

Watershed Based Developmental Efforts in Western Madhya Pradesh

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ABSTRACT: Madhya Pradesh have increasingly harnessed the potentials of rainfed agriculture through wider and intensive applications of watershed based treatments. A variety of schemes/programs have been effectively implemented with wider variations across the state. Present paper presents a compiled and cumulative scenario of watershed based efforts put in the state. Attempts have been made to project in depth progress of such interventions for western parts of the state, which constitute about 28% geographical area of state and face most kinds of variations in terms of parameters like climate, physiographic, and natural resources. An updated scenario of watershed based developmental works under different schemes is presented for western parts of the state with quantified targets/achievement under leading watershed programs like Drought prone Areas Program (DPAP), Integrated Wastelands Development Program (IWDP), National Watershed development Program for Rainfed Agriculture (NWDPR), Rajiv Gandhi Mission on Watershed Management (RGMWM) etc. Under DPAP scheme about 34% watersheds were located in western parts of the state. Year wise spectrum of their coverage and progress is presented. Under IWDP program the western part of the state has got sizeable share (to the tune of about 21%), and covered an area of about 0.097 Mha area in contrast to about 0.5 Mha coverage in state. RGMWM during last 10 years has grown as country's largest watershed management program covering 7600 villages. SWC works on 14.26 lakh ha have been successfully completed, and work is in progress in the remaining 20.12 lakh ha. During 10th five year plan about 32% projects remained in western parts with expenditure outlay of 47% of total allocation for state.

INTRODUCTION

Owing to vast physiographic variations the state of Madhya Pradesh (MP) was bifurcated into Chattisgarh and MP in November 2000. Even after this division, MP remains one of the largest states in India, spread over 31 Mha accounting for 10 percent of the country's area and reported a population of about 60 million (about 6% of country's population). If we consider the status/utilization pattern of various natural resources, there exists tremendous variability between western and other parts of the state. The western part constitute about 8.65 Mha area (> 28% of state) encompassing 12 districts (recently expanded to 14) and 95 Tehsils/Talukas in contrast to total 45 districts and 219 Tehsils/Talukas of State. With annual rainfall ranging from 800 to 1600 mm, from west to east, concentrating in the brief monsoon, most water courses naturally remain extremely dry from January to June. As a result, water availability depends critically on the extent of water storage from a few surface water resources. Climatic and socioeconomic parameters of western MP show specific scenario in comparison to other parts of the state, which sizably influence the agrarian issues of the region. Owing to rapid urbanization, rich farm lands are disappearing and in effect, continuously increased food grains target

is being met not only by putting non agricultural lands in to agricultural use. The region faces wider uncertainties in terms of natural rainfall pattern. Moreover to cope up with these constraints with effective rainwater harvesting, a variety of watershed based interventions are put in the region to yield equitable and sustainable natural resource management under prevailing hydrological variations over time and space. Present paper primarily focused on projecting naturally delineated watersheds of the region with an updated account of various schemes and projects through which watershed development works have been performed. District wise information on physical and financial targets and their progress/achievements is presented with its component analysis. An effort has been made to reflect a relative comparison of watershed based works/interventions in districts of western MP vis-avis other parts of state.

CLIMATE VARIABILITY

MP has eleven categorical agro-climatic delineations (Table 1) reflecting true variability in terms of climatic parameters as well as major crops. The western part of state encompasses three specific agro climatic zones namely Malwa, Nimar, and Jhabua hills. The temperature starts rising in Madhya Pradesh from

Table 1: Agro-Climatic-Zones and Associated Rainfall Patterns in MP

Agro-Climatic Zones	Districts	Range of Rainfall	Major Crops
Chhatisgarh Plain	Balaghat	1200–1600	Rice
Northern Hill Region	Shahdol, Sidhi, Mandla	1200–1600	Rice
Kymore Plateau and Satpura hills	Rewa, Satna, Panna, Seoni, Katni	1000–1400	Wheat, Rice
Central Narmada Valley	Jabalpur, Narsinghpur, Hoshangabad, Harda	1200–1600	Wheat
Vindhy Plateau	Bhopal, Sehore, Raisen, Vidisha, Guna, Sagar, Damoh	1200–1400	Wheat
Gird Region	Gwalior, Bhind, Shivpuri, Morena, SheopurKalan	800–1000	Wheat-Jowar
Bundelkhand Region	Chhatarpur, Datia, Teekamgarh, Panna, part of Shivpuri	800–1400	Wheat-Jowar
Satpura Plateau	Betul, Chhindwara	1000–1200	Wheat-Jowar
Malwa Plateau	Mandsaur, Ratlam, Ujjain, Dewas, Indore, Shajapur, Rajgarh, Dhar, Jhabua	800–1200	Cotton-Jowar
Nimar Region	Khandwa, Khargone, Barwani, part of Dhar	800–1000	Cotton-Jowar
Jhabua Hills	Jhabua	800–1400	Cotton-Jowar

