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Level of adoption of rice production technologies by the tribal farmers under national food security mission (NFSM) programme

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Abstract

National Food Security Mission (NFSM) has been launched from 2007-08 to increase area, production and productivity of rice, wheat, pulses and coarse cereals. The present study was conducted tribal prominent Kandhamal district of Odisha, in four randomly selected blocks. From the eight randomly selected villages (four beneficiary and four non-beneficiary) total 120 respondents were selected (sixty beneficiaries and sixty non-beneficiaries) for the study. The study revealed that most of the beneficiary farmers were fully adopted the recommended package of practice of rice *viz.* use of high yielding rice varieties, line transplanting method, conoweeder. But there was less adoption for chemical fertilizers, plant protection chemicals and other type of chemicals because the farmers of these district perceived that chemical fertilizers, pesticides and herbicides reduce the fertility of soil so they mostly depend on organic manures to fulfill the need of the crops.

Keywords: Beneficiary, Non-beneficiary, Conoweeder, Pesticides, Herbicides, Organic manures

Introduction

India is the second leading producer of rice after china. Rice is grown extensively in India in about 43.38-million-hectare area with an annual production of 104.31 million tones having an average yield of 2404 kg per hectare. In Odisha rice cover about 39.43 million hectare of area with 5.88 million tons of production and 1491 kg per hectare of productivity (Ministry of statistics and programme implementation, 2015). National Food Security Mission programme play a tremendous role in increasing area, production and productivity of rice by helping the farmers in adopting improved rice production technologies.

National Food Security Mission (NFSM) was launched in the year 2007-08. It aims to increase the production of food grains by 25 million tons, comprising of 10 million tons of Rice, 8 million tons of Wheat, 4 million tons of Pulses and 3 million tons of Coarse cereals. In India NFSM programme on rice implemented in 194 districts of 25 states (2015-16). In Odisha NFSM programme on rice implemented in 8 districts, these are Angul, Deogarh, Jharsuguda, Kandhamal, Keonjhar, Malkangiri, Nuapada, Sundaragh which covers 3.94 million ha. area, 6.83-million-ton production, and 1616 kg/ ha productivity (2015-16).

Kandhamal district is a tribal prominent district where people were mostly depending on forest for their livelihood. The productivity of rice in this district is 1211 kg per hectare (2015) which is far below against the state average yield. This is due to the cultivation of less improved varieties and lack of knowledge about improved rice production technologies. Considering these factors, the adoption level of farmers towards rice production technologies under NFSM was studied.

Methodology

The present study was conducted in tribal dominant (53.58 per cent tribal population 2011 census) Kandhamal district of Odisha state. Out of 12 blocks, 4 blocks G. Udayagiri, Tikabali, Nuagao, Phiringia were selected randomly. From each selected block, one NFSM-Rice implemented village and another non-NFSM-Rice village from the same location was selected for investigation. In this way total 8 villages (4 beneficiaries and 4 non-beneficiaries) were selected for the investigation. From each beneficiary village, 15 tribal farmers associated with NFSM-Rice programme were selected randomly. Similarly, from non-beneficiary villages 15 tribal farmers were selected randomly as respondents. Thus, total 120 farmers (60 beneficiaries and 60 non-beneficiaries) were selected for this study as respondents. The data were collected through a well-structured interview schedule. The collected data were analyzed with statistical tools like frequency, percentage method.

In this study adoption was operationalized as the degree to which a farmer has actually adopted the techniques and practices to enhancing the production and productivity of the rice. There were 18 recommended package of practices which were measured on the basis of three-point continuum scale *viz.* adoption, discontinuance and non-adoption which were assigned score 2, 1 and 0 respectively. To find out the adoption level of respondents, overall score for each respondent was calculated by calculating mean and standard deviation.

Result and discussion

Distribution of the beneficiary and non-beneficiary farmers on the basis of their level of adoption towards several recommended package of practice of rice has been shown in the table 1 and table 2, respectively. HYV variety of paddy play an important role to improve the socio-economic status of the tribal farmers. (Raghav D.K.). If we consider the adoption of improved varieties of rice, all the beneficiary tribal farmers were adopting HYV fully, but none of them had any knowledge about the hybrid rice varieties, as the farmers have no knowledge about the package of practice of hybrid rice, high cost of seed and lack of any demonstration on hybrid rice varieties through any programme. However, in case of non-beneficiaries 35 per cent of the farmers were not adopted the HYV rice, they mostly depend on local variety like Buda Dhan, only 36.67 per cent adopted the HYV and remaining 28.33 per cent farmers shows discontinuance, due to the unavailability of seeds at proper time and lack of proper extension agent guidance.

