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Research Article

Role of Farm Women in Soil Conservation & Land Management Activities and Irrigation Water Management Activities in Bikaner District of Rajasthan

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ABSTRACT

Bikaner is one of desert district situated in the north-west of Rajasthan. The district has a dry climate with large variation of temperature and scanty rainfall. A total of four blocks were selected purposively (Bikaner and Lunkaransar blocks-irrigated area, Nokha and Sridungargarh blocks-rainfed area). One-gram panchayat from each block selected (lottery method of sampling). Two villages from each gram panchayat selected (total 8 villages). The role scale has been developed by the researcher to measure the role of farm women in soil conservation and land management activities and irrigation water management activities. The findings of the study showed that in rainfed area, more than half i.e. 56.90 per cent of the respondents belonged to young age group, other backward caste (50%), illiterate (60 per cent), low extent of social participation (66.90%), medium level of mass media exposure (68.10%), low extension personnel contact (64.40 per cent), low level of scientific orientation (56.90 %), low level of innovativeness (70.60%) towards natural resource management and low level of risk orientation (71.90%). In irrigated area, farm women had performed high role in soil conservation and land management activities whereas, in rainfed area, farm women had performed low role in irrigation water management. It can be concluded that farm women of irrigated area were performed high role in soil conservation & land management activities as there was facility of Indira Gandhi canal which helps them in maintenance of land and conserving the soil and farm women of rainfed area were performed low role in irrigation water management activities. The farm women of rainfed area were not performing the activities of handlings drip and sprinkler irrigation machines (Tanks/sub tanks) due to lack of training.

Keywords: *Land Management, Soil Conservation, Role, Scale, Farm women, Irrigation.*

INTRODUCTION

Bikaner is one of desert district situated in the north-west of Rajasthan. The district has a geographical area 30382.15Sq.Km. which is around 8.8 percent of the total area of the state and stands at second place area wise in the state after the Jaisalmer.

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The district has a dry climate with large variation of temperature and scanty rainfall. Hot winds blow in summer, sweeping away and creating new sand- dunes. The normal annual rainfall in the district is 26°3 cms.

The vegetation of Bikaner district fall under the broad natural divisions of tropical forest. Bikaner due to extremely low rainfall and extreme of temperature there is high evaporation and loss Moisture, converting the district into a typical arid track. Most of the time, Bikaner district have always faced shortage of water resources because of its arid climate which affects the quality of other natural resources such as livestock, soil, vegetation etc.

Soil is an animated top layer of the earth's crust composed of various materials such as minerals, organic matter, soil water, and soil air. Soils differ in thickness, structure, texture and their genetic processes. This resource is responsible for the production of crops.

Water resources are potentially useful natural resources of water. 97% of the water on the earth is saline water and only 3% is fresh water. Just over two-thirds of the glaciers and polar ice caps are frozen. The remaining unfrozen fresh water is mainly found in groundwater and is only partially present on land or in the air. The use of water includes agriculture, industry, home, recreation and environmental activities. All living things require water for growing and breeding.

A farm woman is one of the important or key users of natural resources such as soil and water. A farm woman does most of the agricultural operations with a man or sometimes more than a man. Thus, this study showed the role of farm women in soil conservation & land management and irrigation water management activities in Bikaner district of Rajasthan.

MATERIALS AND METHODS

The present study was conducted in Bikaner district of Rajasthan. There were seven blocks in Bikaner district. These were namely – Bikaner, Khajuwala, Kolayat, Lunkaransar, Nokha, Sridungargarh and Panchu. A total of four blocks were selected purposively for the study in which Bikaner and Lunkaransar blocks were selected under irrigated area because of prevailing Indira Gandhi Canal or Rajasthan Canal irrigation project whereas under rainfed area (other than canal irrigation or without canal irrigation source) Nokha and Sridungargarh blocks were selected for the present study. One-gram panchayat from each selected block had taken through lottery method of sampling.

Thus, a total of four gram panchayats were selected for the study. Two villages from each gram panchayat were selected by simple random sampling method. Hence, a total of eight villages were selected for the present study purpose. A total of 320 (farm women) sample size has been selected for the present study out of total population of farm women in Bikaner district. The role scale has been developed by the researcher to measure the role of farm women in soil conservation & land management activities and irrigation water management activities.

