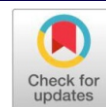


Original Research Article

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An Investigation into the Knowledge Level and The Extent of Adoption of Recommended Bio-fertilizers Practices in Paddy at Gudiyattam Taluk in Vellore District, Tamil Nadu



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ABSTRACT

Assessing the degree to which paddy farmers knew and implemented the suggested bio-fertilizers techniques for paddy cultivation was the goal of the current study. The researcher conducted the study in the selected six villages located in Gudiyattam Taluk of Tamil Nadu's Vellore District. A total sample size of 120 respondents selected, considering time constraints and resource availability. From the selected six villages, 120 respondents selected using a proportionate random sampling technique. A structured interview schedule used to collect data, ensuring that information gathered in a methodical manner. The researcher conducted face-to-face interviews with the respondents for data-collection and the gathered data gone through examination and tallied for the proper statistical assessment to get information. The findings of the study indicated that little less than half of the respondents (45.83%) knew very little about the recommended bio-fertilizers practices for paddy cultivation, followed by medium-level knowledge (39.16%) and high-level knowledge (15.00%). Slightly more than half of the respondents (56.66%) fell into the low adoption category, while 33.34 per cent demonstrated a medium level of adoption, and only 10.00 per cent achieved a high level of adoption of bio-fertilizers practices in paddy cultivation.

Keywords: Extent of adoption, Overall knowledge level, Paddy farmers, Paddy Cultivation, Bio-fertilizers adoption, Recommended Bio-fertilizers, Adoption Behaviour

Introduction

One of the most vital cereals required to ensure food security is paddy. Over half of the world's population has it as primary staple food. The majority of the 200 million paddy farms that grow rice in the world today are smaller than one hectare. It has been cultivated for many millennia in Asia. About half of the world's rice consumption and growth occurs in Asia, which is also a net exporter of rice to other regions. Regarding the development of commercially viable hybrid rice technology, India is trailing behind China. India is the country that grows the most paddy but also produces and consumes the second most of it.

When added to soil, bio-fertilizers substances that contain microorganisms could improve soil fertility and promote plant growth. Through nitrogen fixation, crop development stimulation, and the production of growth-enhancing compounds, they are essential to the advancement of sustainable agriculture and boosting the plants' nutrient absorption capacity. In paddy cultivation, several beneficial bacterial genera, including *Azolla*, *Azospirillum*, *Phosphobacteria*, *Cyanobacteria*, and *Pseudomonas fluorescens*, have been identified and are commonly utilized as bio-fertilizers.

Additionally, a phosphate-solubilizing fungus known as vesicular-arbuscular mycorrhiza also employed for its bio-fertilizers properties. These five bio-fertilizers were selected as the focus of this research study."

An overall knowledge level and the extent of adoption of bio-fertilizers practices in paddy enumerated based on the researcher's field experience and discussions with extension workers and paddy growers. The interviewer questioned the respondents to know about their knowledge level and the extent of adoption of five different bio-fertilizers.

Material and Methods

In this research study, a sample of 120 respondents deemed sufficient. A proportionate random sampling technique used to choose the number of respondents from selected six villages at Gudiyattam taluk in Vellore District of Tamil Nadu. The study employed an ex-post facto research design with carefully planned interview schedule including five bio-fertilizers used in the data-collection process. A schedule of interviews in English made available but the student researcher posed questions to the respondents in Tamil for better comprehension and convenience. The interview schedule had pre-tested in a non-sample area before finalized to find any inconsistencies. Then schedule was modifying to proceed the data-collection in a systematic manner. After data-collection, data cleaned, coded, and tallied in preparation for statistical analysis. February and March of 2021 were the months when the data were gathered. In this study, we define knowledge as the understanding of farmers about the recommended bio-fertilizers practices in paddy cultivation; a teacher-made knowledge test was developed and

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used as followed by [15]. The test included 30 items, covering five recommended bio-fertilizers. Each item of the knowledge test dichotomized as into correct and incorrect responses. Every correct response had assigned two scores, while the incorrect response received one score. The total score obtained by the respondent against items formed the respondent's knowledge score. The possible range of scores in this test was 30 to 60. The maximum score would reveal high-level knowledge, while the minimum score would reveal low-level knowledge. Based on the score obtained, the respondents had classified into low, medium, and high categories using the cumulative frequency method.