March onwards, varying from region to region. In summer, the mean maximum temperature goes up to 42.5°C in northern MP. The monsoon begins in end-June/July and lasts till end-August. The average temperature in winter is as low as 10°C in northern MP, while 10°–15°C in southern parts.

Rainfall

Madhya Pradesh gets maximum rainfall from June to September, and in some places, it rains in December and January due to a low-pressure build up. Both, the Bay of Bengal and the Arabian Sea, feed the clouds reaching this state. The western parts of the state get their monsoon from the Arabian Sea and the eastern parts from the Bay of Bengal. However, by the time

these clouds reach Madhya Pradesh, a major part of their moisture is spent as they travel over many places before arriving in the state. Eastern Madhya Pradesh gets an average rainfall of over 1120 mm, whereas the northern and western areas get much less, ranging from 500–625 mm. In the eastern parts of Madhya Pradesh, the monsoon is comparatively more predictable than in the western parts, making cultivation in dry periods almost impossible. It is quite seeable in Figure 1, where averaged values of observed monthly rains in western v/s other parts of the state are relatively compared. A detailed spectrum of rainfall variability (during monsoon period) across various districts located in western parts of MP is shown in the same Figure.

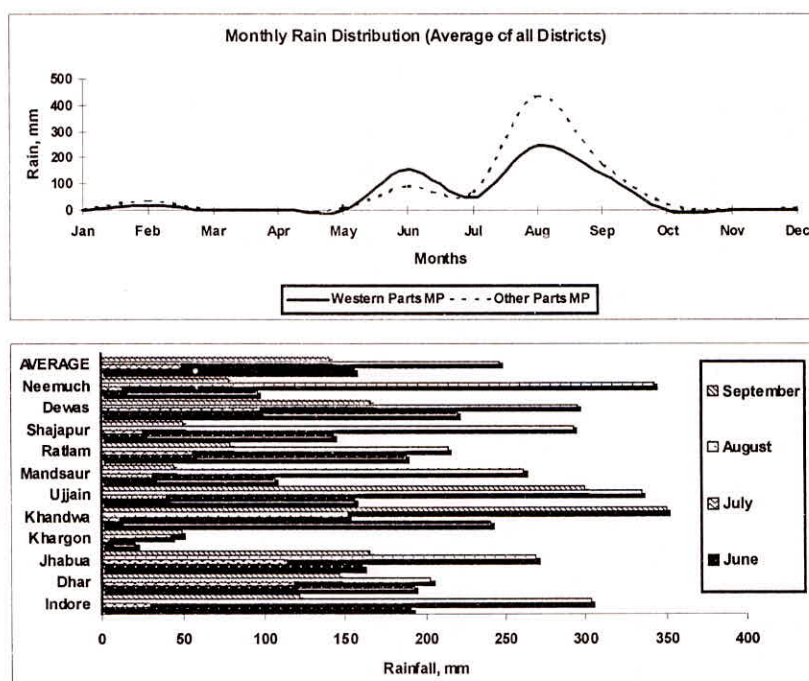


Fig. 1: Relative comparison of average monthly rains in western and other parts of MP

DELINEATED WATERSHEDS FOR WESTERN MP

MP., being the largest state in India, comprises the uplands of Central India forming a drainage divide between north, west and east flowing rivers. Most of these rivers are seasonal. Since the state is situated across a drainage divide, the terrain is undulating and water storage over natural catchments is low. Of the 14 major river systems of India, MP constitutes the

upper catchment of seven river systems. CGWB and other organizations under ministry of water resources, Govt. of India, have put up ample efforts to attempt and delineate small watersheds at micro level encompassing various rivers/basins/and other geographical boundaries within the state. Major 156 Geo-hydrological units for western region of MP are showed in Table 2.

