

Transformation of Agriculture in Damoh District of Madhya Pradesh

Abstract :

India has been considered as a land of villages and from very beginning agriculture has been main means of livelihood of the residents of the country specially people living in rural areas. Agriculture plays a vital role in the nation's economy. About two third of the working population earn their living through agriculture and agriculture sector contributes about 26 per cent in the gross domestic production of the country. The present study examines the transformation of the various dimension of the agriculture in the Damoh district of Madhya Pradesh based on secondary data. With the growing pressure of population, demand for land for non-agricultural activities, implementations of rural development programmes and activities, the land use pattern, cropping pattern, irrigation facilities, farming techniques and other allied activities in the study area has transformed during the period 1990 to 2020. Damoh district is located in the Bundelkhand region of Madhya Pradesh and is part of Sagar division. Total geographical area of the district is 7306 sq.km. out of which 323386 hectares land is available for cultivation with 293599 hectares of irrigated land. The proportion of forest and fallow land has decreased in last two decades while the proportion of net sown area, other uncultivated land, land not available for agriculture and double cropped area has increased during the period. The cropping pattern of the study region, also transformed. The use of modern agricultural implements, fertilizers and pesticides too has increased during 1990-2020.

Keywords : Agriculture, Transformation , Land use, Cropping Pattern, Irrigation, Modern Implements.

Introduction :

Transformation of agriculture refers to change in the format of agriculture and allied activities by using and adopting modern inputs, techniques, practices and by re-orienting it towards commercialization. The word transformation is interpreted in many ways it is defined as change in the shape, appearance and nature of something.

Agriculture sector plays a vital role in the economy of India. In a developing country like India where primary sector promised the main stay for about 70 percent of its total population. Agriculture provides the basic necessities of life, account for about 28 percent of the national income and makes a significant contribution to the export sector. Agriculture provides various raw material for industries and holds the key for future socio-economic development of the country. Though significance of agriculture in the terms of employment and generation of national income is declining. In the recent years this contribution declined from 48 percent to only 26 percent in 2001-02 hence the development of agriculture is very essential for the country.

Agricultural activities, cropping pattern, Irrigation, methods and techniques of cultivation of any region are comprehensive affected by the physical features such as terrain, climate, soil as well as socio-economic environment of the region and Damoh district is not exception of this. The transformation of agriculture has become the most spectacular feature in the developing countries in the last four decades the process of transformation manifests the complex interrelationship between physical and cultural features. This transformation is a combination of several physio-demographic, institutional and technological factors (Bhalla and Chandha 1983). Majority of the rural population in the study region directly depends on agriculture and allied activities. There for the transformation of agriculture and other allied activities has

positively improved the living environment and living standard of the people of study region.

Objectives of the Study:

The objectives of the study mainly include:

1. To study the changes in the present land use pattern of the study region.
2. To study the transformation of cropping pattern.
3. To study the transformation of irrigational and other facilities.
4. To study the causes and impact of agricultural transformation in the study region.

Methodology:

Libraries of various institution have been visited to study the relevant literature and to obtain the required information from unpublished Ph.D. Thesis, Books, Journals, monthly magazine and the reports of various government departments.

The present study mainly based on secondary data. The data and information related to land use, cropping pattern, irrigation and other relevant data have been collected from Superintendent office Damoh, Office of the District Economic and Statistics, Damoh, Divisional office of the land record and Directorate of Agriculture. While general information related to physiography, demography, agriculture, climate and natural vegetation have been collected from district gazetteer Damoh, district census hand book and from official websites of the government department.