Knowledge Test about the Recommended Bio-fertilizers Practices in Paddy Cultivation

1. AZOSPIRILLUM

SEED TREATMENT

- I) How many packets should use for seed treatment?
(Correct/Incorrect)
- ii) After how many hours treated seeds should sow.
(Correct/Incorrect)

SOIL APPLICATION

- I) Mention the units of packets of *Azospirillum* required per hectare.
(Correct/Incorrect)
- ii) The recommended quantity of FYM + Soil or Compost to be mix with bio fertilizer per hectare?
(Correct/Incorrect)
- iii) Mention the time of application.
(Correct/Incorrect)
- iv) What is the advantage of applying *Azospirillum*?
(Correct/Incorrect)

SEEDLING ROOT DIP

- I) How many packets of *Azospirillum* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of water to be mix with bio fertilizer per hectare?
(Correct/Incorrect)

2. PHOSPHOBACTERIA

SEED TREATMENT

- I) How many packets of *Phosphobacteria* used per hectare?
(Correct/Incorrect)
- ii) After how many hours treated seeds should sow.
(Correct/Incorrect)

SOIL TREATMENT

- I) How many packets of *Phosphobacteria* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of FYM + Soil or Compost is to be mix with bio fertilizer per hectare?
(Correct/Incorrect)
- iii) What is the time of application?
(Correct/Incorrect)
- iv) What is the advantage of applying *Phosphobacteria*?
(Correct/Incorrect)

3. CYANOBACTERIA (BGA)

SEEDLING ROOT DIP

- I) How many packets of *Cyanobacteria* used per hectare?
(Correct/Incorrect)

- ii) How much quantity of water to be mix with bio fertilizer?
(Correct/Incorrect)

SOIL APPLICATION

- I) How many packets of *Cyanobacteria* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of FYM + Soil or Compost is to be mix with bio fertilizer per hectare?
(Correct/Incorrect)
- iii) What is the advantage of applying BGA?
(Correct/Incorrect)

4. AZOLLA

SOIL TREATMENT

- I) How many packets of *Azolla* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of FYM + Soil or Compost is to be mix with bio fertilizer per hectare?
(Correct/Incorrect)
- iii) What is the advantage of applying *Azolla* in the field?
(Correct/Incorrect)

SEEDLING ROOT DIP

- I) How many packets of *Azolla* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of water is to be mix with bio fertilizer?
(Correct/Incorrect)

5. PSEUDOMONAS FLUORESCENS

SEED TREATMENT

- I) How many packets of *pseudomonas fluorescens* used per hectare?
(Correct/Incorrect)
- ii) After how many hours treated seeds should sow.
(Correct/Incorrect)

SOIL TREATMENT

- I) How many packets of *pseudomonas fluorescens* used per hectare?
(Correct/Incorrect)
- ii) How much quantity of FYM + Soil or Compost is to be mix with bio-fertilizers per hectare?
(Correct/Incorrect)
- iii) How much quantity of soil is to be mix with bio fertilizer?
(Correct/Incorrect)
- iv) What is the advantage of applying *pseudomonas fluorescens*?
(Correct/Incorrect)

The extent of adoption and their items to measurement

Adoption generally follows knowledge. Adoption is generally a motivation by the knowledge of an innovation. The current analysis conducted to determine whether paddy cultivation exhibits this trend. The term "extent of adoption" describes how well a person has embraced a technology without distorting its meaning. According to Rogers [12], Adoption is the choice to employ an innovation as the most effective available strategy. Five main categories of bio fertilizers and the best ways to use them chosen for this study to examine the environmental motivation. Twenty-eight sub-items identified and discussed below to examine the respondents' level of adoption of the suggested bio fertilizer practices. In their responses, each respondent discussed their adoption or non-adoption against each item.

Five recommended bio fertilizers and their respective -sub-items**1. AZOSPIRILLUM**

I	Seed treatment	Adopted	Not Adopted
(i)	The recommended units of packets used per hectare?		
(ii)	After how many hours treated seeds should sow?		
II	Soil application		
(i)	The recommended units of packets used per hectare?		
(ii)	The recommended quantity of farmyard manure + soil or compost used per hectare?		
(iii)	What is the recommended time for the application?		
III	Seedling root dip		
(i)	The recommended units of packets used per hectare?		
(ii)	Quantity of water to be mix with bio-fertilizers per hectare?		