Table 2: List of Major Natural Watersheds Delineated in Western Part of MP State

Basin	Sub Basin	Watershed	Districts Falling in Watershed	Area (Km ²)
Ganga	Chambal	Upper-Chambal	Ujjain, Ratlam, Dhar	2150
Ganga	Chambal	Middle-Chambal	Ratlam, Ujjain, Indore	1800
Ganga	Chambal	Marten	Mansuar	2560
Ganga	Chambal	Siwana	Mandsuar	2460
Ganga	Chambal	Indore-Retam	Mandsuar	2440
Ganga	Chambal	Banas	Mandsuar	520
Ganga	Chambal	Baheri-Gutab	Mandsuar	1640
Ganga	Chambal	Gambhir	Ujjain, Indore	1500
Ganga	Chambal	Shipra	Ratlam, Mandsaur, Ujjain, Indore	4620
Ganga	Chambal	Upper-Kalisind	Shajapur, Rajgarh, Dewas	3650
Ganga	Chambal	Sind	Mandsuar, Shajapur, Ujjain	2850
Ganga	Chambal	Lakhundar	Shajapur, Ujjain	2000
Ganga	Chambal	Ahu	Mandsaur, Shajapur	560
Ganga	Chambal	Lower Kalisind	Shajapur, Rajgarh	840
Ganga	Chambal	Rewan	Mandsaur	1120
Ganga	Chambal	Anjnar	Mandsaur	240
Ganga	Chambal	Newaz	Rajgarh, Shajapur, Bhopal	4900
Ganga	Chambal	Chapi-Ghani	Rajgarh,	1600
Ganga	Chambal	Upper Parbati	Bhopal, Guna, Rajgarh, Shajapur	4850
Ganga	Chambal	Ajnar Gnorapchar	Rajgarh,	1240
Ganga	Chambal	Lower Parbati	Rajgarh, Shajapur, Bhopal	2230
Narmada	Left Bank	Gorapachar	Khandwa, Hoshangabad	1380
Narmada	Left Bank	Chhota Tawa	Khandwa	3790
Narmada	Left Bank	Kaveri	Khandwa	1120
Narmada	Left Bank	Kharkia	Khargone, Khandwa	1020
Narmada	Left Bank	Kundi	Khargone	4510
Narmada	Left Bank	Barod	Khargone	1080
Narmada	Left Bank	Deb	Khargone	1780
Narmada	Left Bank	Goi	Khargone	2090
Narmada	Right Bank	Upper Narmada	Shahdol, Mandla	5370
Narmada	Right Bank	Sip-Goni	Hoshangabad, Dewas	1000
Narmada	Right Bank	Bagdi-Jamner	Dewas	980
Narmada	Right Bank	Datuni-Chuksha	Dewas	900
Narmada	Right Bank	Kheri	Dewas, Khandwa	1170
Narmada	Right Bank	Kahar-Loahar	Dewas, Indore, Khandwa	1190
Narmada	Right Bank	Choral	Khargone, Indore	1480
Narmada	Right Bank	Koram	Dhar, Khargone, Indore	1270
Narmada	Right Bank	Man	Dhar	1960
Narmada	Right Bank	Uri	Dhar	1820
Narmada	Right Bank	Hatni	Jhabua, Dhar	1960
Narmada	Right Bank	Orang	Jhabua	1180
Tapi	Tapi	Middle	Khandwa	3520
Tapi	Tapi	Sukhi	Khargone	120
Tapi	Tapi	Dathgana	Khargone	600
Tapi	Tapi	Gomai	Khargone	720
Mahi	Mahi	Anas	Jhabua, Dhar	1645
Mahi	Mahi	Pat	Ratlam	920
Mahi	Mahi	Mahi main	Jhabua, Ratlam	4380

Soils and Land Use

There exist a vast heterogeneity in terms of soil types and its qualitative parameters in different districts of the state while western MP lies in black cotton soil zone, the eastern part is typically lateritic and red soil area. The State of MP comprises a variety of soils ranging from rich clayey to gravelly. The major groups of Soils found in the State can be divided in to following 4 categories viz. Alluvial, Medium and deep black, Shallow and Medium black, Mixed red and black. A significant part of MP's geographical area is hilly and forested. Only about 47% is cultivated. Wastelands account for nearly a sixth of the state's area. More than half the wasteland is with or without scrub and about 11% is gullied and ravenous. MP accounts for about 37% of all gullied land and about 19% of country land with or without scrub. Large parts lie in the upper watershed regions, being either hilly or undulating and subject to fairly high soil erosion. In western parts of state, the agricultural intensification in recent years has led to cultivation on low quality sloping lands, forest lands, or wasteland.

