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## Kisaan E- Patrika

Available online at [www.marumegh.com](http://www.marumegh.com)



ISSN : 2456-2904  
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Received: 21-12-2022

Accepted: 30-12-2022

### IMPORTANCE OF SOIL TESTING IN AGRICULTURE

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#### Abstract

In modern agriculture, soil testing is the most important practice to manage fertilizer application and crop production. Without soil testing, it is very difficult to ensure the right application of fertilizers for the crop and get the optimum yield. Soil testing involves collecting soil samples, preparation for analysis, chemical or physical analysis, interpretation of analysis results, and finally making fertilizer and lime recommendations for the crops.

#### What is Soil Testing

The process by which elements such as phosphorus, potassium, calcium, magnesium, sodium, sulphur, manganese, copper and zinc are chemically removed from the soil and measured for their available content within the sample of soil is called Soil Testing. This is an important diagnostic tool for determining the nutrient for plants.



#### Objectives of Soil Testing

- To evaluate the fertility and nutrient status of soil for providing an index of nutrient availability or supply in a given soil.
- Determination of acidity, salinity and alkalinity problems.
- To provide a recommendation on the amount of manure and fertilizer based on soil test value and according to crop.
- To avoid excess use of fertilizer and to ensure environmental safety.

- When crops are harvested, a considerable amount of nutrients are removed from the soil and causes loss of fertility in soil over a long period of time. So, the soil should be tested.
- Evaluation of the suitability of the soil for the crop.
- Restoration of soil fertility is a key factor for crop productivity, profitability and sustainability.
- Fertilization programme must consider crop needs, soil supply, fertilizer use efficiency, the contribution from manures etc.
- Time to time evaluation of the inherent soil fertility status is essential for arriving at the crop and site-specific balanced fertilization program to sustain productivity.
- To Predict the probability of obtaining a profitable response to and fertilizers.

### Sample Timing

The best time of year to soil sample is in the fall directly 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. For crops grown on very sandy soils particularly if the crops remove large quantities of potassium such as corn silage and alfalfa, you should soil test every 1-2 years.

### How to Get Your Soil Sample Tested

You can get your farm's soil tested at independent laboratories, Agricultural universities, Krishi Vigyan Kendras (KVKs), your local cooperative extension offices, or any garden centers.

- Use a Farm Map, Measuring Cup, Soil Boxes shovel, trowel, soil probe, sampling tube, soil auger or any ideal tool. A sample is taken to a depth of normal tillage i.e., to rooting of plants, for field crops 0-30 cm, for permanent crops (orchards and vineyards) 0-30 cm, and 30-60 cm.
- Remove all the grass, stones, thatch or debris.
- Take 6 or 7 samples, thoroughly mix them in a plastic bucket then ensure approximately 1 pint of soil is collected.
- Spread over a dry paper such as a newspaper and let it dry for 24 hours. Most of the labs prefer dry soil. However, some moisture may remain.
- Label the sample and send it to the test center, or the lab.

### Benefits of Soil Testing

- Soil Analysis leads to more informed fertiliser decisions, reducing risks in the soil such as soil erosion, soil infertility and degraded lands and increasing farm profitability in the long-term.
- Reveals the amount of plant-available macro-nutrients in the soil and where soil nutrients are in the soil profile
- Identifies nutrients that could be yield-limiting
- Monitors soil health properties such as pH, EC and OC, which affect nutrient availability to crops and thereby yields and profitability
- Provides a basis for variable rate application (VRT) depending upon soil and crop.

- Supports decisions about fertilizer rate, timing, placement and product.
- Improved knowledge of the soil types within the farm to maximize management options.
- Maximizes in-season Responsiveness.
- Consequently, it also provides a farm management tool with a potential benefit to the farmer of increased yields, reduced operating costs and superior environmental risk management and it also includes improved crop maturity and quality, higher tolerance to disease and pest damage, and increased growth.

### **Soil Testing Benefits for Farmers**

Soil testing provides plenty of benefits for farmers. Healthy soil improves crop growth. Farmers can begin testing their soil before harvest season to get a jump on how they can improve their soil. These benefits can help farmers by:

- Improving yields and profitability because you are providing necessary nutrients to your crops.
- Increasing consistency of nutrient availability across a field.
- More uniform crop growth. This also helps individual plants stronger against weeds and simplifies other processes like cultivation and spraying.
- More uniform plant maturity. This can help simplify crop harvesting and drying along with improving market quality.
- Allowing fine-tuning of which nutrients are most needed. Helping you allocate your fertilizer dollars to those nutrients that will give you the greatest profit increase.

### **Environmental Benefits of Soil Testing**

Soil sampling can also help the environment. Regular usage can wear out the land on which you grow your crops. The biggest impact soil testing has on environmental benefits mean:

- More efficient use of plant nutrients means fewer losses from leaching or runoff into waterways.
- Poorly nourished crops leave less plant residue to hold soil in place. Plant residue helps build soil and saves it from wind and water erosion.
- Providing the right levels of nutrients helps increase yields and may help reduce the need for intensively farming marginal land.

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