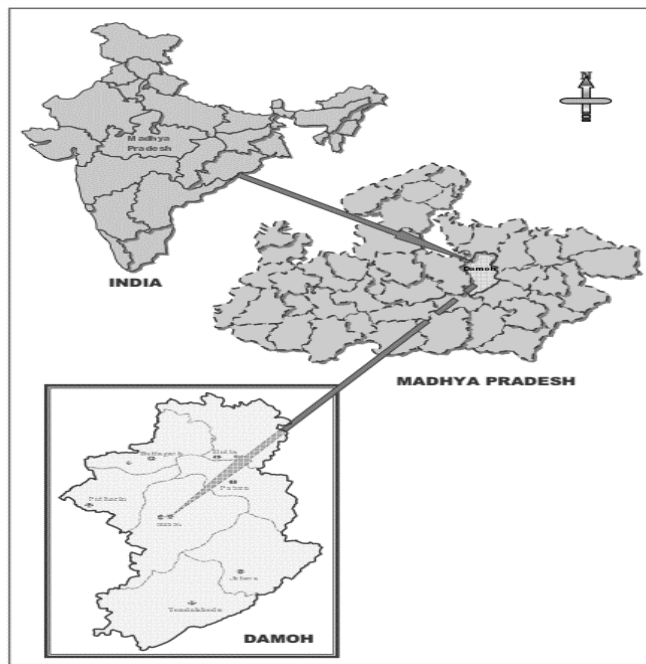
Analysis and Presentation Data:

To obtain result from collected data simple statistical methods such as cross tabulation, average and percent were used and these data have been presented using tables and other cartographic techniques mainly pie chart and bar diagram have been used to present the data.

Study Region:

Damoh district of Madhya Pradesh has been selected for the present study. Damoh District is located in the north east of the Madhya Pradesh. It lies between 23°91' to 24°27' north latitude and 79°31' to 79°51' east longitude. Damoh district is a part of Sagar division. The district is bounded by the District of Chhatarpur in the north and north west, Sagar in the west, Narsinghpur and Jabalpur in the south and Panna district in the east. The shape of district is irregular and elongated from north to south with projection in the east and west. The district is divided into 7 tehsil and seven development blocks with about 1229 village and 7 towns.

Fig 1: Damoh District: Location map



The district is can be divided into three physiographic divisions:

1. The Vindhyan range and Southern Plateau
2. The Sonar Valley
3. The North West Hill Range

In the district the southern part of Vindhyan range up to Katangiare called the Bharner range. Beyond this point the escarpment enclosing the land lock valley of Singrampur and the hill range is known as Kaimur range. The highest point in this range is that of the Kalumar hill (751 m) on the north west of Singrampur. Elsewhere the hills ranges from 550 to 580 meter high. The southern plateau is drained by the Bearma and is transverse by number of spurns and ridges of Vindhyan range. The southern plateau extends in a broad belt from southwest to northwest.

The Sonar valley in a belt across the north central part of the district. It is about 80 km, long, 32 to 43 km wide, the valley lies in the centre part of the district is composed of fertile soil. The north western hills rise about 120m locally known as Barano Hill, the central ridge (460 to 520m) is marked by several flat top ped hills.

The climate of Damoh district is characterized by a hot summer and general dryness except monsoon. The year may be divided into three seasons. The summer season mid-March to mid-June. Therainy season mid-July to mid-September and the winter season mid-November to mid-February. The average annual rainfall of the district is 117cm and about 90.5 per cent of the total rainfall received during monsoon season. May is the hottest month and the normal maximum temperature received during month is 42° Celsius and minimum during December-January is 9.7°Celsius.

The soil in the district is mainly three types-medium block soil. Shallow black soil and skeletal soil. The black soil is found mostly in the sonar valley and the bank of Bearma while other type of soil observes near the foot hills of sandstone in the southern part of the district. The forest of the district are tropical dry deciduous with dry deciduous shrub forest. The species of trees found in the region include teak, *dhaora* , *salai*, *saaj*, *mahua*, *semal*, *haldu*, *tendu* and *achar* etc. Damoh district is accommodating about 1264219 persons according to census 2011 and more than 80.18 percent of the total population is living in rural areas of the district.

Result and Discussions:

1. Transformation of land use pattern:

Agriculture is a primary source of livelihood for the majority of population in India and land is the basic resource for the agriculture. The term land use is used to describe the use of land of an area at a certain time. When man uses the land it's called land use. Its type and distributed panorama are called land use pattern. among the land resource, agricultural land has always played a vital role.