Crops and Productivity

In MP state there exists wider categories of crops and cropping pattern. Once again it is the western part of the state which made an higher and significant contribution in terms of crop productivity. The state is regarded as soybean state of the country, just because of effective cropping interventions in western districts where black cotton soils delivered ample production of major crops. If we compare the area under major crops the western parts of the state encompasses area between 4.4 to 5.8 Mha during different years, being about 26 to 30% of state figures. Results shown in Figure 2 reflects relative comparison of area under major crops in western and other parts of the state, pointing 11 to 13.4 Mha area in rest of the parts of MP. Similarly comparisons of total productions and crop yields are illustrated. It is quite evident from these results that western parts of the state contributed about 23 to 33% of total production from the state. The productivity remained higher in contrast to other parts of the state, under all sort of situations comprising flood or drought scenarios (varied 8 to 46% higher than other parts in different years). This better productivity potential has attracted higher investments in terms of watershed based interventions.

CONSTRAINTS RELATED TO NATURAL RESOURCES

Rivers namely Mahi, Narmada, Tapti, Chambal, Betwa, Sone, Wainganga, Ken, and Pench originate in Madhya

Pradesh and subsequently flowing to the seven bordering states. This leads to sizable constraints pertaining to water resources. These rivers (Table 3) are the only major potential sources for irrigated lands of MP state. Estimated annual runoff from different watersheds of these river basins is about 141419 MCM, out of which it is estimated that about 56857 MCM can be harnessed for irrigation. Also the competition for water resources within the agriculture sector is severe. The irrigated area in MP has increased more than three-fold since 1986 reaching 5.4 million ha in 2000. The Natural calamities like drought, floods and hailstorms are the common feature and almost every year, one or other part of the state, is generally hit by such natural calamities. Table 4, reflects an abstract record of incidences of droughts and floods observed in state during years of last two decades. These results are self explanatory to speak that, every year is the year of one or the other natural calamities, adversely affecting crops.

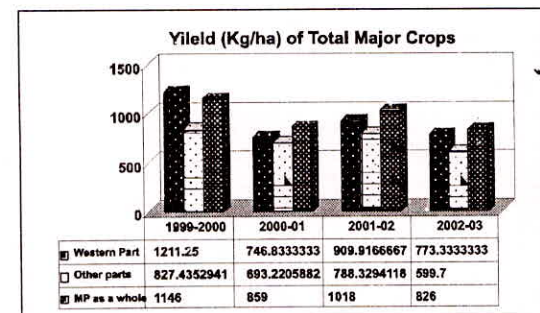
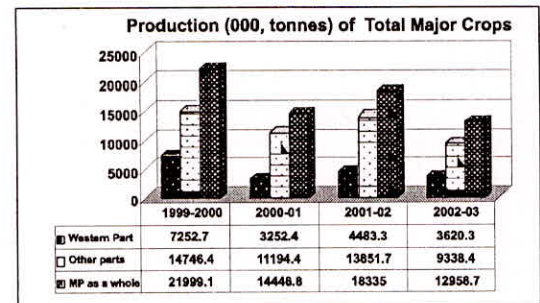
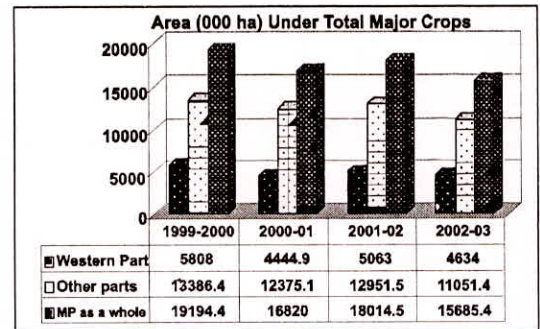


Fig. 2: Variability of area, production and yield of total major crops

Table 3: Major River Basins in the MP State

Sl. No.	River Basin	Area, M ha	Proportion of State Area (%)	Total Length (Km)
1.	Ganga	20	46	10052
2.	Narmada	9	19	4479
3.	Mahanadi	8	17	1654
4.	Godawari	6	14	2654
5.	Tapti	1	2	327
6.	Mahi	1	2	250
	Total	44	100	19496

Source: EPCO, 1996.

