

To study the Impact of adoption of soil testing techniques for providing balance dose of fertilizers Kharif and Rabi Crops grown in Gwalior district (M.P.)

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Abstract

A study was carried out in the Gwalior district of Madhya Pradesh to find out the knowledge and attitude of farmers toward soil testing practice. As the soil testing is an important measure of the soil's ability to supply nutrient elements needed for better plant growth. A proper soil testing will help to ensure the application of enough fertilizer to meet the requirements of the crop and taking advantage of the nutrients already present in the soil. Soil testing is a comprehensive soil fertility evaluation programme, which helps the farmer's injudicious application of chemical fertilizers. The farmers will be able to know how much nutrients are already available in the soil and how much will have to be provided additionally for a particular crop. In present study, the majority of farmers had knowledge about soil testing practices. A Majority of 20.83% respondents gained the knowledge from trainings/ Kisan Gosthis/ Kisan Mela conducted by Krishi Vigyan Kendra in the operational area and the 15.83% respondents gain knowledge by personnel of State Department of Agriculture. Therefore, efforts should be made by KVK and Department of Agriculture for encouraging and to increasing the respondent or the farmers to adopt soil testing practices by organizing training programmes and campaigns especially on soil testing process.

Key words: Nutrient, knowledge, Kisan Gosthis, Kisan Mela, Krishi Vigyan Kendra, soil testing

Introduction

An efficient use of fertilizers is a major factor in any programme designed to bring about an economic increase in agricultural production. The farmers involved in such a programme will have to use balance quantities of fertilizers to achieve the desired yield levels. However, the amounts and kinds of fertilizers required for the same crop vary from soil to soil, even field to field on the same soil. The use of fertilizers without first testing the soil is like taking medicine without first consulting a physician to find out what is needed. It is no doubts that the fertilizers increase yield and the farmers are aware of this. However, are they

applying right quantities of the right kind of fertilizers at the right time at the right place to ensure optimum profit? Without a proper fertilizer recommendation based upon a soil test, a farmer may be applying too much of a little needed plant food element and too little of another element, which is actually the principal factor limiting plant growth. This not only means an uneconomical use of fertilizers, but in some cases crop yields actually may be reduced because of use of the wrong kinds or amounts, or improper use of fertilizers. Soil testing is a chemical process by virtue of which requirement of nutrients for plant can be analyzed to sustain the soil fertility. The farmers find it extremely difficult to know the proper dose and type of fertilizer, which is suitable for his soil. While, using a fertilizer one must take into account the requirement of his crops and the characteristics of the soil (Biswas, 2002).

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Soil analysis is a valuable tool for farm as it determines the in-puts required for efficient and economic production. A proper soil test will help to ensure the application of enough fertilizer to meet the requirements of the crop while taking advantage of the nutrients already present in the soil. It will also allow to deter-mining lime requirements and can be used to diagnose problem of that area. It is very important that soil sampling technique is correct as the results are only as good as the sample take. Soil testing is also a requirement for farms that must complete a nu-trient management plan. The best time of soil sampling is after the crop is removed. Since results can vary depending on the time of year, it is best to sample at the same time each year. Soil tests should be completed every 2-3 years for most crops. Accu-rate fertilizer recommendations are important, because prob-lems can result from either inadequate or excessive fertilization. Too little fertilizer leads to poor plant growth, but too much fertilizer can also reduce plant growth and quality. In addition, excessive applications of fertilizer can be harmful to the envi-ronment. Fertilizer recommendations are based on the kinds of plants that are grown, the type of soil they are growing in, and the results of soil tests (Singh *et al.* 2013). Soil testing provides information on the availability of nutrients in the soil and is required for accurate fertilizer and lime recommendations. Therefore, soil testing will definitely be advantageous to the farmers in achieving maxi-mum production and in earning max profit. So it is essential to create maximum awareness among farmers about judicious use of chemical fertilizers. Keeping in view the impact of adoption of soil testing techniques for providing balance dose of fertilizers Kharif and Rabi towards optimum production of crop and maximum net profit of farmers.

