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Adoption Pattern of Integrated Nutrient Management in Basmati Rice in Haryana

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Abstract: ***The goal of the current study was to find out the extent to which farmers in Basmati paddy make use of integrated natural methods (INM). Four Haryana districts—Karnal, Kaithal, Sonipat, and Jind—were specifically chosen. A random block was chosen from every district. Twenty INM and ten CPM farmers were chosen from each block. As a result, 120 farmers were chosen at random. With the helped of a specifically created interview schedule, the selected farmers were personally interviewed to gather the primary data for the agricultural year 2019–20 using the survey method. As a result, 120 farmers were chosen at random. With the helped of a specifically created interview schedule, the selected farmers were personally interviewed to gather the primary data for the agricultural year 2019–20 using the survey method. The overall results show that farmers use organic components more often than biological ones (approximately 25% of farmers used green leaf manure, such as dhaincha, and about 40% of paddy farmers used FYM, whereas around 2.5% of farmers solely used Azospirilium for seed priming). The Majority (58.75%) of the INM farmers had medium level of adoption about various selected INM practices followed by high extent of adoption (25%) and then low extent of adoption (16.25%). Thus, it is recommended that extension efforts be stepped up to raise farmers' knowledge of the necessity for greater adoption of INM technology for paddy (basmati) production that is sustainable.***

Keywords: Integrated Nutrient Management, Adoption, Sustainable, Conventional Practice Management

1. Introduction

Despite all of the global technological advancements, agriculture continues to be one of the primary means of subsistence for humankind. Not only is the agricultural sector essential to the country's food and nutritional security, but it also has a bearing on the economy of India. Over sixty percent of Indians rely on this industry as their primary source of income. With almost 50% of the nation's workers employed in it, it is the single largest occupational sector. (2018, Indian Economic Survey).

When synthetic fertilizers are used for extended periods of time, the soil becomes unsuitable for cultivation and becomes infertile. Additionally, the synthetic nutrients erode ground water and cause various health issues for both humans and animals.

Unscrupulous and extensive fertilizer use in paddy cultivation has resulted in several types of issues, including environmental and soil contamination, health risks, and unsustainable farming practices. The consumption rates in Haryana and India make it clear that additional options are required to make sustainable farming methods possible. As a result, integrated nutritional management, or INM, has emerged as a viable option.

The goal of Integrated Nutrient Management (INM) is to maximize the benefits from all available sources while maintaining the ideal levels of soil fertility and plant nutrient supply for achieving targeted production. INM is primarily composed of three elements: organic, inorganic, and biofertilizer components.

Over 70% of the world's basmati rice is produced in India, which also happens to be one of the country's top exporters. Since there is a growing demand for basmati rice on the domestic and international markets, it is necessary to produce the crop sustainably, so INM practices will help achieve a sustained yield, which will be beneficial on every aspect. That is why this study was conducted to determine how much INM is used in basmati paddy by farmers.

2. Literature Survey

The method of multistage random sampling was employed in the selection of sample farms. Four paddy-growing districts in the state of Haryana, namely Karnal, Sonepat, Jind, and Kaithal, were chosen at random. From the designated districts of Karnal, Kaithal, Jind, and Sonepat, four blocks—Assandh, Kaithal, Jind, and Kharkhoda—were chosen at random. The third step in the sampling process is choosing the village. The selection of villages from identified blocks were based on availability of desired information for this research work. Twenty farmers using INM practices/technologies and ten farmers using the CPM approach were chosen from each block's specified villages to cultivate basmati rice. Consequently, a sample of 120 farmers was polled in total.

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3. Materials and Methods

A survey schedule was created with a list of 20 INM practices to find out how much extent farmers were adopting the different INM practices. The farmers' responses about each practice were noted. As a result, the highest possible score for adoption that could be attained was 20, and the lowest possible score was 0. The INM farmers were classified into three groups according to the mean and standard deviation.