RESULTS & DISCUSSION

1. General profile of the farm women

The general profile of farm women was presented as follows:

(I) Age

The data in Table 1 revealed that in rainfed area, more than half of the respondents i.e. 56.90 per cent belonged to young age group followed by 25 per cent of the respondents belonged to middle age and 18.10 per cent of the respondents were belonged to old age.

Table 1: Distribution of respondents according to their age (n=320)

S.No.	Age	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Young age(18 – 35 years)	91 (56.90)	84 (52.50)
2	Middle age(36 – 55 years)	40 (25.00)	50 (31.30)
3	Old age(› 56 years)	29 (18.10)	26 (16.30)

Number in parenthesis indicates percentage

In irrigated area, slightly more than half the respondents (52.50%) belonged to young age group followed by 31.30 per cent belonged to middle age and 16.30 per cent of farm women belonged to old age.

(II) Caste

Table 2 showed the distribution of respondents according to their caste. It was found that in rainfed area, exactly half of the respondents (50%) belonged to other backward caste followed by 30.60 per cent belonged to general caste and 19.40 per cent of the respondents belonged to SC/ST.

Table 2: Distribution of respondents according to their caste (n=320)

S.No.	Caste	Rainfed Area (n=160)	Irrigated Area (n=160)
1	SC/ST	31 (19.40)	37 (23.10)
2	Other backward caste	80 (50.00)	66 (41.30)
3	General	46 (30.60)	57 (35.60)

Number in parenthesis indicates percentage

In irrigated area, 41.30 per cent of farm women belonged to other backward caste followed by 35.60 per cent belonged to general caste and 23.10 per cent of respondents belonged to SC/ST caste.

(III) Education

Table 3 presented the distribution of respondents according to their education. It is evident from the data that in rainfed area, more than half of the respondents (60%) were illiterate followed by 28.80 per cent of respondents who had primary level of education. Further, it was noticed that 8.80 per cent of respondents had middle level of education and only 2.50 per cent of respondents had high level of school education.

Table 3: Distribution of respondents according to their education (n=320)

S.No.	Education	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Illiterate (0)	96 (60.00)	90 (56.30)
3	Primary (1-5)	46 (28.80)	57 (35.60)
4	Middle (6-8)	14 (8.80)	13 (8.10)
5	High school (10)	04 (2.50)	0 (0.00)
6	Intermediate(12)	0 (0.00)	0 (0.00)
7	Degree(>12)	0 (0.00)	0 (0.00)

Number in parenthesis indicates percentage

It was also revealed from Table 3 that in irrigated area, more than half of the respondents (56.30%) were illiterate followed by 35.60 per cent of the respondents had primary level of education and only 8.10 per cent of the respondents had middle level of education.

(IV)Family size

It was evident from Table 4 that in irrigated area, majority of respondents (73.80%) had medium family size followed by 18.10 per cent had large family size and very few of the respondents (8.10%) had small family size.

Table 4: Distribution of respondents according to their family size (n=320)

S.No.	Family size	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Small(1-4 members)	27 (16.90)	13 (8.10)
2	Medium (5-8 members)	79 (49.40)	118 (73.80)
3	Large(> 8 members)	54 (33.80)	29 (18.10)

Number in parenthesis indicates percentage

In rainfed area, almost half of the respondents (49.40%) had medium family size followed by 33.80 per cent of farm women had large family size and 16.90 per cent of the respondents had small family size.

(V) Family type

It was apparent from Table 5 that in irrigated area, most of the respondents (91.90%) belonged to joint family type followed by 8.10 per cent of respondents belonged to nuclear family type.

Table 5: Distribution of respondents according to their family type (n=320)

S.No.	Family Type	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Nuclear family	27 (16.90)	13 (8.10)
2	Joint family	133 (83.10)	147 (91.90)

Number in parenthesis indicates percentage

In rainfed area also, most of the respondents (83.10%) were belonged to joint family type followed by 16.90 per cent of farm women belonged to nuclear family type.