Methodology

The soil-testing laboratory of KVK, Gwalior and FW & AD covers farmers of Gwalior district. These laboratories not only analyzing macronutrient (N, P, K) and pH but also analyzes the micronutrient {Fe, Cu, Mo, Zn, etc} and provides recommendation to the balance use of fertilizer to cultivators. Rural Agriculture Extension Officer (R.A.E.O.) helps in the collection of soil sample at field level and provides this sample to soil testing laboratory. He also provided soil-testing report of the recipient farmers. The R.A.E.O.

has thought cultivators about the importance of soil testing and help them for assessed the soil fertility for financial loss can be avoided and to maintain the soil health. Krishi Vigyan Kendra primarily acts as lab to land technology delivery mechanism and work through importing training to farmer’s community on soil testing

The study was conducted in all four blocks of Gwalior district of Madhya Pradesh during 2019-20. The sample for the study was composed of total 120 respondents randomly (30 respondents from each block) belongs to four blocks of Gwalior district, who have availed soil-testing technique formed the sample. The data was collected by personal interview method with the pre-tested schedule designed for the purpose. The collected data was computed and analyzed by frequency, percentage analysis etc.

Results and Discussion

The data presented in Table 1 revealed that majority of the farmers 72.5 per cent had knowledge about soil testing prac-tices while only 27.5 per cent respondents’ farmers had lack of knowledge of soil testing practices. Thus, the knowledge about soil testing practices had been found satisfactory in the district. Similar finding reported by Singh *et al.* (2012).

Table 1: Knowledge of farmers about appropriate soil test-ing practices

| S. No. | Response of respondents | No. of Respondents | Percentage |
|--------|-------------------------|--------------------|------------|
| 1 | Positive | 87 | 72.5 |
| 2 | Negative | 33 | 27.5 |

Further, data presented in Table 2 indicated that majority of respondents (22.5 per cent) were gained the knowledge from train-ings/ kisan gothis/ kisan mela conducted by Krishi Vigyan Kendra followed by extension personnel of Department of FW & AD / IFFCO/ NFL mobile soil testing laboratory (16.67 per cent). While, 14.17 per cent respondents gain knowledge by the Kisan Mobile Advisory service operated by Krishi Vigyan Kendra and 13.33 per cent respondents collected information and knowl-edge from Extension Literature like Krishi Gyan Darpan published quarterly by Krishi Vigyan Kendra. Among the re-spondents, 10.83 per cent respondents gained knowledge through television. 10.83 per cent respondents collected knowledge from radio and 6.67

Table 2: Distribution of respondents according to utilization of source of knowledge

| S. No. | Source of knowledge | Frequency | Percentage |
|--------|---|-----------|------------|
| 1. | Extension Personnel of Department of FW & AD/IFFCO/NFL mobile soil testing laboratory. | 20 | 16.67 |
| 2. | Fellow Farmers | 8 | 6.67 |
| 3. | Radio | 8 | 6.67 |
| 4. | T.V. | 13 | 10.83 |
| 5. | Training/Kisan Gosthis/ Kisan Mela/ campaigns conducted by KVK with Department of FW & AD | 27 | 22.5 |
| 6. | Extension Literature/Krishi Gyan Darpan KVK | 16 | 13.33 |
| 7. | Kisan Mobile Advisory KVK | 17 | 14.17 |
| 8. | No Knowledge about soil testing | 11 | 9.16 |
| | Total | 120 | 100 |

