



Constraints Faced by Farm Women in Soil and Water Resource Conservation: A Case Study

KEYWORDS

Constraints, Farm-Women, Conservation, Indigenous

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ABSTRACT To recognize and quantify the importance and occurrence of several adoption constraints in the Udaipur district of Rajasthan, pre-designed interview schedule was used to collect data from 100 tribal and 100 non-tribal farm women regarding soil and water conservation (SWC) techniques. Important adoption triggers appraised such as limited fertile land availability, lack of training, faulty site selection and inadequate subsidy etc. consequently; the region's SWC adoption rate was low. Level of constraints for soil conservation faced by tribal women was slightly higher than that of non-tribal women albeit similar in water management. The calculated Z-value for constraints encountered in management of soil (2.95) & water (0.17) were respectively greater & lesser than tabulated Z value. Thus, it was deduced that differences were prevalent only with regard to soil constraints between tribal and non-tribal women.

1. Introduction

A sizeable portion (~58%; Khandelwal & Dangi, 2012) of Indian population directly or indirectly relies on agriculture for their livelihood. India has made significant achievement in agriculture by increasing food production by four folds during last six decades; despite it several emerging challenges confront farmers. These include limited land and scarcity of water, which is further aggravated by degradation of natural resources; climate changes; changes in demand and consumption patterns, moving toward high-value agriculture; increasing population pressure; and liberalization of trade (Lele, 2010).

It shown that women constitute a higher proportion of the labor force in the agricultural sector than men (Kasi, 2013; Mitchell & Barre, 1995) and play crucial role at all levels. With more men seeking wage jobs, the contribution and responsibilities of women are increasing. Despite it, women and their role in the production and conservation debate remains rather superficial, and is often reduced to being figurative. Referring UN statistics, Davidson (1993) mentioned that women own no more than one per cent of the world's land, and even where they have access to it for farming; their tenure is often costly and uncertain. Without ownership of land or secure access to it, women are denied access to credit, training, and other supports to production, and cannot engage in the long-term conservation practices they have traditionally used (Davidson, 1993).

Soil and water are vital natural resources for agricultural, therefore managing both resources are critical issues in rain-fed farming of Indian sub-continent. After a long period of dry and hot weather, heavy downpour during monsoon season results in sever soil erosion in most part of the country. While erosion has occurred throughout the history of agriculture, it has intensified in recent years (Lal, Stewart, & Conservation, 1990). In this context, a reducing on soil degradation is imperative in order to boost agricultural production. In Indian context, the crop yields are also vulnerable to vagaries of monsoons (Lal, 2011). Monsoonal characteristics of rains result in disproportionate distribution of water resources complicates the crop output

as agriculture is mainly dependent on quantity, timing of availability and quality of water. Therefore, management of water resources is essential for overall development of agriculture.

Over the centuries several economically viable locally suitable measures have been developed by farmers to reduce soil erosion and for conserving and storing available runoff and soil moisture. These measures are popularly known as indigenous Soil and Water Conservation (SWC) methods and are proved very useful in protecting the resources and improving crop yields. The SWC techniques emphasize on management of resources, agronomic aspects and use of vegetative and structural measures to control soil degradation and enhance agriculture productivity. There has been growing recognition since the early nineties on the merit of using traditional knowledge in conservation planning and management, although many a time the actual process remains quixotic (Vencatesan, 2008).

Score of studies (Agarwal, 1986, 1992; Barry & Yoder, 2002; Butt, Hassan, Mehmood, & Muhammad, 2010; Chayal, Dhaka, & Suwalka, 2010; Davidson, 1993; Hovorka, de Zeeuw, & Njenga, 2009; Jamali, 2009; Jones, 2012; Khandelwal & Dangi, 2012; Pal, Bhattacharyya, Chandran, & Ray, 2009; Satyavathi, Bharadwaj, & Brahmanand, 2010; Sethi, 1991; Sobha, 2001; Vencatesan, 2008) have signified the involvement of women in agriculture. Similarly, numerous studies have stressed on role played by farm-women in conservation of natural resources (Davidson, 1993; Khandelwal & Dangi, 2012; Vencatesan, 2008), yet little is discussed about the problems and constraints faced by farm women. It is well accepted that across the globe, women in agriculture operate under greater constraints than men (Hassan, 1987; Olaweye, 1993).

In this context, the present study identifies the SWC constraints encountered by the tribal and non-tribal women of Udaipur district of Rajasthan. This study was also designed to examine the difference between tribal and non-tribal women with respect to constraints encountered by them.

2. MATERIAL AND METHODS

Eight villages of Udaipur district of Rajasthan were selected to conduct this study. These villages were in purposively chosen as large number of non-government organizations and other environmental agencies are actively involved in the conservation of natural resources. A total 200 women respondent – 100 tribal and 100 non-tribal – were taken as respondents for this study. Further details on study area and selection of villages and respondents are given elsewhere (Khandelwal & Dangi, 2012; Khandelwal & Sharma, 2014).