(VI) Social participation

As revealed from the data presented in Table 6 in rainfed area, 66.90 per cent of the respondents had low extent of social participation followed by 26.90 per cent of the respondents had medium social participation and only 6.30 per cent of farm women had high social participation.

Table 6: Distribution of respondents according to their social participation (n=320)

Extent of Social Participation	Score Range	Rainfed area (n=160)		Irrigated area (n=160)	
		f	%	f	%
Low	8 and less	107	66.90	94	58.80
Medium	9 to 11	43	26.90	43	26.90
High	12 and above	10	6.30	23	14.40

In irrigated area, farm women had low extent of social participation (58.80%) followed by medium social participation (26.90%) and high social participation (14.40%).

(VII) Sources of information

The data presented in Table 7 showed that in irrigated area, 63.80 per cent of respondents had medium level of utilization of sources of information followed by low level of utilization of sources of information (23.10%) and high level of utilization of sources of information (13.10%).

Table 7: Distribution of respondents according to their utilization of sources of information (n=320)

Level of utilization of source information	Score Range	Rainfed area (n=160)		Irrigated area (n=160)	
		f	%	f	%
Low	7 and less	54	33.80	37	23.10
Medium	8-9	63	39.40	102	63.80
High	10 and above	43	26.90	21	13.10

In rainfed area, 39.40 per cent of the respondents had medium level of utilization of sources of information followed by 33.80 per cent of the respondents had low level of utilization of sources of information and 26.90 per cent of farm women high level of utilization of sources of information.

(VIII) Mass media exposure

Table 8 depicted the distribution of respondents according to their mass media exposure. It was found that in rainfed area near majority of respondents (68.10%) had medium level of mass media exposure followed by 28.10 per cent of the respondents had low mass.

Table 8: Distribution of respondents according to their mass media exposure (n=320)

Mass Media Exposure	Score Range	Rainfed area (n=160)		Irrigated area (n=160)	
		f	%	f	%
Low	4 and less	45	28.10	64	40.00
Medium	5	109	68.10	83	51.90
High	6 and above	06	3.80	13	8.10

Exposure and only 3.80 per cent of respondents had high mass media exposure. In irrigated area, slightly more than half of the respondents (51.90%) had medium mass media exposure followed by low mass media exposure (40%) and high mass media exposure (8.10%).

(IX) Extension personnel contact

The extension personnel contact of the farm women was studied and data are arranged in Table 9 and it showed that in rainfed area, 64.40 per cent of farm women had low extension personnel contact followed by medium extension personnel contact (18.10%) and high extension personnel contact (17.50%).

Table 9: Distribution of respondents according to their extension personnel contact (n=320)

Extension personnel contact	Score Range	Rainfed area (n=160)		Irrigated area (n=160)	
		f	%	f	%
Low	14 and less	103	64.40	86	53.80
Medium	15-17	29	18.10	67	41.90
High	18 and above	28	17.50	07	04.40

In irrigated area, more than half of farm women (53.80%) had low extension personnel contact followed by medium extension personnel contact (41.90%) & high extension personnel contact (4.40%).

(X) Cosmopoliteness

The cosmopoliteness of the farm women was studied and data was presented in Table 10 and it showed that in rainfed area, more than half of the respondents (54.40%) had medium level of cosmopoliteness followed by 39.40 per cent of the respondents had high cosmopoliteness and 6.30 per cent of respondents had low cosmopoliteness.

Table 10: Distribution of respondents according to their cosmopoliteness (n=320)

Cosmopoliteness	Score Range	Rainfed area (n=160)		Irrigated area (n=160)	
		f	%	f	%
Low	8 and less	10	6.30	29	18.10
Medium	9 to 11	87	54.40	74	46.30
High	12 and above	63	39.40	57	35.60

In irrigated area, less than half of the respondents (46.30%) had medium level of cosmopoliteness followed by 35.60 per cent had high level of cosmopoliteness and 18.10 per cent of respondents had low level of cosmopoliteness.

(XI) Family occupation

It was evident from Table 4.11 that in irrigated area, majority of respondents (73.80%) had agriculture as their family occupation followed by agricultural labourers (14.40%), business (08.80%) and salaried job (3.10%).

