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A study on constraints faced by finger millet growers in adoption of nutrient management practices in Krishnagiri district of Tamil Nadu

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Abstract

Finger millet is an important minor millet crop grown in India. It has the potential to grow in drought and unfavourable agro-climatic conditions. Nutrient management practices can improve the production and productivity of finger millet in the country. There are several factors preventing farmers from adopting nutrient management practices in finger millet cultivation. Hence, the study was conducted to find out the constraints faced by finger millet growers in the Krishnagiri district of Tamil Nadu. A sample of 120 finger millet growers was randomly selected from the Thally and Kelamangalam blocks of the district. From the study, it was found that the major constraints faced by the finger millet growers were lack of awareness, difficulty in soil sample collection, difficulty in understanding soil test based recommendations, the bulkiness of the organic input, lack of information about the recommended dosage of NPK, lack of awareness about micronutrients, high cost of fertilizers and non-availability of labour during peak season. Based on the findings it was suggested to train the farmers on nutrient management aspects, strengthen the co-operative society, and create awareness about the benefits of soil testing, micronutrients and bio-fertilizers to ensure the greater adoption of nutrient management practices by finger millet growers.

Keywords: finger millet, Nutrient management practices, constraints, soil testing, organic manure, NPK

1. Introduction

India is the largest producer of millets in the world. In India 2018 was declared as the year of millets by the Central Government. The year 2023 will be observed as the International Year of Millets by the Food and Agriculture Organization (FAO), following the proposal of India. Finger millet is an important minor millet crop grown in India. It is commonly known as Ragi. In India, finger millet is cultivated in an area of 1.208 m ha with a production of 2.06 m tonnes with average productivity of 1706 kg/ha (Agricultural Statistics at a Glance, 2017) ^[1]. Finger millet is a staple food in rural sections of the country. It is grown for both grain and forage purposes. Grains are rich in minerals and are the richest source of calcium and other essential nutrition. It is also good for persons suffering from diabetes.

Nutrient management plays a key role in improving the productivity of finger millet. India is the third largest user of fertilizers in the world. Though the per hectare consumption of fertilizers is still inadequate and mining of nutrients from the soils continues to take place at a worrying rate resulting in depletion of soil fertility. The mining of nutrients from the soil on a continuous basis coupled with inadequate and imbalanced use of fertilizers has resulted in increasing deficiencies of essential nutrients including secondary and micronutrients which is limiting crop response to the use of primary nutrients N, P and K.

Finger millet crop is sustainable even under low rainfall situations (Sankar *et al.*, 2011) ^[4] and also it responds even to better rainfall, macro and micronutrient application under irrigated conditions. The nutrient requirement for the finger millet crop is relatively low since it is often found growing in dry lands under subsistence farming conditions, where only a low yield is possible. However, under appropriate soil fertility conditions, an irrigated crop needs relatively higher quantities of mineral nutrients to achieve a potentially higher yield.

The highest grain yield (1412 kg ha⁻¹) in finger millet was realized from the treatment with 100% recommended dose of fertilizers @ 40:20:20 kg NPK ha⁻¹ compared to control with grain yield of only 637 kg ha⁻¹. (Harika *et al.* (2019) ^[2]. Even though nutrient management improves the yield and income of finger millet growers some factors act as constraints to the farmers in the adoption of recommended nutrient management practices. Hence, it is necessary

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to first find out the constraints faced by the farmers in the adoption of nutrient management practices.

Constraints analysis is becoming one of the important components of agricultural technology transfer. Without analyzing the constraints, it is impossible to diffuse the technologies among the farming community. Hence, an attempt was made to know the constraints faced by the farmers in the adoption of nutrient management practices in finger millet cultivation. The study was conducted in the Krishnagiri district among 120 finger millet growers and the results were furnished in this paper.

2. Research Methodology

The study was conducted based on Ex-post facto research design. Krishnagiri district of Tamil Nadu was purposively selected for the study based on the criteria of highest area and production of finger millet in the state. In the Krishnagiri district, Kelamangalam and Thally blocks were selected purposively as the area under finger millet cultivation of these blocks has been highest in the district. A total of 120 finger millet growers were selected as respondents from ten selected villages of the district by using a proportionate random

sampling technique.