Each respondent's adoption quotient was computed. Later, all the respondents were grouped into three categories based on mean and standard deviation (S.D.).

Adoption Quotient (A.Q.) = $\frac{\text{Number of practices used}}{\text{Number of applicable practices}}$

4. Results and Discussion

4.1 Extent of adoption of INM practices

Table 1 illustrates the extent to which Haryana farmers employ INM practices. It has been noted that the adoption of organic components was higher among Haryana's INM-using farmers than the adoption of biological components.

About 25% of farmers used green leaf manure, such as dhaincha, and 40% of paddy farmers used FYM when it came to organic components. Of the biological components, blue green algae was utilized by 96.25% of farmers due to its ability to grow naturally in paddy fields and its potential to boost paddy output by up to 20%. Approximately only 2.5% of farmers used Azospirilium (also known as Azotika or by other names) for seed priming due to its limited availability in the market. As compared to CPM farmers, INM users were shown to use less chemical fertilizer. Approximately 25% of farms used organic manures other than seaweed and Parle bio-care.

Table 1: Extent of Adoption of INM practices in Haryana.

S. No.	Particular	Overall
A. Organic components		
1	FYM	40
2	Green leaf manure/cover crop (Dhaincha)	25
3.	Legume crops (e.g., Moong, Urad, etc.)	17.5
4.	Press mud	-
5.	Vermi-compost	7.5
6.	Crop residue	26.25
	Average	19.38
B. Inorganic components		
7.	Nitrogen (Urea)	100
8.	Phosphorus (DAP)	100
9.	Potash (MOP)	7.5
10.	Zinc sulphate (ZnSo4)	98.75
11.	Micro-nutrients like Fe, Mn etc.	-
	Average	61.25
C. Biological components (Bio-fertilizers)		
12.	Azospirilium	2.5
13.	Fungal Biofertilizers (Mycorhiza)	3.75
14.	Waste decomposer	6.25
15.	Azolla	-
16.	Blue Green Algae	96.25
17.	Actinomycetes	-
18.	Phosphate solubulizing bacteria	10
19.	Potash solubulizing bacteria	3.75
20	Anyother Organic manure (Parle Biocare, seaweed, etc)	25
	Average	16.39

Table 2 shows that, in Haryana, the majority of INM farmers (58.75%) had a medium level of adoption for the selected INM practices, followed by 25% who had a high level of adoption and 16.25% who had a low level of adoption.

Table 2: Extent of adoption of INM practices on farms in Haryana (2019-20)

Level of Adoption	Overall
	Frequency
Low	13 (16.25)
Medium	47 (58.75)
High	20 (25)
Total	80 (100)
	(μ: 28.56) (S.D.: 6.37)

Figure in Parenthesis indicate the percentage to frequency

The study found out that farmers have good knowledge about some organic sources of nutrients like FYM, crop residue, green manure, legumes and upto some extent vermi-compost, but they were having poor knowledge regarding biological sources and harmful effects of high use of synthetic fertilizers in soil as well as underground water. The results also demonstrate the significant gaps exist between adoption and knowledge of INM techniques. Therefore, in order to increase and ensure sustainable paddy output, rice growers are required to receive skill-oriented training about INM techniques.

5. Conclusion

It is concluded that all paddy growers should make greater use of INM technology. Due to their risk aversion, farmers have historically used chemical pesticides to reduce crop loss. Thus, it might take a lot of effort and resurces to convince them to transition to INM technology.

Therefore, it is necessary for the extension agents of the state agriculture department and CCSHAU, Hisar, to inform farmers about the advantages of INM technology. The state's performance with sustainable paddy cultivation will be greatly enhanced if these actions are taken.

6. Future Scope

Integrated Nutrient Management is going to be future demand as every person has become health conscious. Farmers can fetch good price of their produce, if they can sell there produce by doing little value addition and can sell the produce with their packing and branding.

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