ADOPTION AND PRODUCTIVITY OF PADDY PRODUCTION TECHNOLOGY UNDER DIFFERENT MICRO-FARMING SITUATIONS : AN AGRO-ECOSYSTEM ANALYSIS

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Rice is the staple for the People in almost Asian countries and a major source of livelihood in their rural economics, India accounts for 23.46 per cent of the total cropped area under rice with only 21.53 per cent of world in 1989. The country has established and sustains the hard-earned state of self-sufficient in food production and there is no time to relax and to be complaisance. There are many improved practices of paddy cultivation, which have been develop by the research system and are being transferred by the extension system to the farmers for its ultimate users. Adoption of paddy cultivation technologies up to an optimum level is a key factor in determining the productivity of paddy under different micro-farming situations In the social research very few studies have been conducted in the past but they have not revealed about the adoption, non-adoption and productivity level of any technology, which may affect on account of variability under different farming situations.

Hence, considering these issues in the mind, the present study was undertaken to identify different micro-farming situations for the paddy crop and to analyze the adoption and productivity of paddy production technology under identified micro-farming situations.

METHODOLOGY

To achieve the determined objectives, the present study has been conducted in the Northern part of Jabalpur Distric, Madhya Pradesh. A random sample of 70 paddy growers were selected from the identified two paddy micro-farming situations by adopting the procedure of proportionate random sampling. Various micro-farming situations in the selected area of study have been identified with the help of transect walking with the farmers. Two micro-farming situations for the paddy crop were identified on account of soil colour, texture, depth, slope of land, irrigation resources, vegetation, cropping system, disease and insect pests attack and over all problems. The data have been collected by using the method of participatory rural appraisal and interview schedule method. Adoption behaviour of farmers has been measured on three-point continuum as adequate, partial and non-adoption. The productivity level of paddy crop was categorized on the basis of range.

RESULTS AND DISCUSSION

Keeping in view the agro-ecosystem, following micro-farming situations were identified in the area under study.

Micro-farming situation-1 (MFS-1)

This micro-farming situation is attributed by heavy texture black soil, depth varies from 6-10 feet. Fields are flat, bunded and paddy is grown by rainy water. More number of wells are in existence under this situation for assured irrigation of late paddy crop. Rabi crops viz., wheat, gram and pea are grown in conserved moisture of paddy fields and also under assured irrigation. Khaira and blast diseases are the major disease of this micro-farming situation. Heavy weed infestation, poor fertility and zinc deficiency of soil are the main problems of this micro-farming situation. Average productivity of this micro-farming situation is about 20-25 q/ha.

Micro-farming situation-2 (MFS-2)

This micro-farming situation is characterized by the medium textured shallow black soil, depth varies from 6-8 feet, fields are bunded and topography is moderately sloppy. Paddy crop is grown in the rainwater and Rabi crop is grown

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under deficit supply of water. Rust of wheat and wilt of gram are the major disease. Cutworm and pod borers of the gram are dominating insects damage to crops. Lack of irrigation facilities and poor fertility of soils is the major problems of this micro-farming situation. Leaf roller and Khaira disease are the major biophysical constraints in paddy crop. The average productivity of paddy crop under this MFS is 10-15 q/ha.

Adoption of paddy production technology– After foregoing research, following results were obtained for the adoption of paddy production technology by the farmers.

The data given in the table-1 reveals that majority (50.00%) of paddy growers under MFS-1 had partially adopted the LMT, 3.75 per cent adequately while 12.5 per cent of them did not follow the same practice. In case of MFS-2, 46.67 per cent of the paddy growers did not adopt the LMT, 30.0 per cent adequately and 23.33 per cent adopted partially. It was observed that, irrespective of MFSs quite a higher percentage (38.57%) of paddy growers had partially adopted, 24.29 per cent adequately adopted while 27.14 percent did not adopt the same technology. Under the FMS-1, in case of the PMT majority (55.0%) of the paddy growers adopted partially followed by 35.00 per cent adequately and 10 per cent of the paddy growers did not adopt the same practice. However, under the MSF-2 the similar result have been noted. It is persual from the data that higher percentage (43.33%) of paddy growers did not follow the practice, 36.67 per cent adopted adequately while 20 per cent had adopted partially. Irrespective of MFS's recommended PMT of the paddy packages had been adopted partially by the 40.0 per cent of paddy growers, 35.70 per cent adopted adequately whereas 24.29 per cent did not follow the same.