The ministry of agriculture govt. of India classifies land use under nine different categories and is adopted by almost all the states of India (Vishwakarma, 2008). Land use pattern of any area is determined by number of factors and Damoh district is not exception of this. In last thirty years the pattern of land use in the study region has recorded a major change with the expansion of non-agricultural activities along with the increasing pressure of population.

1.1 Changes in the land use pattern during 1990-91 to 2005-2006.

Table 1A

Land use Pattern in Damoh District, 1990-91 to 2005-06

Land use	1990-91	Percent of total area	2005-06	Percent of total area	Percent change
Forest	265629	36.4	267084	36.6	0.54
Land not Available for Agriculture	99670	13.6	91395	12.54	-8.30
Fallow Land	17292	2.37	11749	1.61	-32.05
Other Uncultivated Land	5308	7.28	47318	6.49	-10.85
Net Shown Area	292914	40.20	311037	42.69	6.18
Double Cropped Area	61648	8.46	87611	12.0	42.11

Source: Superintendent Land Record, Damoh, Madhya Pradesh

Table 1A shows the change in the land use pattern during 1990-91 to 2005-06. The proportion of land not available for cultivation, fallow land and other uncultivated land has declined while the proportion of forest, net sown area and double cropped area has increased during the period.

Total forest land in the study region was 265629 hectares (34.5 per cent) in 1990-91 which is increased to 267084 hectares (36.6 per cent) recorded a growth of 0.54 percent. Total of 91395 hectares of land comes under land not available for cultivation which is 12.54 percent of the total area in 2005-06 while in 1990-91 it was 99670 hectares (13.6 per cent) recorded a decline with 8.30 percent during the period.

Fallow land in the study area has decline by 32.05 percent. Total fallow land was 17292 hectares (2.37 per cent) in 1990 is decreased to 11749 hectares in 2005-06 recording percent change of 32.05 percent during 1990-91 to 2005-06. Net shown area is the most important land among the land use pattern. Net shown area in the study region has a increasing trend. It is increased by 6.18 percent from 292914 hectares in 1990-91 to 311037 hectares in 2005-06 which is 42.69 percent of the total geographical area.

Double cropped area too has increased during the period. This is because of the increasing irrigational facilities in the study region. The double cropped area is increased by 42.11 percent. Land under sown more than once or double cropped area is 87611 hectares in 2005-06 which is 12.02 percent of the total area while in 1990-91 it was 8.46 percent with 61648 hectares of land. (Fig.2 and Fig.3)

Fig. 2: Land use pattern,1990-91

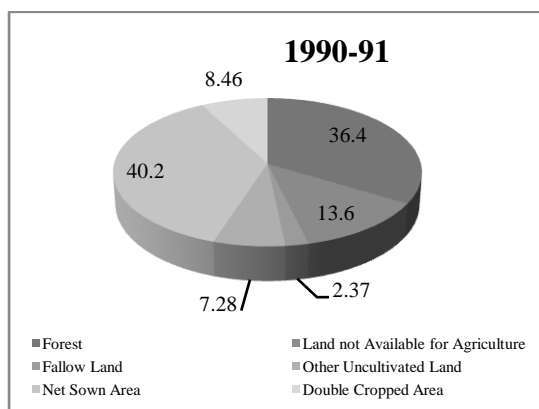


Fig. 3: Land use pattern 2005-06

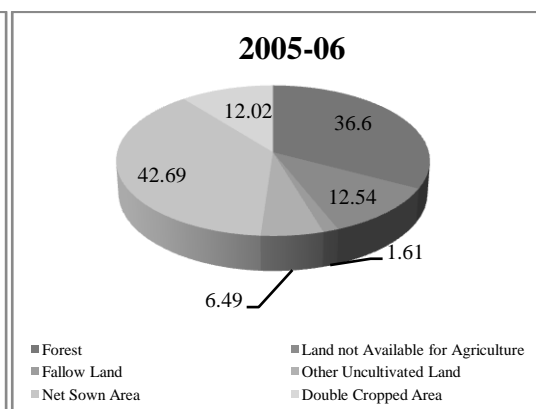


Table 1B

Land use Pattern in Damoh District 2005-06 to 2019-20

Land use	2005-06	2019-20	Percent of total area	Percent change
Forest	267084	267218	36.67	0.05
Land not Available for	91395	92126	12.64	0.79