Table 11: Distribution of respondents according to their family occupation (n=320)

S.No.	Family Occupation	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Agriculture Labourer	41 (25.60)	23 (14.40)
2	Agriculture	97 (60.60)	118 (73.80)
3	Business	18 (11.30)	14 (8.80)
4	Salaried Job	04 (2.50)	05 (3.10)

Number in parenthesis indicates percentage

In rainfed area, 60.60 per cent of respondents had agriculture as their family occupation followed by agricultural labourers (25.60%), business (11.30%) and salaried job (2.50%).

(XII) Family land holding

The data in Table 12 depicted that in irrigated area, exactly half of the farm women (50.60%) had small land holding followed by 23.80 per cent of the respondents were landless. Moreover, 21.90 per cent of respondents had marginal land holding. Only, 03.80 per cent of respondents were having large land holding.

Table 12: Distribution of respondents according to their family land holding (n=320)

S.No.	Family Land holding	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Landless	59 (36.90)	38 (23.80)
2	Small(< 1 ha)	73 (45.60)	81 (50.60)
3	Marginal(1 ha – 2 ha)	24 (15.00)	35 (21.90)
4	Large(> 2 ha)	04 (2.50)	06 (3.80)

Number in parenthesis indicates percentage

In rainfed area, less than half of the respondents (45.60%) had small land holding followed by 36.90 per cent of the respondents were landless. In addition, 15.00 per cent of respondents had marginal land holding. Only, 02.50 per cent of respondents were having large land holding.

(XIII) Family annual income

The data in Table 13 revealed that in irrigated area, slightly more than half of the respondents (51.30%) had annual family income ranged from Rs. 1,20,000 to Rs. 2,40,000 followed by 25 per cent of the respondents had annual family income ranged from Rs. 2,40,000 to Rs. 3,60,000 and 19.40 per cent of farm women had less than Rs. 1,20,000 annual family income. Very few of the respondents (04.40%) had annual income more than Rs. 3, 60,000.

Table 13: Distribution of respondents according to their annual family income (n=320)

S.No.	Annual Family Income	Rainfed Area (n=160)	Irrigated Area (n=160)
1	Less than Rs.1,20,000	76 (47.50)	31 (19.40)
2	Rs.1,20,000 - Rs. 2,40,000	50 (31.30)	82 (51.30)
3	Rs. 2,40,000– Rs. 3,60,000	30 (18.80)	40 (25.00)
4	More than Rs.3,60,000	04 (2.50)	07 (4.40)

Number in parenthesis indicates percentage

Whereas, in rainfed area, slightly less than half of respondents (47.50%) had annual family income less than Rs. 1, 20,000 followed by 31.30 per cent had annual family income ranged from Rs. 1, 20,000 to Rs. 2, 40,000 and 18.80 per cent of the respondents had annual family income ranged from Rs. 2, 40,000 to Rs. 3, 60,000. Only, 2.50 per cent of respondents had annual family income more than Rs. 3, 60,000.

1. Soil conservation & land management Activities

The data of Table 14 depicted the role of the farm women in soil conservation and land management activities. Majority of the farm women in both rainfed & irrigated area respectively had never performed the activities of deep ploughing (84.40%, 78.10%) followed by green manuring (58.10%, 66.90%) and application of organic fertilizers (57.50%, 66.30%).

The farm women in both rainfed & irrigated area respectively had always performed the activities of sowing seeds of improved varieties (71.30%, 86.30%) followed by crop rotation (63.80%, 56.90%), preparation of field bunds (55%, 48.10%), land levelling (59.40%, 38.10%) and planting trees, plants & shrubs (69.40%, 47.50%).

Farm women in both rainfed & irrigated area respectively had sometimes performed the activities of moderate use of fertilizers (49.40%, 65.60%) followed by zero tillage/minimum tillage/direct seeding (61.90%, 50.60%).

In rainfed area, less than half of the farm women (45.60%) had sometimes performed the activity of mulching while in irrigated area more than half of the farm women had always performed the activity of mulching (56.30%).

