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Adoption Level of Soil and Water Conservation Technology under NICRA in Chatra District in Jharkhand

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ABSTRACT

Many states in India are affected by land and water degradation. Successive technologies have promoted to prevent soil and water conservation adopted on a large scale. This paper deals adoption level of soil and water conservation technologies in purposively selected NICRA village of Chatra district in Jharkhand India. A total of 105 farm families were selected purposively for study. Data collected through personal interview, group meeting, and structural schedule from selected respondents. It was found that under crop production (SWC) Soil and water conservation technology, intercropping (88.57%), whereas under mechanical SWC technologies land leveling (97.14%) was adopted by farmers. Most of the respondents come under a medium level of adopter categories related to soil and water conservation technologies.

Keywords: Adoption, Adoption level, Conservation, Soil and water

INTRODUCTION

There has been a significant rise in the frequency of extreme weather events in recent years affecting farm-level productivity and impacting staple food availability at the national level. Within a season, severe droughts and floods are being experienced in the same region posing serious problems to the farmers, agricultural scientists, and extension staff. Fall in yield leads to shortage of food grains, price rise, and inflation affecting the poor the most. Therefore, it is important to enhance the resilience of Indian agriculture to climate change considering the facts. Indian Council of Agricultural Research (ICAR) has initiated a network project on National Innovation on Climate Resilient Agriculture (NICRA) to enhance the resilience of Indian agriculture through strategic research on adoption and mitigation (Covering crops, livestock, fisheries, and natural resource). Natural resource management in this project refer to the management of natural resources such as land, water soil with particular focus on how management affects the quality of life for both present and future generation. KVK, Chatra has also been selected by ICAR as a lead centre to implement the project in farmers' field situations in 2011. In this regard, KVK Chatra selected tribal-dominated village Mardanpur of Chatra block which has 105 farm families and demonstrated more than 25 land, soil, and water conservation and management technologies among farmers to adopt and disseminate among farmers of nearby villages to mitigate climate effect on productivity and profitability of the crops and livestock components. The study was taken to assess the adoption behavior of the farmers towards vegetative and mechanical soil and water conservation technologies

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METHODOLOGY

The study was conducted in Mardanpur village of Chatra block in Chatra district of Jharkhand, where the NICRA project under operation from 2011 to till date. The village was selected purposively because of so many mechanical and crop production soil and water conservation technologies stand demonstrated in the farmer's field. An exploratory reach design was followed and a total of 105 farmer respondents were selected.

An adoption scale was developed to measure the extent of adoption of intervened technologies by the respondents. A list of intervened soil and water conservation technologies was prepared. Respondents were asked to indicate the intervened technologies adopted by them with their extent, for quantifying data each practice was given score O for not aware 1 for aware but not adopting, 2 for adopting responses. Thus total score secured by an individual was the obtained adoption score. The adoption quotient was worked out for each respondent by the following quotient and it was taken as the adoption score for individual respondents.

$$\text{Adoption Quotient} = \frac{\text{Adoption score obtained by respondents}}{\text{Maximum possible adoption score}} \times 100$$

Overall adoption level was worked out by calculating the arithmetic mean of the adoption quotients of all the respondents as given below:

$$\text{Over all adoption level} = \frac{\Sigma_{I=1}^{N} = AQ}{N}$$

Where, AQ = Adoption quotient for i^{th} respondents

N = Total number of respondents

RESULTS AND DISCUSSION

Frequency distribution of different soil and water conservation (SWC) practices adopted by farmers in NICRA village presented in Table 1.

Table 1 shows that the majority of farmers (88.57%) adopted intercropping practices as crop production soil and water conservation technologies followed by contour farming (76.19%), summer plowing (73.0%), mulching (65.71%) and multiple cropping (66.95%) respectively. The least adopted crop production soil and water conservation technologies were cover cropping and green manuring respectively. It may be due to more water and time required for decomposition of Sesbania (Dhaicha) crop which was used as green manuring crops in the field. It is revealed from the table that most of the farmers adopting intercropping and contour farming because KVK introduces so may remunerative intercropping practices i.e. maize + ladies finger or maize + red gram etc. which gave midterm income to the farmers during the lean period i.e. July and August month and also check soil and water erosion in undulating land. Counter farming is also feasible and sustainable practices in this situation because this practices held tilling on sloped land along lines of consistent elevation to conserve rainwater and reduce soil losses from surface erosion. The objectives are achieved using furrows, crop rows, and wheel tracks acres slopes, all of which act as reservoirs to catch and retain rainwater, thus permitting increased infiltration and more uniform distribution of the water.

