ADOPTION OF WATERSHED TECHNOLOGY BY THE BENEFICIARY AND NON-BENEFICIARY FARMERS OF NWDPRA

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The agricultural production of the Rajasthan State is mainly depend upon monsoon rain. Rainfall in Rajasthan generally remains abnormal being irregular, scanty, untimely, unevenly distributed with prolonged drought periods. The natural resources like soil, water, and vegetation of the state are under tremendous stress due to ever increasing biotic pressures, pollution, deforestation, sand dune shifting, land degradation, lowering of water table, continuous drought, prevalence of unemployment and poverty problems. The water resources of the Rajasthan state are very much limited and meagre compromising only one percent of the national gross water resources. In Rajasthan state out of 342 lac hectares of total geographical area 155 lac hectare area is under cultivation. Out of this cultivated area 78 per cent area is under rainfed and only 22 per cent cultivated area is irrigated of which nearly two third is dependent on ground water resources such as wells tubewells etc. (Vital Agriculture Statistics, 2000-2001). Treatment of the rainfed area on watershed basis, therefore, important for optimum use of available rain water through soil and water conservation measures. Thus the optimal management of soil and water resources with minimal adverse environmental impact is essential not only for sustainable development but also for human survival. Realizing the importance of rainfed/dryland agriculture, the National Watershed Development Project for Rainfed Areas (NWDPRA) was started in 1986 by Government of India and restructured NWDPRA was started in Rajasthan in 1991.

Success of any rural development programme depends on degree of involvement of the people in the programme and at what extent it was adopted by the people. Keeping in view the study "Adoption of watershed technology by the beneficiary farmers and non-beneficiary farmers of NWDPRA" was under taken with the specific objective :

To measure the extent of adoption of watershed technology by the beneficiary and non-beneficiary farmers of National Watershed Development Project for Rainfed Aeas.

METHODOLOGY

Rajasthan state was comprised of six watershed regions, Jaipur region, where the researcher belongs, was chosen for the study. Jaipur region was comprised of four watershed divisions viz., Bharatpur, Jaipur, Jhunjhunu and Sikar. Out of these four, Jaipur, Jhunjhunu and Sikar divisions were selected purposely as having the similar soil, moisture conservation and cultivation practices. These three watershed divisions were comprised of seven watershed district from which Churu, Jaipur, Jhunjhunu and Sikar districts were selected purposely as having comparatively higher number of watersheds with similar soil moisture conservation and cultivation practices. Two watersheds from each selected district were selected randomly by using lottery method.

Total number of eight watersheds from four selected watershed districts was selected randomly. Twenty beneficiary farmers from each selected watershed was selected randomly and total number of selected beneficiary farmers (BFs) were 160. The equal number of non-beneficiaryfarmers (NBFs) were also selected from non watershed areas. Thus, total sample size of respondents in the study was 320 farmers (160 BFs and 160 NBFs). The BFs were those who were benefited under the project and NBFs were those farmers who were not benefited under NWDPRA.

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RESULTS AND DISCUSSION

The data in this regard are presented in Table 1. It is evident from Table 1 that 65 per cent BFs were medium adopter whereas 19.38 and 15.62 per cent of the BFs were low and high adopters of watershed technology, respectively. Thus majority of BFs were found to be medium adopters of watershed technology. Hence, it could be concluded that majority of the BFs were medium adopters of watershed technology .

Table 1. Extent of adoption of BFs and NBFs of NWDPRA about watershed technology

Category of respondents	Extent of adoption	No. of respondents	%	Standard deviation	Mean index
BFs(N=160)					
	Low (<20)	31	19.38	8.42	28.42
	Medium (20-36.84)	104	65.00		
	High (>36.84)	25	15.62		
NBFs(N=160)					
	Low (<16.82)	62	38.75	7.64	24.46
	Medium (16.82-32.1)	81	50.62		
	High (>32.1)	17	10.63		

In case of NBFs 50.62, 38.75 and 10.63 per cent were medium, low and high adopters of watershed technology, respectively. Thus majority of NBFs were also found to be medium adopters of watershed technology. Hence, it could be concluded that majority of NBFs were medium adopters. It is also evident from Table 1 that the BFs had adopted more of watershed technology over their contemporaries NBFs as indicated by their comparative mean index i.e. 28.42 and 24.46 respectively.

This finding is in conformity with the findings of Padamaiah (1996), Naik and Jayaramaiah (1997) and Chaturvedi (1999). This contradicts the findings of Mishra (1996).