After studying detailed responses of farm women towards soil conservation & land management activities, overall role of farm women was also analyzed. The data provided in Table 15 depicted that in irrigated area, majority of the farm women (76.90%) had performed high role in soil conservation & land management activities as compared to farm women in rainfed area (64.40%).

In irrigated area, farm women had performed high role in soil conservation and land management activities. The probable reasons

could be due to the good soil conditions, availability of water resources other than rainfall such as canal, tube well etc. Another reason could be that farm women were mostly connected with the environment. They do most of the farm activities with the men or sometimes more than men. The findings were supported by the findings of Wakle et al. (2003), Chouhan (2016) and Singh (2019) who depicted that maximum participation of farm women were found in land management, farming activities and other activities related to soil conservation.

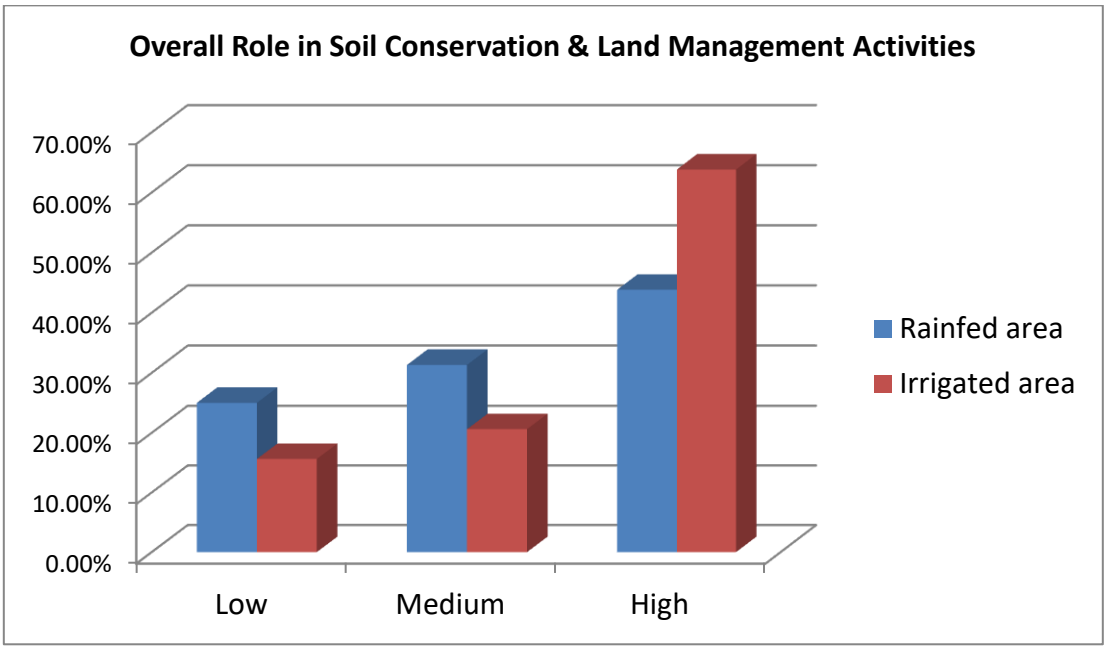

Fig. 1: Overall Role of farm women in Soil Conservation & Land Management Activities

Plate 1- Interviewing the respondent

Table 14: Distribution of respondents according to their role in soil conservation and land management activities

(n=320)