A list of possible constraints in the adoption of nutrient management practices was prepared by the literature review and discussion with the extension functionaries, scientists and progressive farmers. The schedule was tested by a pilot survey conducted in a non-sampling area. With the use of the well-structured and pre-tested interview schedule, the data were collected from the respondents by a personal interview method. The constraints were administered through a two-point continuum as 'yes' and 'no' with scores of 2 and 1 respectively. The collected data were tabulated and analyzed by appropriate descriptive statistical analysis tools. Based on the percentage analysis the constraints were ranked and discussed in this paper.

3. Findings and Discussions

Constraints faced by the finger millet growers in the adoption of nutrient management practices were collected under four aspects namely soil testing practices, organic manure application, fertilizer application and socio-economic constraints.

The collected data in this regard were presented in Table 1.

Table 1: Distribution of respondents according to their constraints in adoption of nutrient management practices (n = 120)*

| S. No. | Constraints | Frequency | Per cent | Rank |
|--------|---|-----------|----------|------|
| A. | Soil testing practices | | | |
| 1 | Difficulty in soil sample collection | 78 | 65.00 | II |
| 2 | Difficulty in understanding soil test based recommendations | 62 | 51.67 | III |
| 3 | Non-availability of test report on time | 39 | 32.50 | IV |
| 4 | Lack of awareness | 109 | 90.83 | I |
| B. | Organic manure application | | | |
| 1 | Non availability of organic input | 35 | 29.17 | III |
| 2 | More labour and time consuming | 112 | 93.33 | I |
| 3 | Bulkiness of the organic input | 104 | 86.67 | II |
| C. | Fertilizer application | | | |
| 1 | Lack of information about recommended dosage of NPK | 120 | 100.00 | I |
| 2 | Lack of awareness about micronutrients | 102 | 85.00 | II |
| 3 | Lack of awareness about bio-fertilizers | 98 | 81.67 | III |
| 4 | Non availability of inorganic fertilizers | 4 | 3.33 | V |
| 5 | Non availability of bio-fertilizers | 8 | 6.67 | IV |
| D. | Socio economic constraints | | | |
| 1 | Inadequate credit facilities | 35 | 29.17 | IV |
| 2 | High cost of fertilizers | 44 | 36.67 | III |
| 3 | High cost of labour | 86 | 71.67 | II |
| 4 | Non-availability of labour during peak season | 107 | 89.17 | I |
| 5 | Water scarcity | 27 | 22.50 | V |

* Multiple response

3.1 Constraints with respect to soil testing practices

From Table 1, it could be observed that a vast majority (90.83 per cent) of the finger millet growers reported a lack of awareness about the soil testing practices as their constraint with the rank one. Even though the government has implemented the soil health card scheme in the study area the awareness about these schemes is also very low among the farmers. Since most of the respondents were old aged, less educated and found with less information source utilization and training undergone, the awareness and knowledge of the respondents on soil testing practices were very low.

The next constraint expressed by almost two-thirds (65.00 per cent) of the finger millet growers was difficulty in soil sample collection as the second ranked constraint. This was due to the reason that farmers did not have enough knowledge on how to

collect the soil samples for different purposes. Hence they felt difficulty in collecting the soil samples.

Difficulty in understanding soil test based recommendations was expressed as the third most constraint by a little more than half (51.67 per cent) of the finger millet growers. This might be due to the reason that the soil test based recommendations are not in the form of the exact quantity of fertilizers to be applied on the field. It was in the form of a dose of nutrients to be supplied to the field.

Non availability of soil test reports on time was expressed by almost one-third (32.50 per cent) of the finger millet growers. This might be because most of the respondents did not voluntarily go for soil testing and the agricultural department officials themselves collected the samples from farmers' fields and kept them for their record purposes. Since the

farmers did not voluntarily go for soil testing they were not interested to go to the department and collecting the results.

3.2 Constraints with respect to organic manure application

In the case of organic manure application, a complete majority (93.33 per cent) of the finger millet growers expressed that more labour and time consumption as the major constraint with a rank of one. The bulkiness of the organic input was reported by a majority (86.67 per cent) of the finger millet growers which obtained the second rank. Commonly the organic manure is applied in tonnes to the field. Hence, the labour consumption and bulkiness of the organic manure were found as the major constraints.