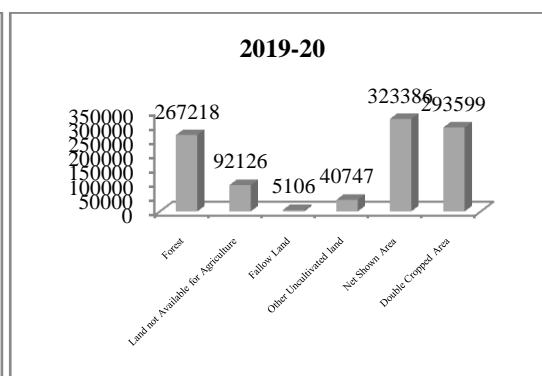
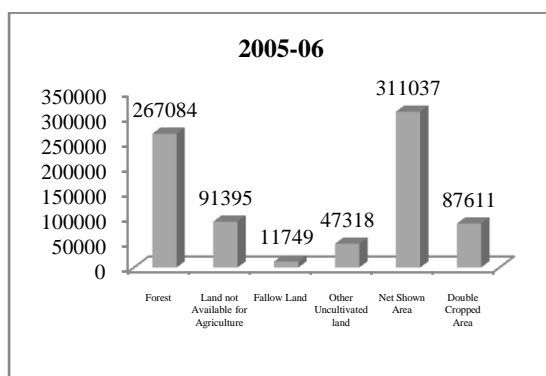
Agriculture				
Fallow Land	11749	5106	0.70	-54.24
Other Uncultivated Land	47318	40747	5.59	-13.88
Net Shown Area	311037	323386	44.38	3.97
Double Cropped Area	87611	293599	40.29	235.11

Source: Superintendent Land Record, Damoh, Madhya Pradesh

Table 1B presents the changes in the land use pattern during 2005-05 to 2019-20. During this period the proportion of forest land has increased by only 0.05 percent. About 267084 hectares of forest land increased to 267218 hectares which is 36.67 percent of the total geographical area. Area under land not available for cultivation increased from 91395 in 2005-06 to 92126 hectares in 2019-20 recorded a growth of just 0.79 percent. During this period the proportion of fallow land and other uncultivated land has decreased by 54.24 and 13.88 percent respectively. While the proportion of net sown area also increased by 3.97 percent and increased to 323386 hectares (44.38 per cent) in 2019-20. During this period double cropped area recorded a growth of 235.11 percent due to the expansion of irrigational facilities in the study region. The double cropped area was only 87611 hectares (12.02 percent) in 2005-06 which increased to 293599 hectares (40.79 per cent) in 2019-20. (Fig.4 and Fig.5)

Fig. 4: Land use pattern,2005-06

Fig. 5: Land use pattern,2019-20



2. Tehsil wise changing pattern of land use 1990-91 to 2019-20.

Table 2A and 2B presents the changes in the different categories of land use in the tehsils of the study region.

Table 2 A

Tehsil wise land use pattern in Damoh District (1990-91 to 2019-20)

Classification of Land	Damoh			Patharia			Jabera		
	1990-91	2019-20	% change	1990-91	2019-20	% change	1990-91	2019-20	% change
Forest	43535	42638	-2.06	743	1580	112.6	50123	59269	18.24

Land Available for Agriculture	Not for	17935	18368	2.41	6065	5958	-1.76	35001	26258	-24.97
Fallow Land		3427	800	-76.65	1743	270	-84.50	2481	694	-72.02
Net Shown Area		54547	60304	10.55	55939	60111	7.45	31706	36183	14.12
Double Cropped Area		10269	52872	414.8	13426	54780	308.0	11205	32663	191.50