Table 1. Extent of adoption of paddy production technology under varying micro-farming situation

Components of Technology	Micro-farming situations N=70						Total, MFS-1+MFS-2		
	MFS-1(n1=40)			MFs-2(n2=30)					
	Ad. Ad	Pr. Ad.	Non. Ad.	Ad. Ad.	Pr. Ad.	Non. Ad.	Ad. Ad	Pr. Ad.	Non. Ad.
LMT	37.50	50.00	12.50	30.00	23.03	46.67	24.29	38.57	27.14
PMT	35.00	55.00	10.00	36.67	20.00	43.33	35.71	40.00	24.29
NMT	15.00	62.50	22.50	16.67	23.33	60.00	15.71	45.71	38 57
WMT	62.50	50.00	12.50	23.03	43.33	33.33	17.14	32.85	50.00
WdMT	52.50	22.50	25.00	10.00	23.33	66.67	38.57	22.86	42.86
PPT	32.50	52.50	15.00	13.33	26	60.00	24.29	41.43	34.29
Tot.Pck.	22.50	55.00	22.50	10.00	33.33	56.67	17.14	45.71	37.14

Data presented in Percentage.

Ad. Ad.=Adequate adoption, Pr. Ad.=Partial adoption and Non. Ad=Non-adoption, LMT=Land management technology, PMT=Plant management technology, NMT=Nutrient management technology, WMT=Water management technology, WdMT=Weed management technology, PPT=Plant protection technology, Tot.Pck=Total package.

As we know that in both the micro-farming situations fertility of soil is major problem but results indicate that under the MFS-1 majority (62.5%) of paddy growers had partially adopted the recommended NMT. While, it was seen that under the adequate adoption only 15 per cent of the paddy growers had adequately adopted whereas 22.5 per cent did not adopt the same. While, under the MFS-2 majority (60.00%) of the paddy growers were found in the non-adoption category, only 23.3 per cent adopted partially and 16.67 per cent adequately. Overall higher percentage (45.71%) of paddy growers had partially adopted followed by 38.57 per cent did not adopt and 15.7 per cent adequately adopted NMT.

As there was adequate availability of irrigation for paddy crop under the MFS-1, so majority over 32.00 per cent of the farmers had adequately use the proper WMT followed by 25.0 per cent partially adopted it. While, paddy growers of MFS-2 were faced problem of irrigation facility, even though quite a higher percentage over 43.33 per cent of the farmers had partially adopted and 23.33 per cent had adequately the recommended system or irrigation towards paddy crop.

Regarding WdMT, majority over 52 per cent of the paddy growers under the MFS-1 had adequate adopted but under MFS-2 just reverse result has been seen where majority (66.67%) of paddy growers did not follow the WdMT. Whereas, irrespective of MFSs a higher percentage (42.86%) of farmers did not adopt followed by adequately (38.57%) and partially adopted (22.86%) the recommended WdMT. As it has been pointed out in the MFS-1 that attack of insect pests was higher than the MFS-2. In line with this, majority over 52 per cent of farmers had partially adopted the PPT under MFS-1 whereas, under MFS-2, majority (60.00%) or the farmers did not follow the same practice and 42.50 per cent of farmers under MFS-1 and 13.33 per cent under MFS-2 had adequately adopted. In combination of both the MFSs, a higher percentage about 42 per cent of paddy growers had partially the PPT. Only 24.29 per cent of paddy growers had adequately adopted while 34.29 per cent did not use the same. When total package of practices of paddy crop was looked, majority about 55.0 per cent of farmers had partially adopted followed by adequate (22.50%) and non-adoption (22.50%) under MFS-1. In case of MFS-2 the adoption of total package of practice for paddy crop was lower. It was also observed that about 46 per cent paddy growers followed partial adoption of package of practices and 17.14 per cent had adequately adopted. While 37.14 per cent farmers did not adopt the practices. Thus, it could be inferred that the overall adoption of all the recommended practice of paddy crop was higher under the MFS-1 on account of compatibility of technology with farming situation as compared to MFS-2.

Table 2. Productivity level of paddy crop under different micro farming situations

S.No.	Productivity	Micro-farming situations					
		MFS-1		MFS-2		Total	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
1.	Low (10-15)	08	20.00	15	50.00	23	32.86
2.	Medium (15.20)	17	42.50	10	33.33	27	38.57
3.	High (20.25)	15	37.50	05	16.67	20	28.57
	Tot3al	40	100	30	100	70	100

The empirical data presented in Table 2 indicate the production level of paddy crop with response to the adoption of differential components of technologies under MFS-1 and MFS-2. It was observed in the farming situation analysis that the productivity of paddy obtained by farmers under was higher under the MFS-1 (20-25q/ha) as compared to KFS-2 (10-15q/ha). Quite a higher over 42 per cent of the paddy growers under MFS-1 and 33.33 per cent of paddy grower under MFS-2 have harvested medium level of productivity. Irrespective of MFS's, 38.57 per cent of paddy growers belonged to medium level of productivity. A majority (50.0%) of paddy growers under MFS-2 had low level of productivity. While 37.50 per cent of paddy growers under MFS-1 and 16.67 per cent under MFS-2 were able to get high level of productivity. In overall 28.57 per cent of paddy growers had high level of productivity. Thus, it can be concluded from the obtained results that a majority over 80 per cent of the farmers belonging to MFS-1 had got medium to high level of productivity whereas 67.14 per cent farmers of MFS-2 were comparatively inferior in productivity that the farmers of MFS-1. This inference makes the generalization forming situations are important factors which make difference in productivity.