Initially, a semi-structured questionnaire was designed for standardization. This questionnaire was developed by selected items after review of literature and discussion with experts (subject matter specialists) and field level staff of study area. The study was originally designed to investigate constraints faced by women farmers in management of soil, water, agro-forestry and livestock resources; therefore, the original list included total 38 impediments. Out of these 38 points, 12 queries were related to soil management, 8 were about to water conservation practices and remaining impediments were for agro-forestry and livestock management. This questionnaire with 38 statements was then sent to 60 experts to check the statements on a three-point continuum of severity. Items were ranked from 1 to 38 with respect to the total scores of each group of judges. The mean scores and ranks of each item allotted on the basis of the total score of each group of judges. Those items, which received overall, mean score less than 1, were eliminated and not included in the final schedule. The sum of ranking given by each category of judges for particular item was summed up for computing coefficient of concordance ('W') with correction term and chi-square (χ^2) to test the similarity of ranking by each category of judge. By this procedure 22 items were retained and used to prepare a comprehensive interview schedule to collect data about constraints.

Out of these 22 retained items, 6 questions were allied to soil management and 5 were related to water conservation practices, 9 questions were allied to agro-forestry and 2 to livestock resource management. These 22 impediments were then used to design final interview schedule. On the basis of extent of severity, reply of each item was recorded on three categories viz. severe, less – severe and not at all severe with value 2, 1 and 0. The recorded responses were counted and converted into mean percentage score (MPS) for each constraint and then ranked accordingly. Besides, to find out the significance difference between tribal and non-tribal women with respect to constraints encountered them, 'Z' test was used and then conclusion was drawn accordingly. Details on constraints faced by farm women in agro-forestry and livestock management are presented in Khandelwal and Sharma (2014). However, the data on agro-forestry and livestock constraints were included while calculating the distribution of the respondents (section 3.3) and overall constraint index (section 3.4).

3. RESULTS AND DISCUSSION

3.1 Soil Management Constraints

Data in Table 1 indicate that lack of recommended plants species suitable for vegetative barrier and faulty site selection with MPS 90 were perceived as important constraints confronted by the respondents. Further, non-availability of good quality implements at local level was other bottleneck with an extent of 89.5 %, which was followed by non-availability of seed materials and unavailability of technical information and guidance (MPS 88.5). Non-availability of

manure and fertilizers (MPS 72.5) was expressed as least severe barrier in the category of soil conservation constraint.

Data presented in Table 1 also indicate that both tribal (MPS 93.5) and non-tribal women (MPS 86) expressed lack of recommended plants species suitable for vegetative barrier as second important obstruction due to least knowledge about vegetative barrier and plants raised for vegetative barrier.

Interestingly, faulty site selection was expressed as one of the important constraint and ranked first by the tribal women (95.5 MPS) but it was given fifth in rank hierarchy (MPS 84.5) by non-tribal women. These findings might indicate that tribal women were not involved in discussion while selecting the site. Contrary to this non-availability of seed materials perceived second least constraint (MPS 89.5) by the tribal women, non-tribal women, awarded it first rank (MPS 87.5). In rest of the impediments related to soil conservation, almost similar pattern of ranking between tribal and non-tribal women were observed. Gupta, Chakraborty, and Garal (1991) and Jagdale and Nimbalkar (1993) also suggested unavailability of improved seeds, lack of plant protection measures, small operational holding and high cost of fertilizers to be most important constraints in adoption of soil conservation measures.

Table 1: Constraints perceived by the respondents related to soil conservation practices

S. No.	Constraints	Tribal (n1 =100)		Non-tribal (n2 =100)		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1	Lack of recommended plants species suitable for vegetative barrier	93.5	2	86.0	2.5	90.0	1.5
2	Faulty site selection	95.5	1	84.5	5	90.0	1.5
3	Non-availability of good quality implements at local level	93.0	3	86.0	2.5	89.5	3.0
4	Non-availability of seed materials	89.5	5	87.5	1	88.5	4.5
5	Unavailability of technical information and guidance	92.0	4	85.0	4	88.5	4.5
6	Non-availability of manure and fertilizers	76.0	6	69.5	6	72.5	6.0

3.2 Water conservation constraints

According to Table 2 inadequate subsidy as compared to the investment was the most severe constraint encountered by majority of the respondents (MPS 81). Besides, lack of training and unavailability of loan facility were other most severe barricades. Lack of education and motivation was another constraint hampering the women to an extent of 56.5 % followed by lack of transport facility to transport raw material in remote areas (MPS 40.5).

Further, Table 2 divulge that inadequate subsidy as compared to the investment ranked first by tribal and third by non-tribal women with MPS 96.5 and 65.5 respectively. The possible reason behind this may perhaps be unawareness among tribal women about subsidies and discrimination by agencies while giving subsidies. The Table 2 fur-

ther suggest that lack of training about water conservation practices with MPS 77 and MPS 71 was second utmost barricade as perceived by tribal and non-tribal women, respectively. Interestingly, unavailability of loan facility was perceived as topmost blockade by non-tribal women MPS 73, while tribal women for the same item awarded fourth rank with 51 MPS.