Source: Superintendent Land Record, Damoh, Madhya Pradesh

Table 2B

Classification of Land	Tendukheda			Batiagarh			Hatta			Patera		
	1990-91	2019-20	% Change	1990-91	2019-20	% Change	1990-91	2019-20	% Change	1990-91	2019-20	% Change
Forest	83386	75387	-9.59	6429	34749	440.5	81413	30562	-62.46	23103	23033	-0.30
Land Not available for Agriculture	12543	12322	-1.76	10067	10274	2.05	18059	5883	-67.42	12936	13063	0.98
Fallow land	3858	1207	-68.71	1235	560	-54.65	4548	694	-84.74	2006	1186	-40.87
Net Shown Area	26837	33085	23.28	38521	41323	7.27	35364	47835	24.68	42561	44545	4.66
Double Cropped Area	7654	29559	286.19	8347	36974	342.9	10747	46256	330	6320	40495	521

Source: Superintendent Land Record, Damoh, Madhya Pradesh

Table 2A and 2B indicates the transformation of land use pattern during 1990 to 2020 among the tehsils of Damoh district. During the period forest land has recorded on declining trends in four tehsils while in three tehsil the proportion of forest land has increased. Forest land decreased in Damoh, Tendukheda, Hatta and Patera tehsil with 62.46 per cent decrease in Hatta tehsil to only 0.30 percent in Patera tehsil. While land under forest increase in Batiagarh, Patharia and Jabera tehsil. Highest proportion of forest land is found in Tendukheda with 75387 hectares in 2020 followed by Jabera, Damoh, Batiagarh, Hatta, Patera and Patharia tehsil with 59269 hectares, 42638 hectares, 34749 hectares, 30562 hectares, 23033 hectares and 1580 hectares respectively. Area under fallow land has recorded on declining trends in all the seven tehsil. The highest proportion of fallow land has decreased in Hatta with 84.74 percent followed by Patharia with 84.50 percent, Damoh with 76.65 percent, Jabera with 72.02 percent, Tendukheda with 68.71 percent, Batiagarh with 54.65 percent and

Patera with 40.87 percent respectively. Area under land not available for cultivation is decreased by 67.42 percent in Hatta during 1990 to 2020 followed by Jabera, Pathariya and Tendukheda with 24.07, 1.76 and 1.76 percent respectively while Damoh, Batiagarh and Patera area not available for cultivation is increased by 2.41, 2.05 and 0.98 percent respectively.

Net sown area in the study region has recorded an increasing trend in all the tehsils. The growth of net sown area ranges from only 4.66 percent in Patera tehsil to 24.66 percent in Hatta tehsil during last thirty years. Net sown area increased from 35364 hectares in 1990 to 47835 hectares in 2020 in Hatta tehsil. The proportion of net sown area increased in Tendukheda, Jabera, Damoh, Patharia, Batiagarh and Patera with 23.28, 14.12, 10.55, 7.45, 7.27 and 4.60 percent respectively. The area under double cropped area has also increased in all the tehsil of the study region. The highest proportion of double cropped area increased in Patera with 521.0 percent while Jabera tehsil recorded lowest growth in double cropped area with 191.50 percent while in other tehsil the proportion of double cropped area is increased by 414.8 percent in Damoh, 342.9 percent in Batiyagarh, 330.0 percent in Hatta, 308.0 percent in Patharia and 286.19 percent in Tendukheda tehsil.

3. Transformation of Cropping Pattern:

Cropping pattern refers to the combination and number of crops grown in the region along with agricultural characteristics. Crops are principle indicators of agricultural typology of an area and they are helpful in interpreting and analysing some aspects of socio-income mediation of the region (Vishwakarma, 2008). Wheat, gram, soyabean, rice, lentil and maize are the main crops of the study region.

Table 3
Changes in Cropping Pattern 2000-01 to 2019-20

Crops	Area in '000h 2000-01	Area in '000h 2019-20	Percent change
Wheat	69.6	95.62	37.38
Rice	55.5	71.01	27.97
Gram	68.9	177.99	159.70
Soyabean	56.5	52.41	-7.23
Lentil	19.6	20.26	3.36

Source: Directorate of Agriculture, Madhya Pradesh

It is evident from table 3 that the proportion of Soybean in the study region has declined though the rate is very low while the proportion of wheat, gram, rice and lentil has increased. The proportion of wheat was 69.6 thousand hectares in 2000-01 which has increased to 95.62 thousand hectares in 2019-20 with 37.38 percent growth.

