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Levels of adoption and encountered barriers of Thiruvarur district farmers of Tamil Nadu on implementation of recommended biofertilizer technologies

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ABSTRACT

Extent of adoption refers to measure how far a particular technology was adopted by an individual correctly without any distortion of message. Efficient transfer of innovative technologies and their adoption to field situations is the key to National agricultural development. Hence, a study was under-taken to assess the levels of adoption and encountered barriers of rice growers on recommended biofertilizer technologies in rice cultivation. The study was taken up in the rice predominant district of Thiruvarur in Tamil Nadu with a sample size of three hundred growers selected based on the random sampling method. The findings revealed that majority of the respondents (51.67 per cent) were found to had medium level of adoption about recommended biofertilizer technologies in rice cultivation followed by low and high level. Out of eight major recommended biofertilizer technologies in rice cultivation, majority of the respondents had high level of adoption on soil application of azospirillum, soil application of phosphobacteria, azospirillum seed treatment and phosphobacteria seed treatment. The study revealed that the major barriers faced by the rice growers were, non availability of labour, lack of interest, lack of confidence towards various biofertilizer practices, lack of technical guidance, lack of training programme and non-availability of viable culture at Government depots.

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INTRODUCTION

In Tamil Nadu rice is the major crop it is cultivated in an area of 2.12 million hectares with a production of 9.34 million tones. The national average productivity as only 3.21 tones per hectare and the average rice productivity in Tamil Nadu is 4.36 tones per hectare, which is low when compared to countries like Japan (6.54 tones per hectare), China (6.35 tones per hectare) (FAO, 2007). Inadequate and improper maintenance of soil health is one of the major causes for poor rice yields in most rice growing tracts. In most of the rice growing areas yield either stagnate or decline due to decrease in organic content in soil (Nambiar and Ghosh, 1984).

After the introduction of inorganic fertilizer in the last century, farmers were happy of getting increased yield in agriculture in the beginning. But slowly inorganic fertilizer started displacing their ill-effects such as leaching out, and polluting water basins, destroying micro-organisms and friendly insects, making the crop more susceptible to the attack of diseases, reducing the soil fertility and thus causing irrepairable damage to the overall system. A number of intellectuals through out the world started working on the alternatives and found that biofertilizer can help in increasing the yield without causing the damage associated with inorganic fertilizers. And also, it is estimated that by 2020, to achieve the targeted production of 321 million tones of food grain, the requirement of nutrient will be 28.8 million tones, while their availability will be only 21.6 million tones being a deficiet of about 7.2 million tones (Datta, 2009). Increasing costs of inorganic fertilizers are getting unaffordable by small and marginal farmers.

To overcome the deficiet in nutrient supply and to overcome the adverse effects of inorganic cultivation, it is suggested that efforts should be made to exploit all the available resources of nutrients under the theme of integrated nutrient management. Therefore complementary use of biofertilizer was essential to maintain and sustain a higher level of soil fertility and rice productivity. Keeping this in view, an attempt has been made to know the extent of adoption and barriers faced by the rice growers on recommended biofertilizers technologies in rice cultivation.

METHODOLOGY

The study was conducted in the rice predominant district of Thiruvarur in Tamil Nadu state. Thiruvarur district consist of ten blocks namely Thiruvarur, Nannilam,

Kudavasal, Koradacherry, Thiruthuraipoondi, Mannargudi, Kottur, Muthupettai, Needamangalam and Valangaiman. A total number of 300 rice growers were selected following the random sampling method. A well structured and pre-tested interview schedule was used to collect the data.

RESULTS AND DISCUSSION

The results of the investigation are being presented in subsequent tables.

Levels of adoption on recommended biofertilizer technologies in rice cultivation:

The results on distribution of respondents, based on their overall levels of adoption about the recommended biofertilizer practices in rice cultivation are given in Table 1.

Table 1 : Distribution of respondents according to their levels of adoption on recommended biofertilizer technologies in rice cultivation (n=300)

Sr. No.	Category	Number or respondents	Per cent
1.	Low	35	36.66
2.	Medium	155	51.67
3.	High	110	11.67
	Total	300	100.00

The Table 1 indicates that the majority of the respondents (51.67 per cent) were found to have medium level of adoption about recommended biofertilizer practices in rice cultivation followed by low (36.66 per cent) and high (11.67 per cent) levels of adoption.

The most of the respondents were aware and had knowledge only on azospirillum and phosphobacteria related practices. The medium level of adoption may be due to the fact that the respondents would have got technical advice from the officials of State Department of Agriculture and Extension Agencies. This is in agreement with the findings of Santhi (2006).

Practicewise levels of adoption on recommended biofertilizer technologies in rice cultivation by the rice growers:

The mean percentage score for practice wise adoption of respondents about recommended biofertilizer practices in rice cultivation are presented in Table 2 and Fig. 1.