S. No.	Soil Conservation & Land Management Activities	Rainfed Area (n=160)			Irrigated Area (n=160)		
		Always performed	Sometimes performed	Never performed	Always performed	Sometimes performed	Never performed
1	Sowing seeds of improved varieties	114 (71.30)	38 (23.80)	08 (5.00)	138 (86.30)	14 (8.80)	08 (5.00)
2	Moderate use of fertilizers	18 (11.30)	79 (49.40)	63 (39.40)	23 (14.40)	105 (65.60)	32 (20.00)
3	Green manuring	23 (14.40)	44 (27.50)	93 (58.10)	14 (8.80)	39 (24.40)	107 (66.90)
4	Crop rotation	102 (63.80)	35 (21.90)	23 (14.40)	91 (56.90)	44 (27.50)	25 (15.60)
5	Preparation of field bunds	88 (55.00)	58 (36.30)	14 (8.80)	77 (48.10)	52 (32.50)	31 (19.40)
6	Land levelling	95 (59.40)	40 (25.00)	25 (15.60)	61 (38.10)	55 (34.40)	44 (27.50)
7	Deep ploughing	10 (6.30)	15 (9.40)	135 (84.40)	17 (10.60)	18 (11.30)	125 (78.10)
8	Mulching	72 (45.00)	73 (45.60)	15 (9.40)	90 (56.30)	27 (16.90)	43 (26.90)
9	Zero tillage/minimum tillage/direct seeding	31 (19.40)	99 (61.90)	30 (18.80)	59 (36.90)	81 (50.60)	20 (12.50)
10	Application of organic fertilizers	31 (19.40)	37 (23.10)	92 (57.50)	27 (16.90)	27 (16.90)	106 (66.30)
11	Planting trees, plants and shrubs	111 (69.40)	25 (15.60)	24 (15.00)	76 (47.50)	66 (41.30)	18 (11.30)

Number in parenthesis indicates percentage

Table 15: Distribution of respondents according to their overall role in soil conservation & land management activities

(n=320)

Category	Score Range	Rainfed area		Irrigated area	
		f	%	F	%
Low	21 & Less	23	14.40	14	8.80
Medium	22 to 24	34	21.30	23	14.40
High	25 & above	103	64.40	123	76.90

1. Irrigation water management activities

The data of Table 16 revealed the role of farm women in irrigation water management activities. Most of the farm women in both rainfed & irrigated area respectively had never performed the activities of installation of tape with emitters (drip irrigation) (91.90%, 93.80%) followed by fitting of pipes (drip irrigation) (89.40%, 85.60%), fitting of pressure gauge (sprinkler & drip irrigation) (85%, 86.30%), installation of venture and filter tank (sprinkler & drip irrigation) (87.50%, 78.10%) and injecting chemical fertilizers (sprinkler and drip irrigation) (76.30%, 76.90%).

The farm women in both rainfed & irrigated area respectively, had always performed the activities of scheduling irrigation (55.60%, 64.40%) followed by preparation of basins (basin irrigation) (56.90%, 39.40%).

More than half of the farm women in both rainfed & irrigated area respectively, had sometimes performed the activities of cleaning of emitters (drip irrigation) (62.50%, 71.90%) followed by cleaning of mains and submains (sprinkler & drip irrigation) (60.60%, 59.40%)

After observing detailed responses of farm women in irrigation water management activities, overall role of farm women was also measured. The data given in Table 17 showed that in rainfed area 60.60 per cent of the farm women had performed less role in irrigation water management activities as compared to farm women in irrigated area (48.10%).

Table 16: Distribution of respondents according to their role in irrigation water management activities (n=320)

S.No	Irrigation water management activities	Rainfed area(n=160)			Irrigated area(n=160)		
		Always performed	Sometimes performed	Never performed	Always performed	Sometimes performed	Never performed
1	Preparation of basins (basin irrigation)	91 (56.90)	39 (24.40)	30 (18.80)	63 (39.40)	61 (38.10)	36 (22.50)
2	Cleaning of mains and submains (Sprinkler & drip irrigation)	24 (15.00)	97 (60.60)	39 (24.40)	25 (15.60)	95 (59.40)	40 (25.00)
3	Fitting of pressure gauge (Sprinkler & drip irrigation)	11 (6.90)	13 (8.10)	136 (85.00)	08 (5.00)	14 (8.80)	138 (86.30)
4	Injecting chemical fertilizers (Sprinkler and drip irrigation)	18 (11.30)	20 (12.50)	122 (76.30)	16 (10.00)	21 (13.10)	123 (76.90)
5	Cleaning of emitters (drip irrigation)	16 (10.00)	100 (62.50)	44 (27.50)	12 (7.50)	115 (71.90)	33 (20.60)
6	Fitting of pipes (drip irrigation)	08 (5.00)	09 (5.60)	143 (89.40)	10 (3.10)	13 (8.10)	13 (85.60)
7	Installation of tape with emitters (drip irrigation)	00 (0.00)	13 (8.10)	147 (91.90)	00 (0.00)	10 (3.10)	150 (93.80)
8	Installation of venture and filter tank (sprinkler& drip irrigation)	08 (5.00)	12 (7.50)	140 (87.50)	16 (10.00)	19 (11.90)	125 (78.10)
9	Scheduling irrigation	89 (55.60)	53 (33.10)	18 (11.30)	103 (64.40)	40 (25.00)	17 (10.60)