Technologywise extent of adoption of watershed technology.

To explore the technologywise (Practicewise) extent of adoption of watershed technology, thirty practices of watershed technology i.e. eleven practices related conservation technology and nineteen practices related to production technology scrutinized by the experts were considered. The practice wise scores (as standardized mean score) were assigned to each adopted practice making a total of 100. On the basis of the practicewise scores obtained by the respondents by adopting particular practice, the mean scores were worked out for all the practices of conservation and production technology.

Table 2. Technologywise extent of adoption of BFs and NBFs of NWDPRA about soil and water conservation technology (per cent)

S. No.	Name of technology	PS	Category of respondents					
			BFs (N=160)			NBFs (N=160)		
			MS	%	R	MS	%	R
1.	Contour farming	5	542.31	67.79	I	493.65	61.74	I
2.	Contour vegetative hedges	2	116.2	14.53	IV	92.75	11.59	V
3.	Tillage practices	4	453.25	56.66	II	418.8	52.35	II
4.	Contour bunding	4	225.99	28.25	III	196.8	24.6	III
5.	Gully control measures	3	110.19	13.77	V	98.7	12.34	IV
6.	Live fencing	2	64.54	8.07	VII	49.32	6.17	VII
7.	Ditch cum bund fencing	3	91.23	11.40	VI	64.8	8.10	VI
8.	Check dams at upper reaches	3	37.17	4.65	VIII	28.17	3.52	VII
9.	Check dams at middle reaches	3	33.51	4.19	IX	20.68	2.58	IX
10.	Water erosion control measures at lower reaches	3	32.90	4.11	X	18.36	2.30	XI
11.	Pasture development	3	31.18	3.90	XI	20.01	2.50	X
	Total (A)	**35**						

PS= Possible score, MS= Mean score, R= Rank,

The mean scores were further converted in to percentages for all the 30 practices. The ranks were assigned to each conservation technology adopted by BFs and NBFs. Similarly, the ranks were also assigned to each practice of production technology adopted by BFs and NBFs. The overall mean percentages obtained by BFs and NBFs were 28.70 and 24.37 respectively. These mean percentages were considered for distinguishing more or less adopted practices. The results in this regard are presented in Table 2.

It is evident from the results in Table 2 indicate that out of eleven practices of conservation technology, contour farming adopted by BFs was occupied the highest position (67.79%), hence it was ranked first. The second and third ranked positions were occupied by tillage practices (56.66%) and contour bunding (28.25%), respectively. Similarly, intercultural operations (38.51%), use of organic matters (32.5%), fertilizer management (28.71%), contour bunding (28.25%), sowing of cover crops (27.27%), used of seed rate (27.02%) and agro-forestry practices (22.52%) were occupied the fourth, fifth, sixth, seventh, eighth, ninth and tenth ranked positions, respectively. The last eleventh rank was awarded to pasture development (3.9%).

It could be concluded at majority of BFs had adopted contour farming was followed by tillage practices, contour bunding, contour vegetative hedges, gully control measures.

High adoption of contour farming might be due to the fact that the respondent farmers might be more cautious to check soil erosion of sloppy land through sowing of crops across the slope.

It may also be concluded that the lowest adoption was of the pasture development. This might have occurred due to the fact that low rainfall and scarcity of ground water for irrigation might have discouraged the BFs to developed pasture land. Other reason might be that the pasture area destroyed by stray animals which might have not compelled to take care of it.

Similar trends with regard to adoption of conservation technology by NBFs were observed except for the practice of gully control measures (12.34%) and contour vegetative hedges (11.59%) which showed slight variation from BFs.

The data in Table 3 reveal that crop rotation practice adopted by BFs was occupied the highest (47.09%) position among 19 practices o production technology, hence, it was ranked first. The second rank was assigned to inter-culture operations (38.51%). Third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, fifteenth, sixteenth, seventeenth and eighteenth ranks were assigned to use of organic matters (32.50%), fertilizer management (28.71%), Sowing of cover crops (27.27%), seed rate/planting distance (27.02%) agro-forestry practices (22.52%), house hold production system (18.14%), mixed/inter-cropping (15.32%), sowing of short duration high yielding varieties (13.99%), health care of animals (13.73%),

Table :3 Technologywise extent of adoption of BFs and NBFs of NWDPRA about production technology (per cent)