2. PHOSPHOBACTERIA

I	Seed treatment	Adopted	Not Adopted
(i)	The recommended units of packets used per hectare?		
(ii)	What is the recommended time for the application?		
II	Soil treatment		
(i)	The recommended units of packets used per hectare?		
(ii)	Recommended quantity of farmyard manure + soil or compost mixed with bio-fertilizers used per hectare?		
(iii)	What is the recommended time for the application?		

3. CYANOBACTERIA (BGA)

I	Seedling root dip	Adopted	Not Adopted
(i)	The recommended units of packets used per hectare?		
(ii)	Quantity of water to be mix with bio-fertilizers per hectare?		
II	Soil application		
(i)	The recommended units of packets used per hectare?		
(ii)	The recommended quantity of farmyard manure or compost used per hectare?		
(iii)	Recommended quantity of mixing soil used per hectare?		

4. AZOLLA

I	Seedling root dip	Adopted	Not Adopted
(i)	The recommended units of packets used per hectare?		
(ii)	Quantity of water to mix with bio-fertilizers per hectare?		
II	Soil application		
(i)	The recommended units of packets used per hectare?		
(ii)	The recommended quantity of farmyard manure or compost used per hectare?		
(iii)	The recommended quantity of mixing soil used per hectare?		
(iv)	Recommended as a dual crop or as a green manure?		

5. PSEUDOMONAS FLUORESCENS

I	Seed treatment	Adopted	Not Adopted
(i)	The recommended units of packets used per hectare?		
(ii)	After how many hours treated seeds should sow		
II	Soil treatment		
(i)	The recommended units of packets per hectare?		
(ii)	The recommended quantity of farmyard manure or compost used per hectare?		
(iii)	Recommended quantity of mixing soil used per hectare?		

Adoption received a score of two, whereas non-adoption assigned with a score of one. The respondent's overall scores calculated by adding the scores for each of these items. This study used the adoption index formula as proposed by [15]. The total high score and the lowest score would be 56 and 28 respectively.

$$\text{Adoption index} = \frac{\text{Respondent's totalscore}}{\text{Total possible score}} \times 100$$

Based on their scores, the respondents divided into low, medium, and high categories using the cumulative frequency method.

Findings and Discussion**1. Knowledge Level of Paddy Farmers about the recommended Bio-fertilizers Practices in Paddy Cultivation**

Knowledge is the prerequisite for the adoption of any innovation. Lack of complete knowledge about any practices prevents an individual being aware of its benefits. Perfect knowledge about an idea or practice helps an individual to relate to his needs in terms of profitability and productivity. Hence, as a prior step to assess the extent of adoption of recommended technologies by the farmers, the knowledge level of respondents studied, and the findings have presented below.

Overall, Knowledge Level on recommended Bio-fertilizers Practices in Paddy Cultivation

The results on the distribution of respondents to their knowledge level on recommended bio-fertilizers practices is presented in Table 1 and Fig. 1

Table 1. Overall Knowledge Level on recommended Bio-fertilizers Practices. (n=120)

Sl. No.	Category	No. of respondents	Per cent
1	Low	55	45.83
2	Medium	47	39.16
3	High	18	15.00
Total		120	100.00

From Table 1, it reveals that little less than half of the respondents (45.83%) had a low-level of knowledge followed by medium-level (39.16%) and high-level (15.00%) of knowledge on the recommended bio-fertilizers practices on paddy cultivation.

Several past studies revealed that mass media exposure, social participation, and information source utilization found them to have a positive relationship with knowledge. Hence, the reported low-level knowledge of respondents may be due to poor social participation, low mass media exposure, and less information source utilization. This finding is in line with the findings of [10].

2. The degree to which Paddy Cultivation has embraced suggested Bio-fertilizers Practices. (Extent of Adoption)

Knowledge and awareness are prerequisites for putting any innovation into practice. A person cannot profit from a practice if they do not fully understand it. Adoption is simply using an innovation or technology to its fullest potential as the best available course of action.