Table 4: Incidences of Reported Droughts (*) and Floods () in MP**

Sl. No.	Year	No of Affected Districts	No of Affected Tehsils
1.	1986-87	35*	173
2.	1987-88	30*	130
3.	1988-89	19*	133
4.	1989-90	23*	9
5.	1991-92	28*	86
6.	1992-93	9*	97
7.	1994-95	6*	28
8.	1995-96	10*	-
9.	1996-97	9*	-
10.	1997-98	30**	-
11.	1998-99	4 *, 6**	-
12.	1999-00	10*	-
13.	2000-01	20*	-

Large Dams Sites

All the 30 big dams proposed along the Narmada, Sardar Sarovar Project (SSP) and Narmada Sagar Project (NSP) are the megadams. The Maheshwar and Omkareshwar dams along with SSP and NSP, are to form a complex which would ultimately cater to the

needs of SSP. The struggle of the people of the Narmada valley against large dams has been one of the burning issue at national level. Western parts of MP state happens to be the major affected area with this controversial technological intervention, where large dams and their hydrological outputs severely affected probable positive influences of small dams or small water harvesting structures under watershed development projects.

PROGRAMS AND EXPENDITURE TOWARDS WATER AND SOIL CONSERVATION

Various programs and projects has been undertaken in the state to implement watershed based interventions whose scheme wise brief description is given below in a self explanatory tabular format.

NWDPRA Scheme

This watershed scheme is sponsored by Govt. of India. It was started in Madhya Pradesh during 8th plan in the Year 1990-91 in 385 blocks having less than 30% assured irrigated area. The total area of 385 selected watersheds was 852753 ha. About 660202 ha. area was treated against the total treatable area of 749641 ha. with an expenditure of Rs. 129.42 crores. The scheme was continued during 9th Plan and 280 new watersheds have been selected in the blocks. These watersheds encompass total geographical area of 1.393 Mha out of which arable land is 0.84 Mha is arable land and 0.29 Mha non arable land. Total treatable area was 1.1 Mha out of which area treated so far is about 0.32 Mha. From the progress made in 9th Plan period by watershed programs under NWDPRA, it is clear that out of all 45 districts of the state western parts of the state received the highest attention (Figure 3 and Table 5).

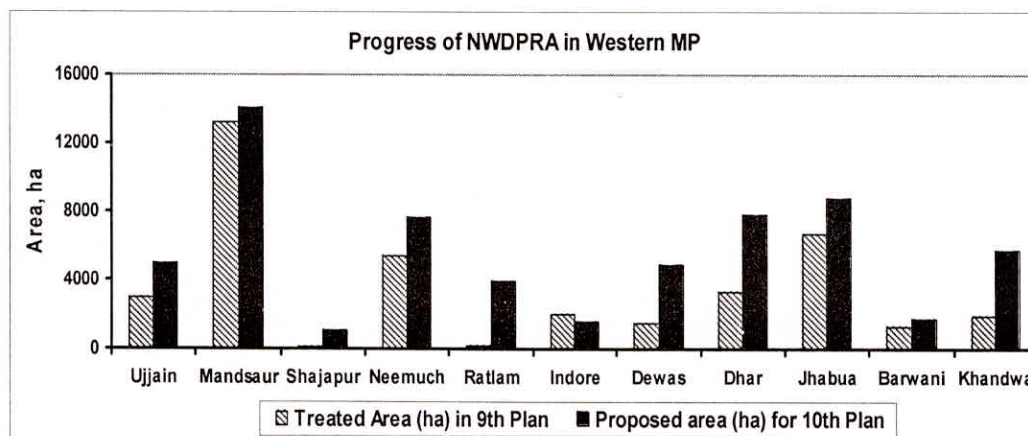


Fig. 3: Watershed Area Coverage under NWDPRA Program

Table 5: Watershed Developments and Projected Expenditure for Western Part of MP under NWDPR

Districts	Treated Area (ha) in 9 th Plan	Proposed Area (ha) for 10 th Plan	Projected Expenditures (10 th Plan)	No. of Micro Watersheds during 9 th and 10 th Plan
Ujjain	2938	4935	210.88	9
Mandsaur	13257	14072	846.35	21
Shajapur	96	1034	47.98	48
Neemuch	5374	7691	405.71	16
Ratlam	143	3938	167.23	8
Indore	2027	1567	70.53	6
Dewas	1487	4906	220.8	16
Dhar	3339	7825	342.44	19
Jhabua	6656	8781	395.07	29
Barwani	1293	1706	76.79	8
Khandwa	1928	5733	278.96	10
Khargon	1476	3318	143.15	10
Western Parts of MP	40014.0	65506.0	3205.9	200.0
Other Parts of MP	71765.0	161857.0	12213.1	431.0
Total M P	111779	227363	15419	631
% for Western Part	35.8	28.8	20.8	31.7