Table 2: Constraints perceived by the respondents related to water conservation practices

S. No.	Constraint	Tribal (n1 =100)		Non-tribal (n2 =100)		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1	Inadequate subsidy as compared to the investment	96.5	1	65.5	3	81.0	1
2	Lack of training	77.0	2	71.0	2	74.0	2
3	Unavailability of loan facility	51.0	4	73.0	1	62.0	3
4	Lack of education and motivation	70.5	3	42.5	5	56.5	4
5	Lack of transport facility to transport raw material in remote areas	20.0	5	60.5	4	40.5	5

Besides, lack of education and motivation and was ranked last by non-tribal women with MPS 42.5, but was given third rank by tribal women (MPS 70.5). The cause might be that tribal women are still confined with decision of male. Similarly, lack of transport facility to transport raw material in remote areas were least constraint faced by tribal (MPS 20) and non-tribal women (60.5). Harding (1998) and Yadav (1993) reported that lack of training provision, education, motivation and limited subsidy on water conservation structure system were the constraints faced by the respondent in adoption of water conservation measures.

3.3 Distribution of the respondents on the basis of constraints encountered

In order to frame the hierarchy of constraints, they were stratified into three categories i.e. (i) low (ii) medium and (iii) high level of constraints on the basis of calculated mean and standard deviation of the scores given to the constraints item by respondents. Half of the respondents i.e. 94 (47%) had perceived medium level of constraints in natural resource conservation. Whereas more than one fourth of respondents i.e. 73 (36.5%) were confronted with the constraints to the high extent and only 33 (16.5%) had faced low level of constraints.

It is also observed that 41% and 53% tribal and non-tribal women possessed medium level of constraints. Besides, more number of tribal women i.e. 49% fell in the category of high-level constraints than the non-tribal i.e. 24%. Reciprocal to it more numbers of non-tribal women (23%) were observed in the category of low level of constraints than the tribal (10%) ones. These findings are in agreement with those of Jagdale and Nimbalkar (1993) reported that a large proportion of respondents in small, medium and large farmers groups had faced a medium level of constraint i.e. 45, 63 and 50% respectively.

3.4 Overall constraints perceived by the respondents

To get an overview of the constraints faced by the women

in conservation of natural resources, the overall score for each major aspect was summed up and the results have been presented in Table 3. The data in Table 3 reveals that among all the categories of constraints, livestock conservation constraints (MPS 88.6) were most severe impediment in conservation of natural resources and assigned first rank in the problem hierarchy. This was followed by soil conservation constraints and forest conservation constraints. The MPS of these barriers were 86.5 and 83.6 and were assigned second and third ranks respectively. However, water conservation constraints (MPS 62.8) were hampering the respondents to the least extent and thus, were placed at fourth position in the rank hierarchy by the farm women.

Table 3: Overall constraints perceived by respondents in conservation of natural resources

S. No.	Con-strains	Tribal (n1 =100)		Non-tribal (n2 =100)		Total		'Z' value
		MPS	Rank	MPS	Rank	MPS	Rank	
1	Livestock conservation	93.2	1	84	1	88.6	1	3.20**
2	Soil conservation	89.9	2	83	2	86.5	2	2.95**
3	Forest conservation	85.5	3	79.7	3	82.6	3	2.70**
4	Water conservation	63	4	62.5	4	62.8	4	0.17NS
	Overall	82.3		77.1		79.7		3.01**

NS = Not significant * * = Significant at 1 % level

In order to find out the difference between both categories of respondents 'Z'-test was applied. A perusal of these values depict that the calculated Z-value for livestock, soil and forest conservation constraints were 3.20, 2.95 and 2.70 which all were greater than the tabulated Z-value. It led to the conclusion that there was a significant difference in constraints perceived by tribal and non-tribal women with respect to these practices. However, calculated Z-value for water conservation constraints was 0.17, which is less than the tabulated value. It is therefore deduced that there was no difference in the tribal and non-tribal women with regard to constraint related to water conservation. In this study $\chi^2 = 35.3$ with 21 degree of freedom exceeds the critical value $\chi^2_{21, 0.05} = 32.7$, the coefficient of concordance was found out to be significant at 0.05 level of significance ($W = 0.561$) and therefore the hypothesis of no agreement was rejected. Further, the overall Z-value for constraints related to natural resources conservation practices by both categories of respondents was 3.01, which are higher than the tabulated value (2.58) and significant at 1% level. It indicates that there is difference in tribal and non-tribal women with respect to constraints encountered by them.

4. Conclusion

This study specifies the constraints faced by tribal and non-tribal women farmers of the study area. Study also point out that there is significant difference in constraints perceived by both categories of farm women regarding some of conservation practices. It can be inferred that though the recommended practices of natural resources conservation are being adopted by women to certain extent but full use of the recommended practices seems not to be possible due to the various barricades come on the

way. Hence, efforts are still required to be made on the part of concerned agencies, planners, administrators to look into the constraints while preparing future development programme.

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