For sowing method of rice, NFSM rice programme conducted demonstration on line transplanting, direct seeded rice, SRI. Line transplanting method adopted by all the beneficiary farmers. Whereas in direct seed rice method, majority (56.67 per cent) of the beneficiary farmers not adopted it as this method gives less yield and also due to availability of improved method of sowing like line transplanting method and SRI method direct seeded method was least preferred by the farmers. SRI method is one of the improved method of cultivation of rice. In the present study it was found that majority (55 per cent) of the beneficiary farmers had not adopted this method due to very complicated process followed by 30 per cent adopted this method and in case of 15 per cent farmer discontinuance occurred because of lack of adequate water during puddling period and also in the critical stages of rice. However, in case of non-beneficiary farmers, line transplanting was adopted by majority (88.33 per cent) of the farmers, 3.33 per cent showed discontinuance and 8.33 per cent had not adopted this method. For direct seeded rice method, 48.33 per cent had not adopted, followed by 36.67 per cent shows discontinuance because, of low yield and only 15 per cent were found to adopt this method. It was also found that none, of the non-beneficiary farmers adopted the SRI method of cultivation of rice due to lack of knowledge. Another showing method also recommended that is cropping system-based sowing but it had very less adoption rate, only 5 per cent of the beneficiary farmers adopted it and none of the non-beneficiary farmers showed any adoption for this method due to lack of knowledge.

If we consider level of adoption of several soil and plant protection chemicals, rate of adoption was found very low due to high cost of chemicals and also farmers of this district perceived that application of chemicals reduce the soil fertility in long run. For this condition Integrated Pest Management practices (IPM) work as better to control pest but farmers have lack of proper knowledge about this practice (Upadhyay Sangeeta). In case of beneficiary farmers, micronutrient adopted by majority (50 per cent) of beneficiary farmers followed by 45 per cent shows no adoption and 5 per cent shows discontinuance in its use. About 26.67 per cent beneficiary farmers use lime to reclaim acid soil, 15 per cent shows discontinuance and majority (58.33 per cent) farmers had not adopted this practice, due to lack of knowledge and lack of observability directly in the field level. In case of plant protection chemicals, majority (76.67 per cent) beneficiary farmers normally use it to control the disease and pest infestation, whereas 13.33 per cent shows discontinuance, and 10 per cent didn't use any chemicals. Adoption of weedicide is very negligible. However, in case of non-beneficiary farmers application of any chemicals for soil and plant protection was found very less only 16.67 per cent adopted it and other chemicals like micronutrients, lime, weedicide not adopted because of lack of knowledge, high cost of chemical and negative attitude of farmers towards these chemicals.

So far as the use of machinery in rice cultivation was concerned, all the beneficiary farmer use conoweeder for weeding purpose. About 81.67 per cent beneficiaries had manual sprayer and only 18.33 per cent had no sprayer. Pump set available with 21.67 per cent beneficiary farmers and 78.33 per cent had no pump set. While, in case of power sprayer, power weeder, paddy thresher and rotavator very less percentage of the beneficiaries *i.e.* 1.67 per cent, 1.67 per cent, 6.67 per cent and 8.67 per cent, respectively had adopted these machineries. None of the beneficiary farmers had self-propelled paddy transplanter. Possible means for less adoption of these machineries was mostly due to their high cost and also marginal land holdings. However, in case of non-beneficiary farmers only 15 per cent adopted conoweeder, 26.67 per cent had manual sprayer and only 8.33 per cent had pump set. While in case of other machinery there was no adoption due to lack of knowledge and also high cost machineries.

The table 3 shows the distribution of the beneficiary and non-beneficiary farmers on the basis their overall adoption level. Majority (61.67%) of the beneficiary farmers had medium level of adoption followed by 35 per cent had high level of adoption and very less percentage (3.33%) had low level of adoption. Similarly, in case of non-beneficiary farmers 56.67 per cent had medium level of adoption, and 43.33 per cent had low level of adoption and none of them had high level of adoption. From the above analysis we may conclude that majority of the beneficiary farmers adopted the most of the recommended package of practice than the non-beneficiary farmers. This may be due to the implementation of NFSM programme. This programme helps the beneficiary farmers to get more knowledge about the different improved technology related to rice and increase their yield and ultimately increase their socio-economic condition.