Table 1: Frequency distribution of crop production (SWC) technologies adopted by farmers (N=105)

Technology	Number of farmers adopted the technologies	
	Number of respondent	Percentage
Contour farming	80	76.19
Inter cropping	93	88.57
Cover cropping	42	40.0
Green manuring	38	36.19
Mulching	69	65.71
Summer ploughing	73	69.52
Multiple cropping	64	60.95

Frequency distribution of mechanical soil and water conservation technologies (SWC) presented in Table 2 which shows that the majority of the farmers (97.14%) adopted land leveling as a mechanical soil and water conservation technologies followed by Bora bandi (77.14%) Marginal bunding (74.28%) Terracing (65.71%) and contour bunding and construction of new ponds (64.76%) respectively. Whereas the other mechanical

Table 2: Frequency distribution of mechanical, Soil and water conservation (SWC) technologies adopted by farmers (N=105)

Technology	Number of farmers adopted technologies	Percentage
Marginal bunding	78	74.28
Contour bunding	68	64.76
Terracing	69	65.71
Land leveling	102	97.14
Check dam	74	70.47
Gully Plough	46	43.80
Bora Bandi	81	77.14
Renovation of old pond	74	70.47
Construction of new pond (5% module)	-	-

soil and water conservation technologies such as Gully plow were adopted only (43.80%) farmers. It is also observed from Table 2 that the other important technologies such as the construction of the new pond (5% model) were not adopted by farmers due to higher cost. Only project fund constructed pond used by the farmers. It was observed that due to undulating land situation water staging in the field is a great problem so that land leveling technologies become so popular among the farmers and about 100% of farmers adopted these technologies.

Table 3 shows that 51 per cent farmers were under medium level categories of adoption of the technologies, 28 per cent respondents were having high level of adoption towards vegetative soil and water conservation technologies followed by 21 per cent respondents having low level of adoption. 53 pert cent fell under the medium level adoption categories concerning mechanical soil and water conservation technologies. followed by 25 per cent of respondents were having a low level of adoption towards mechanical soil and water conservation technologies (SWC) only 22 per cent of farmers having a high level of adoption towards mechanical soil and water conservation technologies. It was observed from table that most of the respondents come under a medium level of adoption categories. Because construction and maintains of soil and water conservation technologies required money every year except few practices, So the majority of the farmers are unable to invest and adopt technologies on a large scale.

The overall extent of the adoption of both the vegetative and mechanical soil and water conservation technologies was calculated with the help of developing adoption quotient. It was found that the overall adoption level of vegetative soil and water conservation technologies (SWC) was 33.16 per cent whereas the overall adoption of mechanical soil and water conservation technologies was 28.62 per cent. It explained that in general, the extent of the adoption of vegetative soil and water conservation technologies was higher than the mechanical soil and water conservation technologies. It may be due to the higher cost incurred in the adoption of mechanical soil and water conservation technologies. Mechanical Soil and water conservation technologies (SWC) were adopted on a community basis, which requires a participatory approach among beneficiaries

Table 3: Adoption level of vegetative and mechanical soil and water conservation (SWC) technologies by NICRA village farmers (N=105)

Adoption level	No. of respondents	Percentage	Mean	S.D.
Vegetative				
Low level below (4-3 scores)	22	21		
Medium level between 4.3 to 7.94 scores	54	51	5.89	1.74
High level above (7.94 scores)	29	28		
Mechanical				
Low level below 3.57 score	26	25		
Medium level between (3.57 to 7.31) scores	56	53	6.08	1.79
High level (above 7.31 scores)	23	22		

CONCLUSION

It may be concluded that the low cost or no cost vegetative and mechanical soil and water conservation technologies suitable to small farm holding should be developed for their easy adoption in the farmer's field situation. The technologies should be developed considering the bio-physical and socio-economic conditions of the area. Which become sustainable, reliable, profitable, among the farming communities. Regular awareness and capacity building program organized by extension agency for creating awareness and interest among farmers related to soil and water conservation technologies. It is also advanced training required to extension officers and extension workers related to soil and water conservation technologies.

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