Table 2. Overall adoption of recommended bio-fertilizers practices (n=120)

Sl. No.	Category	No. of respondents	Per cent
1	Low	68	56.66
2	Medium	40	33.34
3	High	12	10.00
Total		120	100.00

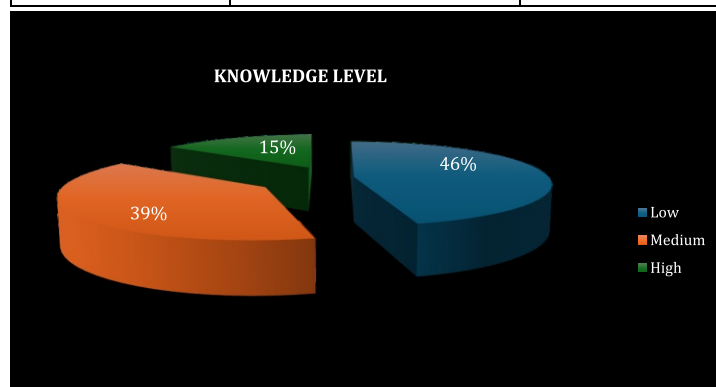


Fig.1. Respondents' Distribution Based on Their Knowledge Level to The Suggested Bio-Fertilizers Practices in Paddy Cultivation

Table 2, revealed that just little over 50.00 per cent of those surveyed had a low-level of adoption (56.66%), followed by a medium-level of adoption (33.34%) and a high-level of adoption (10.00%) of the suggested bio-fertilizers practices in paddy. Although most of them lacked awareness and knowledge regarding bio-fertilizers, they did know a few things about *Azospirillum*, *Cyanobacteria*, and *Azolla* practices. *Azospirillum*, *Cyanobacteria*, and *Azolla* would have served as a substitute for alternative bio-fertilizers and other practices.

Rather than a high level of adoption, this might be the most likely reason for the low to medium level. This result is consistent with the findings of [10].

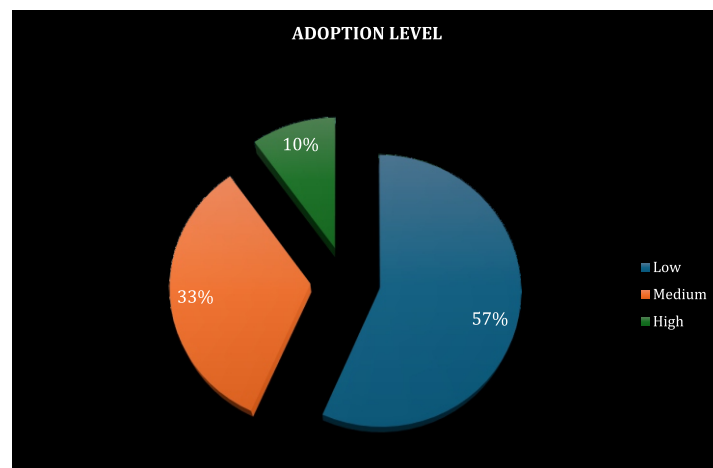


Fig. 2. Respondents' Distribution Based on Their Level of Adoption to the Suggested Bio-Fertilizers Practices in Paddy Cultivation

Conclusion

In summary, the overall knowledge level of the respondents is between low to medium level. This could be the outcome of low awareness, low to moderate engagement in the mass media, lower social participation, and reduced use of information sources. Which in turn leads to adoption categories varies from low to medium levels. To enhance awareness and knowledge, targeted extension strategies such as farm and home visits, personal interactions, comparative demonstrations between experimental fields and controls, in-depth training, field trips, and practical demonstrations on bio-fertilizers application in paddy cultivation can implemented effectively and efficiently. Future investigations should concentrate on assessing the specific capacity development of paddy cultivators concerning bio-fertilizers and their application practices.

Future Scope of the Study

Since many useful information brought about by this pioneer study, similar study need to be replicated in other places of paddy growing areas in Vellore district and the nation to get the complete picture about the profile characteristics of the farmers, with respect to their knowledge and adoption of various recommended bio-fertilizers practices in paddy cultivation. Even Training needs of paddy farmers on bio-fertilizers have to be consider for future research.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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