Co-operative societies are contributing in availability of seed in the State.

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