DPAP Scheme

DPAP was implemented in the state to tackle the special problems like severe drought conditions. The most updated status of DPAP watershed coverage in MP state (Gaur, 2006), reveals that a gross budget of Rs 26451.6 lakhs is allocated for the state (till 2005-06), encompassing 105 blocks of 23 districts. After division of state (Chhatisgarh separated out) the yearly DPAP budget allocation for MP further enhanced, even to the tune of 13 to 21% of national DPAP budget allocations. DPAP watersheds were launched in eight different batches (w.e.f 1995-96 to 2002-03) followed

by revised Haryali-I (03-04) mode. Year wise and district wise details of such DPAP projects for western part of state is provided in Table 6. Most recent progress of watershed projects under DPAP revealed that out of total 2355 watershed projects implemented (1995 to 2004) in MP state about 34% were located in western parts of the state. Year wise spectrum to this effect is reflected in Figure 4, where it is visible that relative proportion of watershed projects for this region is constantly increased after 2000, proving enhanced attention towards these districts. Consolidated district wise progress is presented through Tables 6 to 8, which is self informative.

Table 6: Drought Prone Areas Programme (DPAP) in the Program Districts of Western M P

Batch	Number of Projects Sanctioned									Total
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Haryali	
District/Year	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	
Due Installments	7	7	7	7	6	5	4	3	1	
Badwani		0	0	0		38(6)	12(4)	18(3)	18(1)	86
Dewas	17(7)	0	0	0		27(5)	6(5)	9(3)	9(2)	68
Dhar	39(7)	0	0	0		45(6)	16(3)	24(3)	24(1)	148
Jhabua	54(7)	0	0	0	54(7)	7(4)	24(5)	36(3)	36(2)	211
Khandwa	27(7)	0	0	0		35(6)	10(3)	15(3)	15(1)	102
Khargone	51(7)	0	0	0		38(6)	10(3)	15(3)	15(2)	129
Ratlam	5(7)	0	0	0	5(7)	4(5)	2(3)	3(2)	3(2)	22

(Note: 1. A Watershed Project is of an average size of 500 hectares; 2. The total Project cost is released in 7 installments over a period of 5 years; 3. Figures in bracket indicate the number of installments claimed)

Table 7: Financial Progress (Rs in Lakhs): DPAP Hariyali - II for the year 2004–2005

District	Total No. of Project	Total Project Area (Ha)	Total Project Cost	Total Available Fund	Exp. (up to Jan., 05)
Badwani	18	9000	540	81	0
Dewas	9	4500	270	40.5	100
Dhar	24	12000	720	108	0
Jhabua	36	18000	1080	162	33.86
Khandwa	15	7500	450	67.5	0.87
Khargone	15	7500	450	67.5	0
Ratlam	3	1500	90	13.5	0
Shajapur	6	3000	180	27	0
Western Parts MP	126	63000	3780	567	134.73
Other parts MP	143	71500	4290	644.65	101.05
Total MP State	269	134500	8070	1211.65	235.78
%	46.8	46.8	46.8	46.8	57.1

(Sanction Yr: 2004–05; Project Period: 04–05 to 09–10; Cost per ha. @Rs. 6000 about Rs. 30 lakhs/watershed)

Table 8: Financial Progress: DPAP Hariyali - III for the year 2005–2006 – Nov. 2005

District	No. of Project	Project Area (Ha)	Project Cost	Available Fund
Badwani	21	10500	630	94.5
Dewas	10	5000	300	45
Dhar	28	14000	840	126
Jhabua	41	20500	1230	184.5
Khandwa	17	8500	510	76.5
Khargone	17	8500	510	76.5
Ratlam	4	2000	120	18
Shajapur	7	3500	210	31.5
Total Western Parts	145	72500	4350	652.5
Total other parts	165	82500	4950	742.5
Total MP State	310	155000	9300	1395
% for Western Parts	47	47	47	47

(Yr of Sanction: 2004–05; Project Period: 2004–05 to 09–10; Cost per ha. @Rs. 6000 about Rs. 30.00 lakhs per watershed)