Table 1: Distribution of beneficiary farmers on the basis of level of adoption of recommended package of practices of rice (n₁=60)

Sl. No.	Recommended package of practice of rice	Adopted		Discontinuance		Not adopted	
		F	%	F	%	F	%
1.	Use of HYV Rice variety	60	100.0	0	0.0	0	0.0
2.	Use of Hybrid Rice	0	0.0	0	0.0	60	100.0
3.	Line transplanting method of sowing	60	100.0	0	0.0	0	0.0
4.	Direct seeded Rice method of sowing	3	5.00	23	38.33	34	56.67
5.	SRI method of sowing	18	30.00	9	15.00	33	55.00
6.	Cropping system-based sowing	3	5.00	0	0.0	57	95.00
7.	Use of micronutrient	30	50.00	3	5.00	27	45.00
8.	Use of liming in acid soil	16	26.67	9	15.00	35	58.33
9.	Use of plant protection chemical and Bio-agents	46	76.67	8	13.33	6	10.00
10.	Weedicide	0	0.0	1	1.67	59	98.33
11.	Conoweeders	60	100.0	0	0.0	0	0.0
12.	Manual Sprayer	49	81.67	0	0.0	11	18.33
13.	Power Sprayer	1	1.67	0	0.0	59	98.33
14.	Power Weeder	1	1.67	0	0.0	59	98.33
15.	Paddy Thresher	4	6.67	0	0.0	56	93.33
16.	Rotavators	5	8.33	0	0.0	55	91.67
17.	Self-Propelled Paddy Transplanter	0	0	0	0.0	60	100.0
18.	Pump sets	13	21.67	0	0.0	47	78.33

F = Frequency

% = Percentage

Table 2: Distribution of non-beneficiary farmers on the basis of adoption of recommended package of practices of rice (n₂=60)

Sl. No.	Recommended package of practice of rice	Adopted		Discontinuance		Not adopted	
		F	%	F	%	F	%
1.	Use of HYV Rice variety	22	36.67	17	28.33	21	35.00
2.	Use of Hybrid Rice	0	0.0	0	0.0	60	100
3.	Line transplanting method of sowing	53	88.33	2	3.3	5	8.33
4.	Direct seeded Rice method of sowing	9	15.00	22	36.67	29	48.33
5.	SRI method of sowing	0	0.0	0	0.0	60	100.0
6.	Cropping system-based sowing	0	0.0	0	0.0	60	100.0
7.	Use of micronutrient	0	0.0	0	0.0	60	100.0
8.	Use of liming in acid soil	0	0.0	0	0.0	60	100.0
9.	Use of plant protection chemical and Bio-agents	10	16.67	14	23.33	36	60.0
10.	Weedicide	0	0.0	0	0.0	60	100.0
11.	Conoweeders	9	15.00	0	0.0	51	85.00
12.	Manual Sprayer	16	26.67	0	0.0	44	73.33
13.	Power Sprayer	0	0.0	0	0.0	60	100.0
14.	Power Weeder	0	0.0	0	0.0	60	100.0
15.	Paddy Thresher	0	0.0	0	0.0	60	100.0
16.	Rotavators	0	0.0	0	0.0	60	100.0
17.	Self-Propelled Paddy	0	0.0	0	0.0	60	100.0
18.	Transplanter Pump sets	5	8.33	1	1.67	54	90.00

F = Frequency

% = Percentage

Table 3: Distribution of farmers on the basis of overall adoption of recommended package of practice of rice.

Sl. No	Level of adoption	Beneficiary (n ₁ =60)		Non-beneficiary (n ₂ = 60)	
		F	%	F	%
1	Low (Score < 4)	2	3.33	26	43.33
2	Medium (Score Between 4 to 15)	37	61.67	34	56.67
3	High (Score above 15)	21	35.00	0	0.0
Mean = 9.70 Standard deviation = 5.67					

F= Frequency

% = Percentage

Conclusion

From the study it was concluded that majority of the beneficiary farmers had medium level of adoption behavior (61.67 per cent) followed by high level of adoption (35 per cent) for rice production technologies and have less gap in technology adoption. Beneficiary farmers were fully adopted the HYV variety for rice cultivation, line transplanting method of sowing, conoweeder. But there was less adoption for chemical fertilizers, plant protection chemical and other

type of chemical agents because the farmers of these district perceived that chemical fertilizers, pesticides and herbicides reduce the fertility of soil so, they mostly depend on organic manures to replace these chemical need. Where as in case of non-beneficiary farmers all the farmers come under low (43.33 per cent) and medium level (56.67 per cent) of adoption categories and none of them had high level of adoption of rice production technologies. And it was also found that in case of non-beneficiary farmers gap in

technology adoption is high. This difference in adoption level of different rice production technologies between beneficiary and non-beneficiary farmers is due to NFSM programme, as it provides new technologies at the doorstep of farmers in cost effective manner.

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