During last twenty years highest growth is recorded in land under gram. The proportion of gram has increased by 159.0 percent while the proportion of rice and lentil is increased by 27.94 and 3.36 percent respectively. The proportion of Soyabean in the district was 56.5 thousand hectares in 2000-01 which has decline to 52.41 thousand hectares in 2019-20.

4. Transformation of Irrigation Facilities:

Irrigation is one of the most important and basic ingredients in the process of agricultural transformation. Main sources of irrigation in the district are canal, river, tanks, tub wells and wells.

Table 4
Changes in Irrigation Area 1990-91 to 2019-20

Tehsil	1990-91	2019-20	Percent change
Damoh	8240	51688	527.2
Patharia	12678	55434	337.2
Jabera	12240	29035	137.2
Tendukheda	7108	28678	303.4
Batiagarh	11216	38580	243.9
Hatta	12619	43492	244.6
Patera	-	29095	-

Source :Superintendent Land Record, Damoh.Madhya Pradesh

Above table4 shows the percent change in irrigated land during 1990-91 to 2019-20 in the tehsils of the district. The proportion of the irrigated land increased by 527.2 percent in Damoh tehsil which is highest growth among the tehsils. In other tehsil the proportion of irrigated area has increased by 337.2 percent in Patharia, 303.4 percent in Tendukheda 244.6 percent in Hatta, 243.9 percent in Batiagah and 137.2 percent in Jabera tehsil during the period. Out of total irrigated area in the district more than 46.28 percent is irrigated by wells followed by canals, rivers and tanks with 10.8, 7.95 and 2.12 percent respectively.

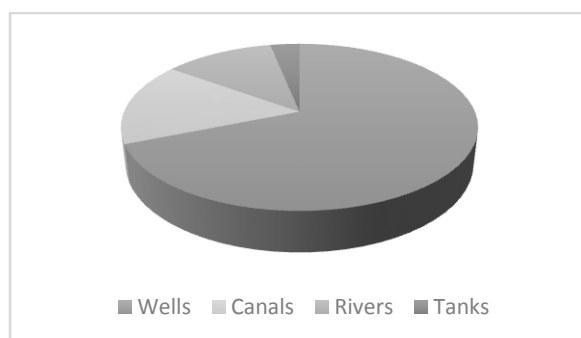


Fig.6:Irrigated Area by Sources

5. Agricultural Implements:

The development of agriculture becomes possible with the use of modern agricultural implements. the available implements in the study region are iron plough, diesel and electric pump set, tractors, sprinklers, threshers and harvesters. These inputs have gradually replaced the traditional way of agriculture and agriculture productivity in the district.

The traditional wooden plough is the most common implement used in the study region but the number of woodenplough has decline rapidly currently 16942 wooden plough are available in the district while the number of iron plough has increased during the period. The available number of iron plough in the region is 11207. While the number of electric pumps, diesel pump and tractor is 26332, 9336 and 5335 respectively.

Conclusion:

The pace of transformation of agriculture in the study region is very high. Due to increase in population and its pressure on land and demand of land for non-agricultural activities, the land use pattern of study region has transformed during 1990-91 to 2019-20. Over the period of time the land under forest has increased, this increased in forest land is the result of the implementation of various programmes under national forest policy. Forest land in the study region has increased by 0.29 percent in last three decades. As forest are the very important resource it should be protected and area under forest should be expanded. Land not available for cultivation and fallow land has decreased with the expansion of agricultural land. Net sown area has increased by 5.07 percent during last thirty years while the proportion of double cropped area has increased by 42.11 percent during 1990-91 to 2001 and during 2000-01 to 2019-20. It is increased by 235.11 percent which indicates the growth of irrigation facilities in the study region. The cropping pattern of the study region indicate that the proportion of wheat, rice and gram has increased while the land under Soyabean is remain constant.

Over the period of time irrigated land and irrigational facilities in the study region have also transformed. Use of electric pumps and diesel pumps increased rapidly. Use of modern agricultural implements, fertilizers and pesticides, hybrid seeds, storage and marketing facilities has too increased rapidly and traditional way of farming are being transformed.

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