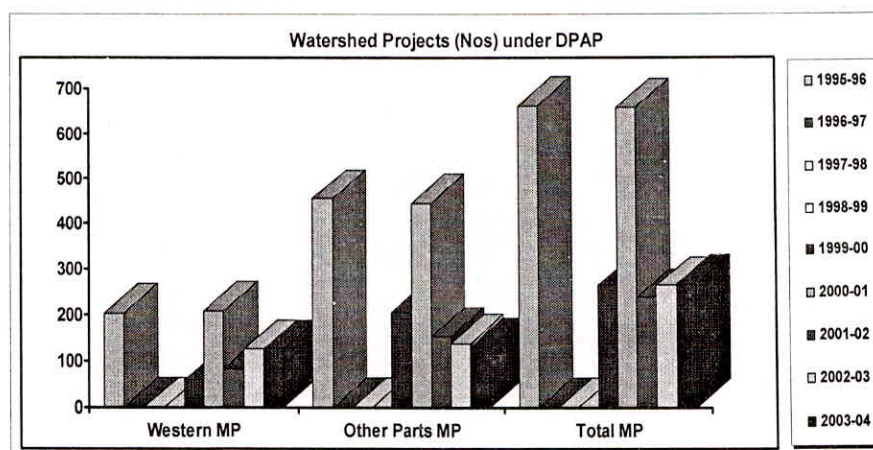
**Fig. 4: Comparisons of DPAP Watershed Projects in Madhya Pradesh**

Table 9: Statement Showing Total Area and Release of Funds under IWDP (Up to 05/2005)

<i>District/ Region</i>	<i>Total Area (ha.)</i>	<i>Total Cost (Rs. lakhs)</i>	<i>Total Released Funds (1992-93 to 2005-06) (Rs. lakhs)</i>
Indore	5816	336	70
Jhabua	11155	582	246
Ujjain	11986	579	454
Dhar	3000	185	116
Neemuch	19571	1034	708
Shajapur	9562	574	309
Ratlam	12382	743	407
Baewani	6484	389	266
Mandsaur	7232	434	178
Dhar	5708	342	233
Khargon	5000	300	123
<i>Total Western parts</i>	<i>97896</i>	<i>5498</i>	<i>3110</i>
<i>Total other parts</i>	<i>402380</i>	<i>21315</i>	<i>11568</i>
<i>Total MP</i>	<i>500275</i>	<i>26813</i>	<i>14678</i>
<i>%</i>	<i>20</i>	<i>21</i>	<i>21</i>

IWDP Scheme

The program was implemented in the state as a 100% Central Sector scheme. The cost norm was initially kept as Rs.4000 per hectare. IWDP is aimed towards improving productivity of land and poverty alleviation through generation of employment in the rural areas, active participation of people at all stages in the development of wastelands. The main objectives of the program were to develop wastelands based on village and micro-watershed, watershed plans, to promote overall economic development and improving the socio-economic conditions. The western part of the state has got sizeable share (to the tune of about 21%), and covered an area of about 0.097 Mha in contrast to about 0.5 Mha total coverage of the state. The district wise area and released funds are reflected below in Table 9, which are self explanatory to depicts the importance of non arable lands in the region.

RVP and FPR Scheme

MP encompasses sizeable area under centrally sponsored programs for River Valley Projects (RVP) and treatment in catchments of Flood Prone Rivers. RVP programs are in operation in four major river catchments namely Chambal, Mahi, Tawa, and Matatila, out of which two happens to be in western part. Initiative was taken in the state by involving departments like agriculture and forest. In all about 29 micro watersheds were adopted in the state for soil and water conservations activities covering 59780 ha area, out of which till now an area of about 22887 ha

has been treated. Similarly for Flood prone rivers area, about 9 micro watersheds were adopted in the state. Further details pertaining to micro watershed adopted and overall targets/achievements in physical and financial terms are presented in Table 10.

RGMWM Scheme

Rajiv Gandhi Mission on Watershed Development was started in October, 1994. A number of watersheds have been taken up under the schemes of EAS, DPAP, IWDP and IJRY. The Mission during last 10 years has grown to be the country's largest watershed management program covering 7600 villages. SWC works on 14.26 lakh hectares have been successfully completed, and work is in progress in the remaining 20.12 lakh hectares. In terms of agricultural production, there has been 34% increase in Kharif area and 37% increase in project villages. There has been 16% increase in Rabi area and 30% increase in Rabi production in project villages. There has been 59% increase in irrigated area and 34% decrease in wasteland area in the area where Mission has worked. 52311 hectares have come under fodder cultivation with a production of 37051 MT. Fuel wood cultivation is undertaken in 74711 hectares and Horticultural crops cover 23,579 hectares. 3294 villages have reported increase in ground water table. The state level crisis of wide-spread drought of 2001 was sought to be converted into an opportunity by the Government to take the message of water harvesting to all villages through the Pani Roko Abhiyan. In the operation between January-June 2001, over 7,06,334