It is interesting to note from the Table 2 and Fig. 1 that out of eight biofertilizer practices in rice cultivation,

Table 2 : Mean percentage score for practice wise adoption of rice growers about recommended biofertilizer technologies in rice cultivation

Sr. No.	Recommended technologies	Mean percentage score
1.	Seed treatment with azospirillum	63.88
2	Seedling dip with azospirillum	28.88
3	Soil application of azospirillum	72.49
4	Azolla application	5.00
5	Blue Green Algae application	6.66
6.	Seed treatment with phosphobacteria	59.99
7.	Seedling dip with phosphobacteria	14.06
8.	Soil application of phosphobacteria	71.66

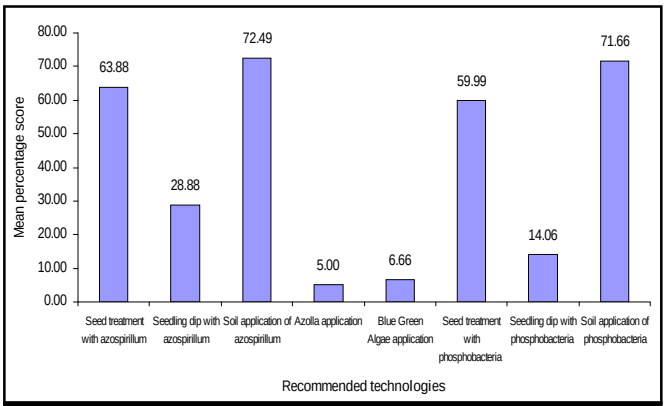

Fig. 1 : Mean percentage score for practice wise adoption of respondents about recommended biofertilizer technologies in rice cultivation

the mean percentage score of respondents was found to be more for four practices *viz.*, soil application of azosprillum (72.49 per cent), soil application of phosphobacteria (71.66 per cent), azosprillum seed treatment (63.88 per cent) and phosphobacteria seed treatment (59.99 per cent).

The azospirillum related technologies namely soil application of azospirillum and seed treatment with azospirillum was adoptrd by 72.49 and 63.38 per cent of the respondents respectively. In Tamil Nadu, Government Department of Agriculture was provided adequate packets of azospirillum to the respondents along with certified seeds through depots. So only the rice growers of Tamil Nadu had to necessarily use the azospirillum packets. Moreover, the respondents would have realised the advantages of applying biofertilizers, by witnessing its impact on the yield level and hence they were have adopted it. This is in line with the findings of Balakrishnan

(2001).Seedling dip with azospirillum were adopted only by 28.88 per cent of the respondents. This may be due to lack of interest because they would not interested to do this technology between the seed treatment and soil application.

Regarding azolla application only a meager proportion of the respondents (5.00 per cent) have adopted. Majority of the respondents reported they were not aware of this technology. Though only very few of them were aware, they felt that the hazards got increased due to azolla application. This may be the probable reason for non adoption of azolla by majority of the respondents (95.00 per cent). This findings is in line with findings of Sathasivam (1997).

Blue Green Algae application was adopted only by 6.66 per cent of the respondents. Lack of technical guidance, lack of awareness, lack of confidence, lack of visual impact may be attributed as reasons for non adoption. Though only 22.77 per cent of the respondents were aware of Blue Green Algae, they were not convinced due to the appearance of the Blue Green Algae and its impact on yield level.

The phosphobacteria related technologies namely soil application of phosphobacteria and seed treatment with phosphobacteria were adopted by 71.66 and 59.99 per cent of the respondents respectively. Only 14.06 per cent of the respondents were found to be adopted seedling dip with phophobacteria. This may be due to the same reasons of adoption of azospirillum related technologies.

Barriers Encountered by the Rice Growers in the adoption of recommended biofertilizer technologies:

The findings on the barriers encountered by the rice growers in the adoption of recommended biofertilizer technologies are presented in Table 3 and Fig. 2.

It could be observed from the Table 3 and Fig. 2 that in total, sample it revealed that majority of the respondents (92.33 per cent) reported "non-availability of labour" as their first and foremost barrier followed by "lack of interest" as their second barrier (80.00 per cent). "Lack of confidence towards various biofertilizer practices" was