S No.	Name of technology	PS	Category of respondents					
			BFs (N=160)			NBFs (N=160)		
			MS	%	R	MS	%	R
1.	Scheduling of harvested water for irrigation	3	7.41	0.93	XIX	4.83	0.6	XIX
2.	Agro-forestry practices	3	180.15	22.52	VII	156.34	19.54	VII
3.	Mixed/inter cropping	3	122.52	15.32	IX	103.8	12.98	IX
4.	Crop rotation	4	376.75	47.09	I	346.00	43.25	I
5.	Use of organic matters	2	260.01	32.50	III	231.84	28.98	III
6.	Soil testing	3	36.87	4.61	XVIII	23.91	2.99	XVIII
7.	Fertilizer management	3	229.67	28.71	IV	200.1	25.01	IV
8.	Plant protection measures	5	95.41	11.93	XIII	74.1	9.26	XIII
9.	Inter-culture operations	3	308.07	38.51	II	263.9	32.99	II
10.	Sowing of cover crops	3	218.14	27.27	V	183.6	22.95	VI
11.	Mulching	5	80.20	10.03	XVI	59.6	7.45	XVII
12.	Sowing of short duration, high yielding varieties	4	111.90	13.99	X	86.75	10.84	X
13.	Seed rate/ planting density	3	216.18	27.02	VI	185.11	23.14	V
14.	Mid season correction	4	78.62	9.93	XVII	62.3	7.79	XVI
15.	House hold production system	3	145.13	18.14	VIII	118.5	14.81	VIII
16.	Breed improvement through artificial insemination	3	84.50	10.56	XV	63.3	7.91	XV
17.	Castration of scrub bulls	3	100.790	12.60	XII	76.1	9.51	XII
18.	Green fodder production	4	92.60	11.58	XIV	72.2	9.03	XIV
19.	Health care of animals	4	109.84	13.73	XI	84.5	10.56	XI
	Total (B)	**65**		**28.70**			**24.37**	
	Grand total(A+B)	**100**						

PS= Possible score, MS= Mean score, R= Rank

castration of scrub bulls (12.60%), plant protection measures (11.93%), green fodder production (11.58%), breed improvement through A.I. (10.56%), mulching (10.03%), mid season correction (9.93%) and soil testing (4.61%), respectively. The last rank was awarded to scheduling of harvested water for irrigation (0.93%).

It could be concluded that majority of the BFs were conducted crop rotation practices, followed by inter-culture operations, use of organic matter and fertilizer management. High adoption of crop rotation by BFs might be due to the fact that they might have knowledge, understanding and imp ortance of the crop rotation. It may also be concluded that lowest adoption was of the scheduling of harvested water for irrigation. This might have occurred due to the fact that scarcity of ground water, lack of irrigation facilities and rainfall was very low, erratic and scanty which might have not compelled them to schedule the harvested water for irrigation purposes. Similar trends with regard to adoption of NBFs were observed except for the practices numbered 10, 11 and 13 which showed a slight variation from the BFs.

It could be concluded that in general BFs and NBFs had almost similar priorities in their ranks of adoption of watershed technology. However, as shown in Table 2 and 3 they differed appreciably in their aggregate extent of adoption. Although it needs to raise the adoption of all the practices of watershed technology but special attention was needed to raise the adoption of breed improvement through A.I., mulching, mid-season correction, live fencing, check dams at upper reaches, soil testing, checks dams at middle reaches, water erosion control measures at lower reaches and pasture development need concentration of efforts as they secured lower ranks. Because these practices are complicated in nature hence need special knowledge and skills which the respondents might be lacking.

This finding is in accordance with the findings of Ingle and Kude (1991), Undirwade *et al* (1991) and Mishra (1996).

CONCLUSION

Based on they study following conclusions were emerged :

1. Majority of the BFs (65%) and NBFs (50.62%) were medium adopters of watershed technology whereas 19.38 per cent and 15.62 per cent of BFs, 38.75 per cent and 10.63 per cent of NBFs were low and medium adopters of watershed technology, respectively. BFs had adopted more of watershed technology as compared to NBFs.

2. According of technologywise, almost all the BFs and NBFs had adopted the contour farming practices followed by tillage practices, crop rotation, interculture operations.

3. Conservation technology was adopted by 9.48 per cent and 8.15 per cent BFs and NBFs whereas production technology was adopted by 18.86 per cent and 16.22 BFs and NBFs, respectively. Overall adoption of watershed technology by BFs and NBFs was 28.71 per cent and 24.37 per cent, respectively. BFs had higher extent of adoption than NBFs.

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