Table 10: Over all Progress of RVP/FPR Schemes in Madhya Pradesh

S. No.	Catchment	Sub Divisions	MWS	Sanctioned by GOI			Progress till 03/2003		
				Phy	Stru	Fin	Phy	Stru	Fin
RVP									
1.	Chambal	Mahidpur	4	12353	3012	337.6	6957	1965	153.4
		Mandsaur	2	4084	3215	266.7	2074	1691	136.7
		Jaora	2	3734	1182	170.7	1530	808	93.9
		Ratlam	1	768	266	39	221	79	8.1
		TOTAL	9	20939	7675	814.0	10782	4543	392.2
2.	Mahi	Ratlam	5	7560	1583	321.9	3737	577	126.9
3.	Tawa	Hoshangabad	3	8788	1855	485.2	2651	732	104.5
4.	MataTila	Vidisha	7	10993	2028	438.2	3629	929	141.8
		Mungawali	4	10690	1881	647.2	1590	212	66.9
		Raisen	1	900	187	28.5	498	71	7.7
		Total	12	22583	4096	1113.9	5717	1212	216.4
Total - RVP			29	59870	15209	2735	22887	7064	840.0
FPR									
1	Sone	Umaria	4	8104	3426	396.5	1335	293	77.89
		Shahdol	2	2775	549	55.41	2475	435	45.37
		Anup Pur	3	5527	1519	311.58	1473	246	78.92
		Total	9	16406	5494	763.5	5283	974	202.2
Total - FPR			9	16406	5494	763.5	5283	974	202.2
Grand Total RVP + FPR			38	76276	20703	3498.5	28170	8038	1042.2

structures came up. Out of Rs.415 crores spent on this campaign, community contribution was as high as Rs. 99 crores. People of Madhya Pradesh responded to the campaign in an overwhelming manner prompting the government to refashion the Mission and inbuilt this as a second track or the new generation of the Mission. A recent update of overall coverage of watershed mission in western parts of MP state is illustrated in below given Table 11, where it is shown that about 32% of total projects again remained located in this region with an expenditure outlay as high as 47% of totally allocated for the state. Again western districts are distinctly seen as more preferable locations for watershed projects.

International/Bi Lateral Programs/NGOs

Under Internationally supported programs on watershed management, two specific schemes were of prime nature. One was the Indo-Danish collaborative watershed project and another one being TATA-ICRISAT-ICAR joint watershed project. Though these projects are covering only a few districts in the state but fortunately again these project remained concentrated in three western districts of Madhya Pradesh State, namely Dhar, Jhabua and Ratlam. After popularization

of watershed programs, several NGOs have also come forward to under take these activities. Most of such NGOs preferred western MP as their most preferred work area.

Table 11: Overall Coverage under Rajiv Gandhi Watershed Mission

Districts/Region	Total No. of Projects	Allocated Expenditure (Rs Lakhs)
Dhar	10	720
Khandwa	8	450
Khargon	7	450
Jhabua	13	1080
Indore	4	0
Barwani	7	540
Mandsaur	7	0
Ratlam	6	90
Shajapur	8	180
Ujjain	6	0
Dewas	6	270
Neemach	3	0
Western MP	85	3780
Total MP	269	8070
%	31.6	46.8

CONCLUSIONS

MP, being the largest state in India, comprises uplands of central India forming a drainage divide between north, west and east flowing seasonal rivers. A preliminary delineation of micro watersheds based on natural drainage networks is presented for western districts of the state. It revealed that in western parts of state there exists 5 basins, 12 sub basins, and about 154 natural watersheds. Prevailing constraints pertaining to natural resource management in the region are described. An update scenario of watershed based developmental works under different schemes is presented for western parts of the state. Also efforts have been made to relatively quantify targets and achievement under leading watershed programs like DPAP, IWDP, NWDPR, RGMWM etc. Under DPAP watershed scheme (implemented in 23 districts of state, 2355 watershed projects) about 34% were located in western parts of the state. Year wise spectrum of their coverage and progress is presented. Under IWDP program the western part of the state has got sizeable share (to the tune of about 21%), and covered an area of about 0.097 Mha area in contrast to about 0.5 Mha total coverage of the state. Under RGMWM, the Mission during last 10 years has grown to be the country's largest watershed management program covering 7600 villages. SWC works on 14.26 lakh hectares have been successfully completed, and work is in progress in the remaining 20.12 lakh hectares. During current five year plan it is shown that about 32% of total projects remained located in western with an expenditure outlay as high as 47% of totally allocated for the state. This way the western

districts are clearly seen as more preferable locations for watershed projects in the state.

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