Table-3 indicates the bio-physical and socio-economic constraints as reported by the paddy growers. It was observed that heavy pest and disease incidence was the important constraints mentioned by the cent-per cent (100%) paddy growers. This finding is in the agreement with the finding of the Veeraswamy et al. (1992). Lack of irrigation facilities and non-availability of HYV seeds were second most important constraint as expressed by the majority (92.86%) of the paddy growers. This finding is in line with the result reported by the Anderson and Hazell (1989). Further it was found that majority (90.0%) of the farmers faces the constraints of inappropriateness of the varieties under varying micro-farming

situations, particularly under the MFS-2 which was reported third important constraints. This finding is also in line with the Thyagrajan and Vasanthakumar (1990). The other Bio-physical constraints reported by the paddy growers were complexity of new practices (85.71%) followed by the adulteration in fertilizers, insecticides and pesticides (821.86%) and occurrence of heavy weed growth (57.14%) mentioned by the paddy growers.

Table 3. Biophysical and socio-economic constraints faced by paddy growers

S. No.	Constraints	Percentage	Rank order
A	**Biophysical constraints**		
1.	Heavy pest and disease incidence	100.0	I
2.	Lack of irrigation facilities	92.86	II
3.	Non-availability of HYV seeds	92.86	II
4.	Complexity of new practices	85.71	IV
5.	Inappropriateness of varieties	90.0	III
6.	Adulteration in fertilizers, insecticides and fungicides	82.86	V
7.	Occurrence of heavy weed growth	57.14	VI
B.	**Socio-economic constraints**		
1.	Lack of awareness towards improved technologies	94.23	I
2.	High cost of inputs	92.86	II
3.	Lack of subsidies for inputs	85.71	III
4.	High cost of labour	82.85	IV
5.	Unpredictable practice of produce	71.43	V
6.	Non-availability of proper plant protection equipment	57.14	VII
7.	Lack of training in plant protection measures	48.57	VIII

The socio-economic constraints as lack of awareness towards new technologies were found to be first important constraints as expressed by the 94.23 per cent of paddy growers. High cost of inputs was second constraints as mentioned by 92.86 per cent of paddy growers. Thyagrajan and Vasantkumar (2000) reported similar findings for the same constraints. Third important constraints identified as lack of subsdies for inputs as reported by 85.71 per cent of paddy growers. The other socio-economic constraints as reported by the paddy growers were high cost of laboures (82.85%), unpredicted price of produce (71.43%), non-availability of proper plant protection equipment (57.14%) and lack of training in the plant protection measures (48.57%) in order of magnitude.

CONCLUSION

From foregoing study it has been concluded that, performance of paddy production technologies under the MFS-1 was better and the overall adoption and productivity of paddy growers were also higher that the grower's of MFS-2. It was found that majority of the paddy growers did not harvest desired level of productivity. Heavy insect pest incidence, lack of irrigation facilities and non-availability of HYV seed were the main bio-physical constraints and lack of awareness towards improved technologies, high cost of inputs and lack of subsidies were the major socio-economic constraints faced by the growers. The constraints reported by the paddy growers will be of immense use for the State Department of agricultural, researchers and policy makes to plan the extension programe for eliminating the above said constraints of paddy growers to achieve the high level of production.

Implications—Thus, study suggest that researchers and field functioned must understand the diversities in the Indian farming situations and accordingly the recommended technologies on the basis of suitability of farming situations. Blanked recommendation should not be served some of the packages have become out dated.

REFERENCES

1. Anderson, R. J. and Hazell, P.B.R. (1989). Variability in Grain Yield. International Food Policy Research Institute, Washington DC, Reasearch Report No. 11 P.11.
2. Thyagrajan, S. and Vasanthakumar, j. (2000). Constraints of High Yields in the Rice at Farm Level. J. Extn. Edn. TAU, (2) : 2747-2753.
3. Veeraswamy, S; Satapathy, C. and Rao, G.A. (1992). Constraints of Rice Production in Coastal Orrisa. Indian J. Extn. Edn. 28,3(3) : 540-543.

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