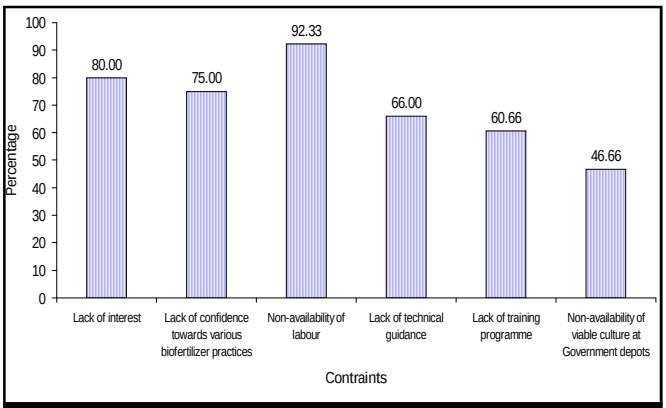

Fig. 2 : Barriers experienced by the respondents adopting the recommended biofertilizer practices in rice cultivation

the third important barrier experienced by 75.00 per cent of the respondents. "Lack of technical guidance", "lack of training programme" and "non-availability of viable culture at Government depots" whereas found to be the fourth, fifth and sixth constraints expressed by 66.00, 60.66 and 46.66 per cent of the respondents respectively.

The first foremost barrier expressed by 92.33 per cent of the respondents was "non-availability of labour". During the peak period of every season all the farmers would start their work at the same time hence, there would have been a heavy demand for labours. Further now-a-days the agricultural labour prefere to work on the NREGA, Ministry of Rural Development scheme. In addition to this, absence of adequate number of family labourers due to the nuclear family systems would have also contributed the labour scarcity. This finding is in accordance with findings of Sathasivam (1997).

The second barrier expressed by 80.00 per cent of the respondents was "lack of interest". During the survey, majority of the respondents reported that they were not to change their usual culture operations followed traditionally. Moreover they felt that rice crop does not require any specific technology for its yield contribution and also they give more importance to plant protection aspects only. And they depend much on inorganic fertilizer

Table 3 : Barriers experienced by the respondents adopting the recommended biofertilizer practices in rice cultivation (n=300)

Sr. No.	Barriers	Number or respondents	Per cent	Rank
1.	Lack of interest	240	80.00	II
2.	Lack of confidence towards various biofertilizer practices	225	75.00	III
3.	Non-availability of labour	277	92.33	I
4.	Lack of technical guidance	198	66.00	IV
5.	Lack of training programme	182	60.66	V
6.	Non-availability of viable culture at Government depots	140	46.66	VI

for higher yield levels and hence they were not much interested in this unfamiliar technology. This may be then the probable reasons for the above said constraint. This finding is in line with findings of Subashini (1996).

"Lack of confidence towards biofertilizer practices" was reported by 75.00 per cent of the respondents. It is having demerit of lack of visual impact and hence it would not serve the principle of seeing is believing. These conditions might have tempted the respondents to express the constraint. Moreover, incomplete information on biofertilizer practices in turn would have lead to lack of confidence. Sathasivam (1996) also reported that lack of confidence in the new biofertilizer technology was one of the most important constraints for adopting the biofertilizer practices in rice cultivation.

The fourth barrier experienced by 66.00 per cent of the respondents was "lack of technical guidance" though the extension officials of State Department of Agriculture take intensive efforts to disseminate the biofertilizer practices, they did not provide the complete technical guidance on biofertilizer like the advantages of applying the specific biofertilizer, place of availability, its complementary nature, etc. further more they did not teach the farmers in time. The above said facts were reported by the respondents during the data collection hence this may be a attributed reason for such reported constraint. Sathasivam (1997) also reported that most of the rice farmers expressed lack of technical guidance about the certain new technology as one of the most important constraints in limiting production of rice in Cuddalore District of Tamil Nadu.

"Lack of training programme" was experienced as the fifth barrier by 60.66 per cent of the respondents. Even though the State Department of Agriculture organized various training programme for the farmers, but the number of trainings conducted on biofertilizer were meager as reported by the respondents. This may be the reason for above constraint. The results are accordance with findings of Thyagarajan (1996).

"Non availability of viable culture at Government depots" was felt as barrier by 46.66 per cent of the respondents. Most of the respondents reported that they could get only the out dated packets of biofertilizer from the agricultural sales points. They further reported that there was no advantage of applying the out dated packets. This might have prompted the respondents to report this constraint.

Conclusion:

It can be concluded that majority of the respondents belonged to medium level of adoption about the recommended biofertilizer practices in rice cultivation followed by low and high. Fairly high level of adoption was found in azosprillum and phosphobacteria soil applications and seed treatment. Very low level of adoption was found in blue green algae application and azolla application. Non-availability of labour, lack of interest, lack of confidence towards various biofertilizer practices, lack of technical guidance, lack of training programme and non-availability of viable culture at Government depots were the major barriers encountered by the respondents in the adoption of recommended biofertilizer practices in rice cultivation. It is suggested that the State Department of Agriculture may give suitable instruction at gross root level extension workers to deliberately intensify and contact all the farmers during the regular and frequent visits and progress achieved may be review periodically, and also State Department of Agriculture should conduct training programme on biofertilizer at village level. It will help in increasing the adoption level and decreasing the barriers.

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