Table 3: Distribution of respondents according to their attitude towards soil testing practices

| S. No. | Statements of respondents | Response of respondents (out of 120) | | | | | |
|--------|---|--------------------------------------|-------|-----------|-------|-----------|-------|
| | | Agree | % | Undecided | % | Disagreed | % |
| 1. | Result is given timely | 38 | 31.67 | 11 | 9.17 | 71 | 59.16 |
| 2. | Result of soil testing is reliable | 95 | 79.17 | 18 | 15.00 | 7 | 5.83 |
| 3. | Behavior of soil testing staff is good | 87 | 72.5 | 19 | 15.83 | 14 | 11.67 |
| 4. | Understand the soil health card technical information. | 81 | 67.5 | 19 | 15.83 | 20 | 16.67 |
| 5. | Soil testing is necessary for better crop production | 99 | 82.5 | 16 | 13.33 | 5 | 4.17 |
| 6. | Soil testing is wastage of time and money | 14 | 11.67 | 15 | 12.5 | 91 | 75.83 |
| 7. | Expenditure of crop production decreases after soil testing | 82 | 68.33 | 27 | 22.50 | 11 | 9.17 |

per cent respondents collected knowledge from Fellow Farmers. It is also surprising that 9.16 per cent farmers had no knowledge of soil testing practice but they are using soil testing practice.

The results in Table 3 indicated that the majority of respondents were in agree with the towards soil testing practices but it could also be pointed that they had showed positive attitude because most of adaptors (75.83 per cent) did not agree with the statement that "soil testing is wastage" of time and money. When the respondents were asked that "Result of soil testing is reliable" total 79.17 per cent adopters agreed with the statement where-as only 5.83 per cent adopters disagreed with it. 59.16 per cent adopters said that, "soil testing result given very late. It was also observed that majority of farmers agreed (82.5%) with the statement "Soil testing is necessary for better crop production". It means the farmer's attitude was generally conservative. Soil analysis can guide farmers

and gardeners in making soil amend-ment and soil management decisions. Making soil sampling an annual event will allow for tracking management practices and influencing future soil amendment decisions Rao, *et al.* 1998).

Table 4 show the trends of soil sample collected and tested for macro and micro nutrients in the Fore blocks of the Gwalior district from 2016-17 to 2018-19. Soil testing laboratory is established at headquarter of district Gwalior. Where, Morar and Debra, blocks having distance radius about 5 to 60 KM but Bhitwar and Ghatiganw blocks having distance around 45 to 95 Kms from district headquarter. Because of this long distance of Bhitwar and Ghatiganw blocks from soil testing laboratory, farmers are sending less number of soil samples as compared to another two blocks in district. Farmers are aware regarding importance of soil testing for micro nutrient for getting better crop production through provide balance fertilizers dose as

Table 4: Block wise information of tested soil samples (Macro and Micro Nutrient) of at soil testing lab district Mandasaur

| Block | Soil Samples | 2016-17 | 2017-18 | 2018-19 |
|-----------|--------------|---------|---------|---------|
| Morar | Collected | 10872 | 7214 | 7105 |
| | Tested | 10766 | 7195 | 7086 |
| | % of tested | 99.02 | 99.74 | 99.73 |
| Debra | Collected | 9227 | 5987 | 5318 |
| | Tested | 9215 | 5912 | 5297 |
| | % of tested | 99.86 | 98.75 | 99.61 |
| Bhitarwar | Collected | 7516 | 4630 | 4782 |
| | Tested | 7502 | 4595 | 4702 |
| | % of tested | 99.18 | 99.24 | 98.33 |
| Ghatgawn | Collected | 7117 | 3097 | 3029 |
| | Tested | 7105 | 3045 | 3029 |
| | % of tested | 99.83 | 98.32 | 100.00 |
| Total | Collected | 34732 | 20928 | 20234 |
| | Tested | 34588 | 20747 | 20114 |
| | % of tested | 99.58 | 99.14 | 99.41 |

per requirement of field crop. The increment in the awareness and change in at-titude and knowledge of the farmers in the district for provide balance dose fertilizers in Kharif and Rabi crops for higher crop production increased the number of testing of soil samples. This finding was conformity with the findings of Shrivastava, et al. (2012).

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