Number in parenthesis indicates percentage

Table 17: Distribution of respondents according to their overall role in irrigation water management activities (n=320)

Category	Score Range	Rainfed area		Irrigated area	
		f	%	f	%
Low	11 & Less	97	60.60	77	48.10
Medium	12 to 15	44	27.50	42	26.30
High	16 & above	19	11.90	41	25.60

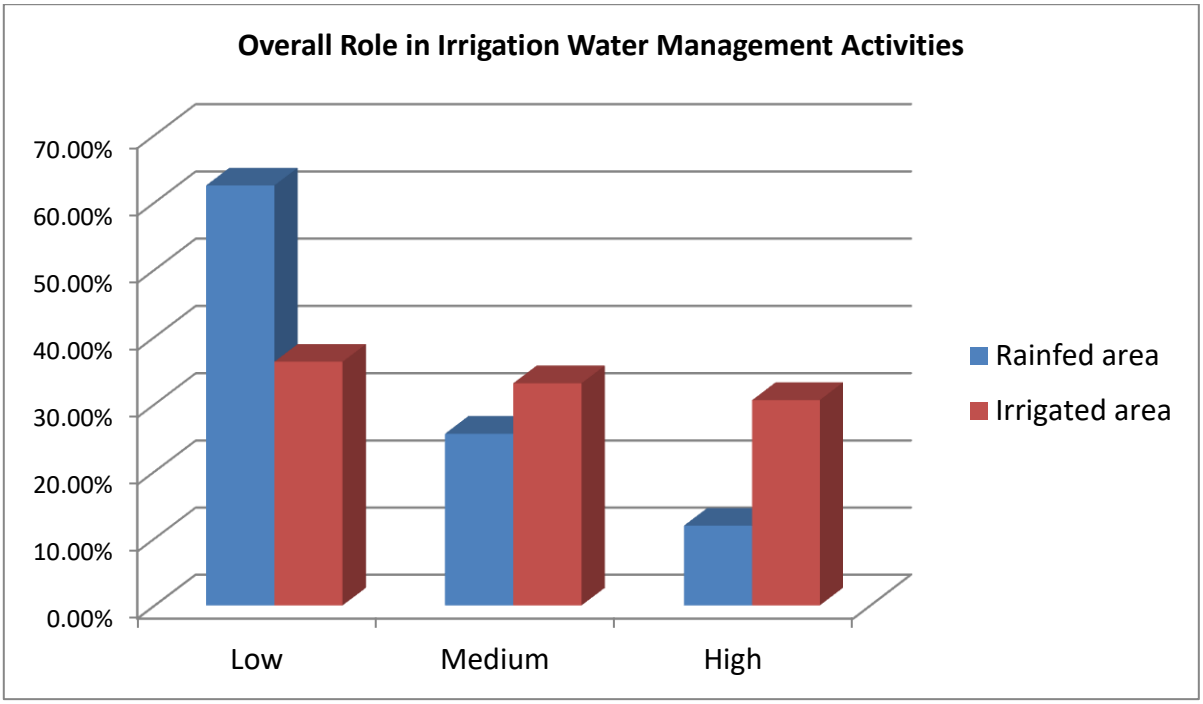

Fig. 2: Overall Role of farm women in Irrigation Water Management Activities

CONCLUSION

It can be concluded that farm women of irrigated area were performed high role in soil conservation & land management activities as there was facility of Indira Gandhi canal which helps them in maintenance of land and conserving the soil and farm women of rainfed area were performed low role in irrigation water management activities. The farm women of rainfed area were not performing the

activities of handlings drip and sprinkler irrigation machines due to lack of training.

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