Nearly one-third (29.17 per cent) of finger millet growers reported that non availability of organic manure was a constraint. Nowadays the cattle population was gradually reducing. Hence, there was a lack in the availability of organic manures.

3.3 Constraints with respect to fertilizer application

Lack of knowledge about recommended dose of NPK fertilizers was found as the constraint among cent per cent of the finger millet growers with rank one. The next two constraints discovered with the ranks of two and three were lack of awareness about micronutrients (85.00 per cent) and lack of awareness about bio-fertilizers (81.67 per cent). This might be because the education and information source utilization from the formal sources being very low among the respondents. Hence, the knowledge on the recommendation of inorganic fertilizers and bio-fertilizers were found to be the major constraints in the study area.

Only a few respondents have expressed the constraints such as non-availability of bio-fertilizers and non-availability of inorganic fertilizers. There are a plethora of input shops available around the study area and most of the respondents do not apply these fertilizers for finger millet cultivation. Hence, these constraints were not perceived as the major constraint among the finger millet growers in the study area.

3.4 Socio-economic constraints

Among the socio-economic factors, the majority of the finger millet growers (89.17 per cent) expressed that non-availability of labour during peak season as the main constraint with the rank of one. The second ranked constraint was the high cost of labour found among nearly three-fourth (71.67 per cent) of the finger millet growers. Now a days the agricultural labours were moving to other sectors. Also, some government initiatives implemented in the study area for employment guarantee have an impact on the availability of labour for agriculture works. Hence, these factors also lead to an increase in labour costs.

The next two constraints reported with the ranks of III and IV were the high cost of fertilizers by a little more than one-third (36.67 per cent) of the finger millet growers and inadequate credit facilities by nearly one-third (29.17 per cent) of the finger millet growers. Even though the fertilizers were supplied at a subsidized rate by the government, the farmers were felt that the cost of inorganic fertilizers was high. Some of the respondents were low in economic status, they were not aware of the benefits of fertilizer application in finger millet cultivation. Hence, some farmers felt that the cost of fertilizers was high and credit facilities were less for the purchase of fertilizers.

Water scarcity was reported as a constraint by nearly one-fourth (22.50 per cent) of the finger millet growers. Though the finger millet crop did not need much water like paddy and some other crops, water was scarce for irrigation in the critical stages of crop production. Whereas none of the respondents expressed that the constraints like inadequate transport facilities and delay in supply of inputs. It was already mentioned that there were sufficient input shops available around the study area and the villages were well connected by transport facilities there was no issue with transport and supply of fertilizers.

4. Conclusion

From the study, we can conclude that the major constraints faced by the finger millet growers were lack of awareness about soil testing, difficulty in soil sample collection and understanding the soil test based fertilizer recommendations, the bulkiness of the organic inputs, lack of awareness and knowledge on NPK fertilizers, micronutrient fertilizers and bio fertilizers, unavailability of labours in the peak season and the high cost of labour. To overcome these constraints the state department of agriculture has to create awareness among the farmers about the benefits and necessity of soil testing and the results and recommendations must be in the form of easily understandable by the farmers, preferably it should be in local language and it has to be given on time. The number of soil testing laboratories and mobile soil testing units has to be increased in the block level. A mobile app can be developed by the government to assist the farmers in soil testing, documentation and delivery of the test results to the farmers in time.

To overcome the constraints regarding organic manure application the agriculture department has popularized alternate forms of organic sources such as vermicompost and some other sources of composts since the compost was easy to handle compared to farm yard manure. In the case of inorganic fertilizers, the farmers have to be educated on the recommended dose fertilizer application for different crops and made aware of the beneficial effects of the bio-fertilizers and micronutrient fertilizers. These can be achieved by the training programmes on nutrient management practices for finger millet cultivation.

To improve the knowledge of the farmers on nutrient management and other crop production practices a pocket dairy can be made by the government in the local language and distributed to the farmers. Labour availability is the major problem; the government has to ensure the availability of labour for agriculture through some policies like utilizing the labour source from the employment guarantee scheme. By implementing the above mentioned suggestions the constraints described in this study can be overcome. Hence, the adoption level of nutrient management practices among ragi growers can be improved.

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